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MOTIVATING POLITICIANS: THE IMPACTS OF MONETARY INCENTIVES ON QUALITY AND PERFORMANCE

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ABSTRACT

Recent studies have emphasized the importance of the quality of politicians for good government and consequently economic performance. But if the quality of leadership matters, then understanding what motivates individuals to become politicians and perform competently in office becomes a central question. In this paper, we examine whether higher wages attract better quality politicians and improve political performance using exogenous variation in the salaries of local legislators across Brazil's municipal governments. The analysis exploits discontinuities in wages across municipalities induced by a constitutional amendment defining caps on the salary of local legislatures according to municipal population. Our main findings show that higher wages increases political competition and improves the quality of legislators, as measured by education, type of previous profession, and political experience in office. In addition to this positive selection, we find that wages also affect politicians' performance, which is consistent with a behavioral response to a higher value of holding office.

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1 Introduction

Governments that secure property rights, regulate entry less, and curb corruption are thought to create the right incentives for economies to prosper.[1] But while the virtues of good government for economic development and growth are widely acknowledged, what determines the quality of government is much less clear. One predominant view in the literature argues that political institutions that restrict rent-seeking and promote electoral accountability shape the necessary incentives for good policy-making. However, political institutions can only partially explain the variation in the quality of government both across countries and over time.[2] A complementary view is that the quality of policy-making depends on the honesty and competence of the political class (Besley (2006)). Recent empirical evidence suggests that leaders play an important role in enacting the right policies and affecting economic performance (Besley, Persson, and Sturm 2007; Jones and Olken 2005). But if the characteristics of policy-makers matter, then it is important to understand what attracts high quality politicians into office and what provides them with the incentives to perform according to voters preferences.

Politicians have a variety of motivations for holding public office. Some derive personal satisfaction from being in power or experience an intrinsic benefit based on a sense of civic duty; others desire to implement their preferred policies because of ideology or to satisfy special interest groups.[3] For many, however, monetary rewards are the principal motivation. A growing theoretical literature has shown that increases in monetary incentives affect both the types of politicians that run for office as well as their performance. Yet, in contrast to the standard efficiency wage model, which justifies higher levels of compensation as a way to align incentives and encourage positive

[1] See De Long and Schleifer (2003); Knack and Keefer (1995); North (1981).

[2] In their account of the success story of Botswana, Acemoglu, Johnson, and Robinson (2003) conjecture that good institutions played an important role in Botswana's performance. Nevertheless, they also attribute a key role to "a number of important and farsighted decisions by the post-independence political leaders, in particular Seretse Khama and Quett Masire".

[3] Alesina (1988), Calvert (1985), and Witman (1977) provide examples of models where politicians are motivated by the desire to influence policy. The question of whether intrinsic motivations affect political behavior has received a lot of recent attention. For instance Besley and Ghatak (2005) develop a model where incentives depend on the extent to which agents agree with the cause. Callander (2007) use a game-theoretical model of electoral competition to distinguish between office-motivated politicians versus policy-motivated politicians. Dal Bó, Dal Bó, and Di Tella (2006) provide a model where legal institutions and violence affect incentives of individuals to enter public office. Besley (2006) and Persson and Tabellini (2000) provide excellent discussions of these various models of political motivations.

selection into firms, the benefits of increasing monetary rewards are not as clear in a political setting where monitoring and accountability may be weak. For instance, using a citizen-candidate model, Caselli and Morelli (2004) show that the competence of the elected body is increasing in the political rewards from office. An opposite prediction emerges from the model of Matozzi and Merlo (2008) where an increase in the salary a politician receives while in office decreases the average quality of individuals who become politicians. Thus, the question is ultimately an empirical one.

In this paper, we use exogenous variation in the salaries of local politicians across Brazil's municipal governments to study the effects of wages on political selection and performance. In particular, we examine whether salaries affect who enters politics, the characteristics of elected politicians, and their legislative performance. We overcome two existing obstacles to identify these effects. First, previous studies have had to limit their analysis to elected politicians, which is a selected group with unobserved skills (e.g. ability, valence) that may not only affect their probability of winning but also their performance while in office.[4] We gather data on all candidates that ran for legislative office, and thus we are able to estimate the effects of wages on the number of candidates and their characteristics. Second, and more importantly, wages are not set randomly, but often by the politicians themselves, which introduces several identification concerns. Politicians that perform better may be able to demand higher wages (Di Tella and Fisman 2004). We address this identification issue by exploiting a quasi-experimental source of variation in local legislators' salaries. A 2000 constitutional amendment introduced a cap on the maximum salary that could be paid to local legislators. This cap, which varies according to the municipality's population, induces discontinuities in wages across municipalities. We use these discontinuities to estimate the causal effects of salaries on political selection and performance using a two-stage least squares estimator motivated by the fuzzy regression-discontinuity design (Campbell 1969; Van Der Klaauw 2002).

Our findings indicate that increases in the salary of legislators not only attract more individuals to run for political office, but also attracts more educated ones. A one standard deviation increase in wages increases political competition by 0.7 candidates per seat and the share of candidates with a high school degree by 7.4 percent. We also find that higher salaries attract more candidates from

[4]Existing studies do not have information on political candidates, only on those elected for office. See for example Besley (2004) and Diermeier, Keane, and Merlo (2005).

white-collar professions (i.e. more businessmen and lawyers compared to farmers and policemen). Moreover, these effects are not limited to the pool of candidates. In municipalities that offer higher salaries, politicians have higher reelection rates, particularly those that are more educated. Thus, legislative bodies that pay higher wages have more educated and experienced legislators.

In addition to these effects on political selection, we also find that salaries affect politicians' performance. Legislators can influence local policy-making by submitting bills (formal requests for project that are then passed into laws) and petitions (requests for targeted public works). We find that higher wages increase both the number of bills submitted by the legislators and those approved. But, our findings show mixed evidence with respect to public goods provision. While higher salaries increase the number of health clinics and schools, and improve school infrastructure, we find no effects on households' access to water and sanitation.

While these effects on legislative performance are consistent with a political agency model where changes in the value of holding office affect political behavior, it is difficult to separate it from a selection effect. We do however provide suggestive evidence that the increase in legislative productivity is not entirely driven by the positive selection of politicians. Instead, our results suggest that legislators do put forth effort in policy-making due to an increase in the future value of holding office.

In this paper, we present the first empirical evidence that exploits exogenous variation in politicians' wage to identify its effects on political selection and performance. Existing studies have simulated the effects of politician wages using structural models. Diermeier, Keane, and Merlo (2005) estimate a dynamic model of career decisions of U.S. congressmen to quantify the returns to a career in congress. They show that a 20 percent increase in the wages of House members increases the likelihood of running for re-election from 91.2 percent to 94.2 percent. Using the same framework, Keane and Merlo (2007) examines the effects of a 20 percent reduction in salaries. This policy simulation leads to not only a 14 percent reduction in the average duration of congressional careers, but also induces skilled politicians to exit disproportionately more. These findings are consistent with our results that higher wages decrease turnover and increase the education level of the legislature. Our paper complements these empirical studies in several ways. It examines the effects

of wages, not only political selection, but also on candidate entry. With data only on members of Congress, these previous studies cannot evaluate the effects of wages on the composition of the pool of candidates. Moreover, our study also focuses on legislative productivity and the provision of public goods.

Our results lend further empirical support for the citizen-candidate models of Besley and Coate (1997) and Osborne and Slivinski (1996), which highlight the importance of politicians' identity for policy choices.[5] Our results are thus consistent with Besley, Pande, and Rao (2005), who use data from Indian villages and show that education increases the chances of selection to public office and reduces politicians' opportunism. Our paper is also related to a large body of work in political agency models that focus on the role of electoral accountability in disciplining incumbent politicians.[6] Our findings suggest that increases in wages are likely to make incumbent politicians more accountable because it makes the value of holding office in the future higher. Politicians respond by increasing their legislative effort in order to boost their chances of re-election.

The rest of the paper is organized as follows. Section 2 provides a theoretical framework that will help the interpretation of our empirical findings. Section 3 provides the institutional background and describes the data used for the analysis. Section 4 presents the empirical strategy, followed by the results shown in section 5 and the conclusions in section 6.

2 Theoretical Framework

In this section, we summarize the existing theoretical literature that builds on the citizen-candidate model to analyze the effects of monetary incentives on the average quality of politicians. Moreover, because the citizen-candidate model focuses only on political entry, we summarize the use of political agency model to analyze how wages might affect the behavior of incumbent politicians. To complement this discussion, we present, in Appendix A, a simple model that generates predictions on how changes in politicians' salaries affect both selection and behavior.

[5] See Chattopadhyay and Dufflo (2004), Lee, Moretti, and Butler (2004), and Munshi and Rosenzweig (2008) for empirical evidence in support of these models.

[6] See Barro (1970) and Ferejohn (1986) for original work focusing exclusively on hidden actions. More recently, Besley (2006) and Smart and Sturm (2006) build models with both unobserved types and actions. Empirical evidence is provided by Besley and Case (1995) and Ferraz and Finan (2007).

2.1 Wages, Political Behavior and Selection

The basic theoretical framework used to study the decision to enter politics is the citizen-candidate model [Besley and Coate (1997); Osborne and Slivinski (1996)]. In this class of models, citizens' decide whether or not to run for public office in an environment where running for office is costly and candidates cannot fully commit to policy implementation. Without full commitment, candidate heterogeneity in preferences ultimately determines the policy that is then implemented. Caselli and Morelli (2004) adopt this framework to investigate how wages affect the quality of candidates that run for office. They present a model with high and low ability individuals, where high ability individuals have better policymaking skills and are also more productive in the private sector. Voters, however, do not observe the quality of the candidates, but do receive a signal from each candidate. In equilibrium, voters will only select high-signal candidates. Thus, as the monetary returns from office decrease, high quality individuals are less likely to run and the proportion of low quality-high signal candidates increases.[7] In a related paper, Messner and Polborn (2004) also using a citizen-candidate framework provide a different comparative static result. The expected quality of candidates may decrease as the benefits of holding office increase. With higher wages, more individuals enter politics thus increasing the incentive for more-competent candidates to free-ride on the other candidates and thus not run for office.

A different result is obtained by Matozzi and Merlo (2008) using a dynamic equilibrium overlapping generations model. In their model, an increase in the salary of politicians induces two effects: an entry effect, which affects the average quality of persons that become politicians, and a retention effect given by the turnover in the political sector. An increase in the return to the political profession makes it more attractive compared to private sector activities. Hence lower quality individuals enter the political sector lowering the average quality of entering politicians. In addition, it also increases the future earnings relative to the market wage making it more desirable for politicians to stay in office for a second-term instead of moving to the private sector.

While these papers provide interesting insights into the effects of wages on political selection, they do not provide any predictions on how wages will affect the behavior of politicians once in office.

[7] The term quality is used in most of these models as the ability to provide public goods at low costs. Caselli and Morelli (2004) emphasize that quality is mostly determined by two factors: competence and honesty.

Political agency models provide a useful framework to understand these additional effects. Besley (2004) examines the effects of wages on the selection and behavior of politicians using a political agency model where voters are unable to observe either the politician's type or his actions.[8] In the model, there are two-types of politicians: congruent and dissonant politicians. Congruent politicians always act in accordance with voters' objectives, whereas dissonant politicians receive additional rents from taking an action that is different from voter's preferred action. But, as Besley (2004) shows, given the possibility of re-election, as the value of holding office increases, dissonant politicians are much more likely to refrain from rent-seeking and behave according to voters' preferences. Hence, this model predicts that an increase in the remuneration increases average politician's performance (as dissonant politician take voters' preferred action) and, thus also decreases turnover of incumbent politicians.

3 Institutional Background and Data

3.1 Local Governments and the *Câmara de Vereadores*

Brazil is one of the most decentralized countries in the world. Local governments receive large sums of resources to provide a significant share of public services.[9] The decision on how to spend these resources is made by an elected mayor in conjunction with the local legislature – the *Câmara de Vereadores*.[10] These *câmaras* consist of a council of legislators elected from an open list, proportional representation system every four years. Its size varies from 9-55 members depending on the municipality's population. According to Brazil's constitution, the legislature is responsible for enacting laws and monitoring the executive for its use of public resources. Specifically, legislators are in charge of proposing bills consisting of programs and budgetary projects that would become laws, creating commissions designed to discuss local problems, and encouraging public hearings to

[8] See Banks and Sundaram (1993) for an early agency model with both adverse selection and moral hazard.

[9] Differently from local governments in other countries, Brazil's municipalities are responsible for providing education, health care, transportation, and local infrastructure. The 5,560 Brazilian municipalities receive on average $35 billion per year from the federal government, which represents approximately 15 percent of federal government's revenue.

[10] Brazil's *Câmaras de Vereadores*, date back to the 1800s. They were established by the Portuguese crown in the major *Vilas* and were in charge of all local decision-making including administrative, police, and judiciary acts. See Leal (1975) for details on its historical evolution.

learn about the needs of the community.

Legislators can influence local spending and the quality of public policy in three ways. First, legislators must approve the municipal budget. The legislature receives a detailed budget proposal from the mayor with spending items on all programs and public work projects. The legislature (or a specific finance commission) analyzes the budget proposal and then returns it to the mayor with or without line-items vetoes.[11] While mayors are not obligated to spend on all of the approved items, the budget, as approved by legislators, limits the amount that can be spent on each item.[12]

Local legislators influence local policy-making mainly by submitting bills (*projetos de lei*) and petitions (indicações). Bills consist of formal projects that are submitted for consideration to the legislature in order to become municipal laws. They can be submitted by individual legislators, a legislative committee, or the mayor himself. While most bills submitted by mayors focus on obtaining funds for extra spending and the hiring of public employees, bills formulated by legislators focus on the adoption of new programs or the creation of local councils to monitor the executive for its implementation of social programs. Some examples will help to illustrate the use of these bills. In the municipality of Brumado, in Bahia, the legislator Gilberto Dias Lima, elected in 2004, proposed two bills that directly affect the quality of education and health provided. The first project established direct elections for municipal school directors and a second project obliges municipal health clinics to test newborns for hearing difficulties. Bills are also used to establish new social programs. Rosinere França Abbud, a legislator from Juiz de Fora, Minas Gerais, presented a bill aimed at creating an emergency unemployment program. In Santa Cruz do Capibaribe, Pernambuco, legislator Rui José Medeiros Silva proposed a bill to create a municipal council of economic and social development.

Petitions, on the other hand, consist of explicit requests made by legislators to the mayor, for geographically-targeted public works and services. Most petitions consist of infrastructure projects such as road building, construction of health clinics and schools. But it is also common to see

[11] See Pereira and Mueller (2002) for an analysis of the budget process and the executive-legislative relations in Brazil.

[12] Differently from the federal congress, however, amendments play a small role in the bargaining process between the local executive and legislative (Melo 2005). See Ames (1995) for a detailed description on the use of *Emendas Parlamentares* in Brazil.

legislators request such items as additional doctors in local clinics or teachers and computers for schools. For instance, in the municipality of São Manuel, São Paulo, a legislator sent a petition to the mayor to build a primary school in the neighborhood of Conquista e Bela Vista. In Itabela, Bahia, the legislator Genilda Farias requested resources to train primary school teachers, while another legislator, Agnaldo Santos, proposed the hiring of doctors to attend the growing number of patients in the Itabela health center. In the municipality of Taquari, Rio Grande do Sul, petition no.140/06, from legislator Celso Göethel, asked for the acquisition of computers for the municipal school "Sóror Joana Angélica", located in Passo do Juncal. In addition to submitting bills and public work requests, local legislators are also in charge of monitoring the executive for its use of public resources. The quality of legislators (competence and honesty) is likely to affect whether they overlook corruption, irregular public hires, and irregularities in the public administration.[13]

Differently from mayors who face a two term limit, legislators can get reelected indefinitely. Hence, politicians that desire a career in local politics have strong incentives to perform according to voters expectations. Moreover, for some politicians, the local legislature is just a first step towards a higher level political position. A large number of mayors, governors and congressmen started their careers as local legislators. For all these reasons, increases in legislators salaries are likely to induce *vereadores* to put more effort into signaling high productivity to voters in order to get reelected or build a future career.

We measure this effort by examining the number of bills submitted and approved by legislators and the variation in public services using data for the number of schools, health clinics, doctors, and water and sanitation connections. In order to illustrate how legislators inform voters about the bills and petitions (*indicações*) they have submitted, we present in Appendix C three examples extracted from the personal web sites of legislators. Each example includes the name of the legislator, the municipality they got elected for, and the internet address of the web site that provides information on their accomplishments.

In the first example, legislator Ana Selma, from *Cabo de Santo Agostinho*, Pernambuco, describes her visit to the city of Garapu, where she informed its citizens about her petitions to benefit

[13]See Lopez (2004) for a detailed case study of the executive-legislative relation at the municipal level.

the region. She requested the construction of a primary school, a health clinic for the Health Family Program and the intensification of police escorts to control crime. In the second example, legislator Romério, from Resende in the state of Rio de Janeiro, highlights his petitions for educational improvements. His website claims the acquisition of magazines and newspapers for school libraries, and the construction of computer and science labs in the local schools. The third example illustrated by José Damaso, from Palmas, informs his constituents about his requests for the construction of new classrooms in the municipal school of Tiago Barbosa, as well as the construction of a local police station in the community of Taquari.[14]

3.2 Constitutional Rules and the Salary of Legislators

The salary of federal deputies, as determined by Brazil's constitution, serves as the basis for the wages of all other legislators. State legislators are free to set their own salary subject to a maximum of 75 percent of what federal deputies earn and until 2000 local legislators were subject to a maximum salary of 75 percent of state deputies' earnings. In February of 2000, a constitutional amendment was established to further limit the maximum salary of local legislators. It defined caps on the salary of legislators and the share of revenues that could be spent on the local legislature as a function of municipal population. Because wages can only be set by legislators for the subsequent administration, these new caps did not have an immediate effect on salaries during the 2001-2004 legislature.[15] Even though wages are set in the previous legislature , as it will become clear in the empirical strategy section, this does not affect our research design. Our identification strategy, which is an *intention-to-treat* design, exploits cross-sectional variation and the discontinuous jumps created by the amendment. This does not suggest, however, that the law did not affect selection into the 2000 election or politicians' performance during the 2001-2004 term. It is possible that among municipalities that were able to offer a higher future wage, incumbent politicians increased effort in order to get re-elected. We test for this in Section 5.

Table 1 summarizes the main features of this law. There are 5 population thresholds defining the

[14]These three examples are just a sample of many web pages and blogs used to disseminate the information about the actions being taken by legislators. In effect, several legislators list the bills and petitions submitted on their web pages or blogs as a way to signal productivity to voters.

[15]Except for a small subset of municipalities that had to reduce wages to comply with the law.

maximum salary of legislators. In smaller municipalities, up to 10,000 inhabitants, local legislators can get as much as 20 percent of the state deputy salary. This share increases to 30 percent in municipalities with a population between 10,000 and 50,000 residents. For larger municipalities, those above 500,000 inhabitants, the maximum value is set at 75 percent of state deputy salaries. Column 3 displays the maximum allowed wages estimated for 2004/2005, given that federal deputies had a salary of R$12,847.2 and state deputies had a salary capped at R$9,635.4.[16] For municipalities with less than 10,000 inhabitants, the maximum salary of a legislature can receive is R$1,927 per month versus R$7,227 per month for legislators residing in municipalities with a population above 500,000 inhabitants. The constitutional amendment also capped the amount of legislative spending as a percent of total revenues, but these percentages only vary for the municipalities with a population above 100,000, which represents only 3 percent of the sample (see column 4).

Given that salaries are determined by these population cutoffs, there are two potential concerns that might affect our analysis. First, municipal governments may have influenced the law through some bargaining process with the federal government or may have altered their population count. This is extremely unlikely in the case of Brazil, where municipal governments (even larger ones) have limited control over the constitutional amendments that are legislated. Also, we can indirectly test for this when comparing the characteristics of municipalities near the threshold points. A second concern relates to the existence of other policies that are determined by population cutoffs. As we discuss in detail in the robustness section, these population cutoffs do not determine any other policies and our results are robust to accounting for policies that are affected by other population thresholds.

3.3 Data and Descriptive Statistics

The main data source used in this study comes from a new Census of Brazil's Municipal Legislatures. It was collected in 2005 by the *Interlegis*, a sub-secretary of the Brazilian Senate, for approximately 5,000 municipalities. Roughly, 260 surveyors collected data on physical facilities (e.g. building ownership, existence of telephone lines, and access to the internet); institutional characteristics

[16] There is almost no variation in the salaries of state deputies across Brazil. Most of the variation comes from the perks from office.

(e.g. administrative structure, existence of legislative commissions, wage paid to legislators); and personal characteristics of legislators (e.g. education, gender, age, term in office). A novel feature of this census is the availability of municipal level data on the legislators' wages, and measures of legislative output (number of bills submitted and approved).[17]

To study the effects of wages on political entry and selection, we construct a complementary dataset with the characteristics of legislative candidates that ran in the 2000 and 2004 elections. Using the electronic files available from the Tribunal Superior Eleitoral (TSE), we calculate for each municipality, the number of candidates, the proportion of female candidates, their age, their years of schooling, occupation, campaign spending, and their political parties.

For the purpose of the analysis, it is important to account for any differences in municipal characteristics and to test whether these characteristics are discontinuous at the wage cutoffs. As such, we gathered information from several additional sources.[18] The Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística(IBGE)) 2000 population census provides us with socio-economic characteristics such as the percentage of urban population, Gini coefficient, income per capita and a measure of infrastructure availability (percentage of households with electricity). In addition, we use the IBGE inter-census population estimates to obtain data on the 2003 and 2004 municipal populations. To control for different institutional features of the municipality, we use the 2002 and 2005 *Perfil dos Municípios Brasileiros: Gestão Pública*. This survey characterizes various aspects of the public administration, such as budgetary and planning procedures, the number of public employees. It also provides us with structural features such as the existence of local radio and the presence of a judge and public prosecutors. Public finance data was obtained from the National Treasury (Secretaria do Tesouro) through the FINBRA dataset. It contains municipal spending by categories and revenues by sources (i.e. local taxes, intergovernmental transfers). The differences in legislators' wages across municipalities might, in part, reflect differences in living costs across regions. In order to control for this we also gathered data on average municipal wages from the RAIS, which includes information on all workers in the public

[17] We also have data on total compensation (wages plus perks from office such as gas for their cars and mobile phones) but there is considerable measurement error associated with these figures. We use wages in the analysis that follows but our results are similar if instead we use total compensation.

[18] See the data appendix B for a detailed description of data sources.

sector and formal private sector.

Descriptive statistics for the main variables used in the analysis are shown in Table 2. The average size of the legislature is about 9 legislators (which is equal to the minimum size) and the average wage for a legislator is R$1641, which is approximately 2.6 times the average wage for workers. In a large number of municipalities, the legislature is in session for only part of the week, on average 10 hours. During 2005, there were approximately 0.86 bills submitted per legislator and 0.69 got approved. The legislatures are mainly composed of male legislators (approximately 87 percent) and legislators that are either in their first or second mandate (72 percent). Approximately one third are less than 40 years old and the average years of schooling of legislators is 9.7 (median is 10.6), which is equivalent to a high school drop-out. Elected legislators seem to be slightly more educated than the average candidate (9.08 years of schooling) and a smaller proportion of woman get elected (women are, on average, 20 percent of candidates). There are, on average, 6.1 candidates per seat, but this number drops to 3.6 for the first quartile of municipalities. As for municipalities in Brazil, they are, on average, small (23,000 inhabitants), largely urban (61% of urban population), highly unequal (average Gini coefficient of 0.56), and approximately a quarter of the population is illiterate.

4 Empirical Strategy

Our analysis estimates the effects of wages on politician selection and performance. To identify these effects, we exploit exogenous variation in local legislators' salaries induced by federally-mandated salary caps. We begin this section by discussing the identification concerns associated with using OLS estimation. We then present the econometric models we use to estimate these wage effects and the assumptions needed for a causal interpretation of the parameters of interest.

Consider the following cross-sectional relationship between wages and politicians' characteristics or performance:

$$\begin{aligned} y_i &= \beta_0 + \beta_1 \log(w_i) + x_i'\delta + \varepsilon_i \qquad (1) \\ \log(w_i) &= \alpha + x_i'\theta + \nu_i \end{aligned}$$

where y_i is the average characteristic or performance indicator of politicians in municipality i (e.g. average years of schooling or the average number of projects approved by the legislative council), w_i is the wage that members of the local legislature receive, x_i is a vector of observed municipal characteristics, and ε_i and ν_i are unobserved determinants of politician performance (or selection) and wages, respectively. Under the assumption that $E[\varepsilon_i \nu_i] = 0$, the least squares estimator of β_1 will be a consistent estimate of the causal effect of wages on politician performance (or selection).

Unfortunately, there are several potential omitted factors in equation 1 that covary with both wages and politician performance. Municipalities that offer higher wages presumably attract more able politicians who are also more educated and more productive in submitting bills to the legislature. Moreover, the correlation between wages and politician performance might capture the fact that high performance politicians might be able to set themselves a higher wage (Di Tella and Fisman (2004)).

To overcome these identification concerns, we exploit the exogenous variation in legislators' wages induced by salary caps. As we discussed in Section 3, the federal government stipulated five ceilings for the wage of local politicians depending on population thresholds. In municipalities with population above the cutoffs, legislators receive, on average, higher salaries compared to those legislators in municipalities below the cutoffs, as we show in the next section.

Our empirical approach uses these discontinuities in the wages to identify the effects on politician selection and performance. Intuitively, if legislators' salaries are smoothly related to other characteristics at the population cutoffs, then we can estimate the effects of wages by comparing outcomes of legislators in municipalities with population levels just below and above these cutoffs. In our setting, because salaries are not entirely explained by the population cutoffs, we use a fuzzy regression discontinuity design where indicators for population cutoffs serve as excluded instruments in a Two-Stage Least Squares (TSLS) setting (Van Der Klaauw 2002).[19] Formally, consider

[19]The population cutoffs act as a cap on the maximum value that can be paid to legislators. The amount that is effectively paid, however, depends on the resources available to the municipal government, on political bargaining between the mayor ad legislators, and on the social pressure exerted by the population. Thus, a large number of smaller municipalities pay salaries below the cap.

the following model:

$$\begin{aligned} y_i &= \beta_0 + \beta_1 E[\log(w)_i | P_i,\ x_i] + f(P_i) + x_i'\delta + \varepsilon_i \\ E[\log(w)_i | P_i,\ x_i] &= \alpha_0 + \sum_{k=1}^{5} \alpha_k 1\{P_i > \bar{P}_k\} + g(P_i) + x_i'\theta \end{aligned} \tag{2}$$

where P_i is the population of municipality i, $1\{\cdot\}$ is an indicator function that equals one if the municipality's population is above the k^{th} cutoff $\bar{P}_k$ (i.e. 10,000 inhabitants), and the functions $f(\cdot)$ and $g(\cdot)$ are flexible functions of population.

In the context of equation (2), consistent estimation of β_1 using the TSLS approach relies on wages being discontinuous at the cutoffs (which is testable) and $f(\cdot)$ and $g(\cdot)$ being locally continuous at the population cutoffs (Hahn, Todd, and Van der Klaauw 2001). If the functions $f(\cdot)$ and $g(\cdot)$ are specified correctly, they will capture all other potential effects of population on wages and legislators outcomes far away from the cutoffs. Then, the use cutoffs indicators as excluded instruments will provide a consistent estimate of β_1.

In our preferred specification, we use the five population cut-offs and estimate $f(\cdot)$ and $g(\cdot)$ as piecewise linear splines (i.e. separate regressions on both sides of each discontinuity). We also show that our results are robust to alternative estimation strategies. First, we relax the spline functional form assumption and allow for a flexible polynomial on population.[20] Second, we restrict the sample to only those municipalities close to the cut-offs. Finally, we use the actual value of the salary cap as an instrument for the salary paid to legislators. This identification strategy is related to the trend-break models used by Angrist and Lavy (1999) and Burgess and Pande (2005).

[20] Alternatively, the fuzzy-regression discontinuity estimator could be implemented using a non-parametric approach. A local linear regression could be used to estimate the outcome and treatment regressions. Due to the small number of municipalities to the right of the first cut-off, we preferred to estimate a parametric specification. See Lee, Moretti, and Butler (2004), Ferreira and Gyourko (2007), Urquiola and Verhoogen (2008) for other studies that adopt a similar strategy to ours and Imbens and Lemieux (2008) for an overview of different alternatives for estimating the Regression Discontinuity.

5 Empirical Results

In this section, we begin by documenting the OLS estimates of the effects of legislator's salaries on the measures of political selection. Next, we propose an alternative identification strategy based on discontinuities in the wages. Using these TSLS estimates, we show that salaries affect both the type of politicians that run for and get elected into office, as well as their behavior. These results are robust to various specifications and are consistent with the models of Caselli and Morelli (2004) and Besley (2004).

5.1 The Effects of Wages on Political Selection

OLS Estimates

Table 3 presents the relationship between legislators' wages and characteristics of both the candidates of the 2004 elections as well as those that were elected. The first row reports the estimated slope coefficient on log wages from a series of OLS regressions where the dependent variables are specified in each column. Each specification adjusts for various characteristics of the legislature (e.g. the number of assistants per legislator and the number of hours for which the legislature functions per week) as well as characteristics of the municipality, such as: population, income per capita and urbanization. The regressions also control for average wages in the municipality to capture any potential differences across municipalities in politicians' opportunity costs.

In column 1, we report a strong positive association between the wages legislators receive and the number candidates per seat (a measure of political competition). The point estimate on log wages suggests that a one standard deviation increase in wages (approximately 50 percent) is associated with a 1.35 more candidates per seat. Higher wages may not only induce more political competition, but also attract a different composition of candidates. Increases in the salary of legislators are associated with more educated candidates (column 2) and a higher share of female candidates (column 4). We do not, however, find any evidence that higher wages attract a higher share of candidates who were employed in a white-color profession (column 3). One potential implication of higher salaries is that candidates should be willing to pay more to gain political

power. In column 5, we test this by examining whether there is more campaign spending per candidate among municipalities that offer higher wages. We find a 30 percent increase in campaign spending when wages increase by 50 percent.

In columns 6-9, we present the OLS estimates of the relationship between wages and the characteristics of those that were elected into office in 2004. In municipalities that offer higher wages, the legislature is on average more educated (column 6) and has a higher share of white-collar professionals (column 7). Despite a positive effect on the share of female candidates, higher wages are negatively correlated with the share of female legislators.[21] As with the result found for all candidates, higher wages attracts more campaign spending among elected politicians: a 50 percent increase in wages increase campaign spending by 32.5 percent.

Overall, the results presented in Table 3 suggest that higher remuneration is associated with increased competition and potentially higher quality legislators (more educated and white-collar professionals). One should, however, be cautious to interpret these results as causal. There are several omitted factors that could confound these results, and next we address these identification concerns.

Population Thresholds and Politicians' Salaries

As we discussed in Section 3, the federal government stipulated a ceiling for the wage of local politicians that depends on various population thresholds. The innovation of our empirical approach is to use this exogenous variation in wage determination to identify the effects of wages on politician selection and performance. The effects of the federal mandate on politicians' wages can be seen in the 3 panels presented in Figure 1, which plots politician wages in 2005 against the municipality's population in 2003.[22] Each panel presents unadjusted population-cell means of wages (depicted by the small circles) along with the fitted values of a locally weighted regression calculated within each population segment (as denoted by the vertical lines).[23] The data exhibit a sharp discontinuity

[21] In Brazil, there is a quota for female candidates, but not for female legislators.

[22] We use the 2003 population because the wages in 2005, the first year of the legislature, had to be set by the previous legislature in power between 2001 and 2004. Since wage changes are usually done during the last year of the legislature and population estimates are only available in the end of the year, legislators choosing wages in 2004 were likely to be regulated based on the 2003 population.

[23] The average wage is computed for a 200 person bin.

at each of the population cut-offs and a discernable step-function at each segment. For instance, municipalities between 50,000 and 100,000 inhabitants (i.e. the third segment) display a cluster of wages set at around R$ 4,000 per month (approximately $2,200). In the fourth segment, the wages appear to cluster at just below R$5,000. The figure also highlights the fact that several municipalities do not set their politician wages to the maximum allowance.

The general patterns presented in the figure are also borne out in the adjusted regression results. In Table 4, column 1 presents the first-stage regression of log wages on indicators for whether population is above the first five cutoffs along with a piecewise linear spline for population. The coefficients on the cutoff indicators estimate the average increase in log wages at each threshold point. For instance, the indicator for the first cutoff suggests that wages in municipalities just above the population threshold pay politicians 21 percent more than municipalities immediately below the cutoffs. The other cutoffs display a similar pattern to the one presented in Figure 1, except for the second cutoff where the discontinuity is close to zero and not statistically significant. The results remain very similar when we control for municipal characteristics in column 2.

When we only allow for differential slopes in the first two cut-offs, where most of the data are concentrated, the regression does not lose any explanatory power and the cutoff indicators have more predictive power.[24] Overall, the regressions fit the data well. The cut-off indicators and the population function explain almost 70 percent of the variation in wages generating a joint F-statistic of 29.10 on the excluded instruments.

Smoothness condition and other potential confounds

The general concern with any regression discontinuity design is the possibility that other determinants of the variable of interest are also discontinuous at the various cutoff points. Although we cannot directly test this assumption for unobserved characteristics, we can examine whether the observable characteristic have discontinuous breaks. Figure 2 present a series of municipal characteristics plotted again population. Each figure depicts population cell means of the municipal characteristic for the first three population thresholds (which represents 96 percent of the observa-

[24]For all of our subsequent results, we use the second specification presented in Table 4 as the first stage. Using the third specification provides similar results that given the higher F-statistic are more precise.

tions) along with the fitted values of a locally weighted regression calculated with each segment.[25] Consider, for example, log income per capita, which is a strong predictor of the types of candidates that run for office. As Figure 2 depicts, income per capita is smooth across each of the three cutoff points. We also graph the following pre-determined characteristics: average private sector wage, total expenditure in 2000, effective number of political parties in 1996 election, assistants per legislators and hours in session. In general, the figures show only small differences at each threshold points. Table 5 formally tests whether the population cutoffs are significant for a larger set of municipal and mayor characteristics. It reports a series of regressions where we fit the dependent variable listed in each column to equation (2). Overall, the table confirms that there are no significant differences at cutoff points for various characteristics of the municipality. The only exception, among 20 characteristics, is income inequality as measured by the Gini coefficient.

The results presented in Table 5 address another potential concern. If the legislatures that offered higher wages also provided other non-wage job attributes or perks that directly affect the utility of politicians, then we might be overestimating the effects of wages on performance and selection. But as columns 13 and 14 demonstrate (and as Figure 2 depicts), there are no discontinuities in the two principal non-pecuniary features of the legislature: number assistants and number hours the legislature is open.[26] Alternatively, and perhaps a more reasonable situation would be for legislatures just below the population cap to provide perks to compensate for the lower salary (e.g. cell phones, fuel for cars). If this was the case, then the effects of wages would be underestimated.

As another specification test of our design, Figure 3 plots the density of population. If there were any discontinuities in the density at the cutoff points, one might be concerned that municipalities were manipulating their population statistic in order to offer a higher wage (McCrary 2008). However, as Figure 3 depicts, the density appears continuous at the various cutoff points. Moreover, the population statistics are collected by the Brazilian Statistical Office (IBGE), which is an independent government body.

[25] We excluded the 4th and 5th cutoffs for presentational purposes. To include these additional observations does not affect the results.

[26] Each regression that has been presented has controlled for these features of the legislature.

Two-Stage Least Squares Estimates of Political Selection

In Table 6, we investigate whether municipalities that offer higher wages attract more individuals into politics. For each dependent variable, we estimate specifications based on equation (2), where $f(P_i)$ and $g(P_i)$ are assumed to be piecewise linear splines in population. The excluded instruments are the indicator variables for the five cutoff points, and the joint test of their significance is reported for each sample. In our base specification (odd-numbered columns) we control for the number of assistants per legislator and number of hours that the legislature functions per week; whereas, in our full specification we adjust for all of the controls presented in Table 3 (even-numbered columns).[27]

Column 1 presents the TSLS results for the effect of wages on the number of candidates per seat that ran for election in 2004. The estimated coefficient on log wages is 1.424 (robust standard error = 0.597) which is approximately half the size of the OLS estimate (see Table 3), and suggests that a 50 percent increase in wages increase political competition by 0.72 candidates per seat. In column 2, we report our full specification and find that the point estimate is similar when additional controls are added.

Given the increase in political competition, a natural question to ask is whether this reflects the entry of more political parties. We find that a 50 percent increase in wages increases the number of political parties that participate in the elections by 0.95 per seat (columns 3 and 4). This result is perhaps not surprising given Brazil's open-list proportional representation system which encourages fragmentation of parties (Myerson 1993).[28] In column 5-8, we demonstrate that candidates increase campaign spending in response to higher wages and increased competition. Among elected candidates, a 50 percent increase in wages increases campaign spending by 18.65 percent.

In addition to these effects on political participation, Table 7 shows that wages affect the candidate pool and the type of elected legislators. Panel A reports the TSLS estimates for the effects on candidate characteristics, whereas Panel B reports the effects for elected legislators. Consistent

[27] Although our base specification controls for the number of assistants per legislator and the number of hours, removing these controls does not affect our two-stage least squares estimate in the slightest. This is not too surprising given that the instrument is orthogonal to these characteristics as demonstrated in the figures.

[28] Legislators in Brazil are elected based on the d'Hondt method. As a result, members of smaller political parties are often elected despite having fewer vote totals than losing candidates of larger political parties. See Ames (1995) for details.

with the OLS estimates, we find that a 50 percent increase in wages, increases candidates' average years of schooling by 0.31 years (see column 1). Although this effect appears relatively small, the average years of schooling for Brazil's adult population in 2005 was 6.5. Moreover, when we focus only on the share of candidates with at least a high school degree, a similar increase in wages increases the share by 7.4 percent (column 3). Different from the OLS estimates, higher wages not only attract individuals with more education but also more females and those from white-collar professions. For instance, in column 5, the effects of wages on the proportion of white-collar candidates is 0.062 (standard error=0.028), which represents a 16 percent increase from the average. Another natural question is whether municipalities that offered higher wages attracted politicians from other municipalities. Although not reported, we do not find any evidence that this case (point estimate = 0.031, standard error of 0 .071).

Although wages induce a positive selection on the pool of candidates, this does not necessarily imply a change in the composition of elected politicians. The results do indicate that wages affect the characteristics of the legislative body. The estimates reported in columns 1-2 suggest that a 50 percent increase in wages increase the average education of the legislature by 0.47 years of schooling and the share of legislators with at least a high school degree by 10 percent. Columns 5-6 and 7-8 report the effects of wages on the share of legislators from a white-collar occupation and share female legislators, respectively. The effects are large and significant for share of legislators from a white-collar occupation, while measured with less precision for the share of female legislators.

According political agency models, we expect a lower turnover of legislators among municipalities that can offer higher salaries (Besley 2004). In Table 8 we examine how higher salaries affect both reelection rates and the tenure of legislators. Columns 1 and 2 report the estimated slope coefficient from a TSLS regression where the dependent variable is the proportion of legislators that were re-elected in the 2004 elections. Using the full specification (column 2), the estimated effect is 0.063 (standard error = 0.037). In columns 3-6, we show that the increase in re-election rates is predominately among more educated legislators (columns 5 and 6). A 50 percent increase in wages increased re-election rates on legislators with at least a high school education by about 30 percent. Consistent with these results, columns 7-14 provide further evidence that legislatures are

more experienced among municipalities that offer higher wages. For instance, the estimated effect of log wages on average number of terms is 0.41 (see column 8) and highly significant (robust standard error = 0.151). When we consider the entire distribution, we find that higher wages increase the share of legislator with 4-7 terms (approximately 0.09 percentage points, robust standard error=0.03), while decreasing the share of legislators with only 1 term of experience (0.038 percentage points, robust standard error = 0.053). These results support the theoretical prediction that higher wages decrease turnover rates of politicians and echo the empirical findings of Diermeier, Keane, and Merlo (2005).

In sum, exploiting discontinuities in the wages that local legislators receive, the findings indicate that higher salaries attract a better pool of candidates and elected legislators (more educated and a higher share of white-collar professionals).[29] Given this positive selection, a natural question to ask is whether or not wages also affect politicians' behavior and performance. As we discussed in the theoretical framework, there are many reasons why legislative performance might be affected. First, as the monetary benefits from holding office increase, elected officials will exert more effort in order to signal productivity to voters and get re-elected. Second, as we change the composition and type of legislators that are elected, we would expect performance and effort to change. Next, we investigate whether higher salaries affect legislative performance using indicators of bills submitted and approved, and measures of the provision of local public goods.

5.2 The Effects of Wages on Politician Performance

Although there are several potential indicators of politician performance, it is not easy to obtain an objective measure for local legislatures. We use the data available in the legislative census to measure performance as the number of bills submitted and the number of bills approved by the legislators in 2005. Although these measures do not account for the quality of the bills and projects submitted, we would expect the number of bills to be a function of legislators' effort.[30]

Table 9 presents estimates for the effects of wages on the various measures of legislative perfor-

[29] These characteristics may not necessarily lead to more competence in office. We do, however, believe that they are positively correlated with public sector performance.

[30] See for example Clinton and Lapinski (2006) for a discussion on measuring legislative accomplishment.

mance. The TSLS results are displayed in panel A while the OLS results are shown in panel B for comparison. For each dependent variable, we estimate equation (2) with municipal controls and a piecewise linear spline in population (not shown in results). The excluded instruments are again the indicator variables for the five cutoff points.

Column 1 of Panel A reports the estimated slope coefficient from a TSLS regression where the dependent variable is the log of the number of bills submitted per legislator.[31] In the first specification, which adjusts for the population of the municipality, the number of assistants per legislator, and the number of hours the legislature is in session, we find a strong positive association suggesting that a 50 percent increase in wages increases the number of bills submitted by 25 percent. The estimated effect is approximately 0.07 percentage points lower than the OLS estimate. In column 2, we report our full specification and find that the point estimate is virtually unchanged with additional controls. Even though the number of bills submitted does capture a measure of politician's effort, perhaps more important for society is whether these bills get approved. In columns 3 and 4, we re-estimate the specifications reported in the first two columns but use the log number of approved bills per legislator. We also find a significant and positive relationship between wages and the number bills approved, with an elasticity of 0.51 (robust standard error = 0.264). Moreover, when we divide the number of bills approved by the bills submitted and compute a share of bills approved, we find that higher wages also increase this share (see columns 5 and 6). For instance, a 50 percent increase in wages increases the share of bills approved by about 15 percentage points. This point estimate lies in contrast to the OLS estimates which suggest that share actually decreases.

In addition to bills, we use another measure of the organization of the legislative process – the functioning of the committee system. Several scholars argue that in legislatures, the existence of committees reduce the possibility of opportunistic behavior by legislators (e.g. Weingast and Marshall 1988 suggest that committees improve ex-post enforceability). Even though most municipalities only have one or two committees, their existence induces gains from specialization and improvements in the quality of decision-making. In columns 7 and 8, we report the estimated

[31] Before taking the log, we add a one to the total number of bills submitted to avoid losing the municipalities that had zero bill in 2005. To do so, does not affect our results in the slightest.

effects of wages on an indicator for whether the legislature has a functioning legislative commission. We find that legislatures with higher wages have a higher probability of having a functioning commission, but the effect is small (a 50 percent increase in wages increase the chances of having a commission by 0.10 percentage points).

In sum, the estimates presented in Table 9 suggest that wages have an important effect on legislative productivity. Local legislatures that pay their elected officials higher wages have more bills submitted and approved and are more likely to have functioning commissions. But whether these legislative acts map into population welfare gains is not entirely obvious, especially given that we are unable to distinguish the type of bills in our data. In the next section, we explore one potential effect of legislative quality given by the provision of public services.

5.3 The Effects of Wages on Public Goods

As described in the Section 3, legislators affect policy both through formal bills as well as informal requests (*petitions*). These informal requests are a common way for legislators to provide patronage to their constituents and consist of various types of public works (as depicted in Appendix C). Unfortunately without data on the number and type petitions, we cannot test whether wages affect the number of petitions that legislators submit. Instead, we examine the relationship between salaries and the provision of public goods and services that are most frequently cited in these petitions – schools, local clinics and sanitation infrastructure.[32]

Table 10 presents the relationship between wages and the provision of various public goods. For each dependent variable, we estimate equation (2) controlling for our full set of covariates. Columns 1-4 present the effects of wages on various educational inputs, columns 5-7 present the effects on health inputs, and columns 8 and 9 present the effects on household access to water and sanitation. Each of these public inputs is found in the petitions presented in Appendix C.

Column 1 reports the effects of log wages on the number of primary and secondary schools per

[32]If bills and petitions are viewed as substitutes then it is quite possible that higher wages may have even lowered the number petitions. Using data for 148 legislators on the number of petitions and bills that were submitted in 2005-2007 by legislator for a sample of 14 municipalities, we estimate a positive correlation coefficient of 0.151 (bootstrap standard error=0.083). Unfortunately this is not based on a random sample of municipalities. We could only gather this information for a subset of the municipalities that posted this information on the legislatures' websites.

school-aged child in 2006. A 50 percent increase in wages increases the number of schools by 0.64 schools per 1000 children. Moreover, for municipalities that offer higher wages, there is an increase in the school infrastructure as measured by the share of schools with a science lab (column 2) and a computer lab (column 3).[33] In columns 5-7, we also find that higher wages affect the provision of health services. For instance, a 50 percent increase in wages increases the number of health clinics by 0.12 per 1000 inhabitants (column 5). There is also an effect on the number of doctors per capita (point estimate = 0.639; robust standard error=0.279), and the average number of doctor visits (point estimate 0.521; robust standard error= 0.241). Differently from education and health inputs, we do not find robust evidence that increases in salary lead to differential changes in the provision of water and sanitation for households (columns 8-11).

5.4 Discussion

Behavior versus Selection of Politicians

Thus far the findings that politicians' performances change with higher salaries are consistent with the standard political agency models where higher salaries increase the value of holding office in the future and induce more effort. There are however, at least two other explanations for our results. One possible interpretation is that the results are driven exclusively by selection: higher wages attract higher quality politicians and this induces better performance. This is the intuition behind the Caselli and Morelli (2004) model and the original efficiency wages models (e.g. Weiss (1980)).[34] Another potential interpretation of our findings is that higher wages increases worker morale or dedication, as discussed by Akerlof (1982).

Although our research design does not allow us to separately identify whether higher wages increase performance through effort (rather than selection), we can test whether wages still affect our measures of performance after accounting for the changes in the composition of the legislative body. Assuming that the observed characteristics of the politicians are correlated with their unobserved characteristics, then this approach attributes to the observed characteristics of the legislature all

[33]The results are similar if we use the change in the stock of public of goods from 2004-2006 as a measure of new public goods.

[34]Higher quality politicians may also induce positive social interactions that leads to more productivity.

the effects of the unobserved variables. Thus, if politician productivity is largely due to changes in the pool of local legislators, then we would expect that accounting for these differences should attenuate the wage effects.[35]

Table 11 shows that some characteristics of the legislative body have significant power in predicting legislative performance. More educated and male-dominated legislative bodies are associated with higher performance.[36] We do however find that adjusting for the observable differences has only a minimal effect on the wage coefficient; in most cases, attenuating the effects only slightly. Thus, if the politicians' unobserved abilities are correlated with their measured characteristics, selection cannot entirely explain our results.

Specification Tests

Given the differences in income inequality across the third population threshold and some of the other slight differences in the observable characteristics that we observed in Table 5, we re-estimate all the models presented in Tables 3-10 including a flexible-functional form for each of our control variables (a fourth-order polynomial). The results are presented in column 1 of Table 12, where each coefficient is the TSLS estimate of the dependent variables listed in each row on log wages. As column 1 reports, the estimates are not only similar, but in some cases measured with more precision.

In Table 12, columns 2-5, we test whether our results are sensitive to the functional form assumption of a linear spline. We present TSLS estimates of a model where instead of allowing for different slopes in each side of the discontinuities, we control for a fourth degree polynomial in population and again use the cutoffs as the excluded instruments (columns 2-4).[37] This model, unlike the linear spline where the identification is limited to the cutoff points, imposes additional structure by assuming a constant treatment effect.[38] As seen in Column 2, virtually all of the

[35] An obvious concern with this test is that we can only capture observable differences in politician characteristics, and controlling for these difference may not be sufficient to partial out all the effects of the unobserved variables. For instance, higher wages may have encouraged more able politicians and if ability is not captured in the observable differences, we are not fully accounting for the selection effect.

[36] The negative coefficient on the share of female legislators while difficult to interpret is not unprecedented. Jeydel and Taylor (2003) provides a discussion of these issues.

[37] In model 2, $f(P) = g(P) = \sum_{i=1}^{4} P^i$.

[38] See Card, Mas, and Rothstein (2008) and Lee (2008) for applications of such models.

results are qualitatively similar. In general the point estimates are slightly larger and more precisely estimated. In columns 3-4, we re-estimate this model using only observations close to the discontinuities (i.e. the set of observations that are 5 and 10 percent above and below the cutoff points). The point estimates are consistent with the previous results, although as expected with fewer observations, they lose precision.

In column 5, we present estimates of an alternative TSLS model, which is based on the approach used in Angrist and Lavy (1999) and Burgess and Pande (2005). Instead of using the cutoffs, we estimate the model using the maximum wage that a municipality could offer as the excluded instrument. As expected, the results are similar to those presented in column 2 and again highlight the robustness of the results.

Tests of potential confounds

An important contribution of our paper is the use of discontinuities in the wages that local legislators' receive to identify the effects of wages on political selection and performance. One potential threat to our research design comes from the possibility that other forms of federal spending or policies are discontinuous at the same cutoffs. Although we demonstrated in Table 5 that there is no evidence that other characteristics of the municipality change discontinuously at these cutoff points, both the size of the legislature and the amount of block grant a municipality receives vary according to other population cut-offs.

To account for these potential confounds, columns 6 and 7 present estimates of our model, where we control for a 4th degree polynomial in the amount of the block grant and the size of the legislature. In both columns, our results remain highly robust. As an alternative test, we estimate the extent to which the block grant affects our measures of political selection and performance, restricting the estimation sample to a set of municipalities where the maximum wage does not vary (i.e. for municipalities between 10,000 and 50,000 inhabitants). As reported in the appendix Table A1, the block grant does not have any effect on our dependent variables. Finally, our approach of using only those municipalities just around the cut-offs points isolates our results from the effects from these other discontinuities (see columns 3-4, Table 12).

6 Conclusions

Despite the general consensus that good governance matters for economic development, there is much less agreement on which aspects of governance are important or how it can be improved. The existing political economy literature has mostly focused on how incentives shape the quality of government. But recent studies have introduced an important role for political selection. Institutions and policies are shaped by those holding power, so improvements in governance may require good leaders (Besley 2006).

In this paper, we estimate the effects of monetary rewards on political selection and legislative performance. While there has been a growing theoretical literature that examines how monetary rewards to politicians affect political selection (Caselli and Morelli (2004), Matozzi and Merlo (2008)), data limitations and identification concerns have limited the empirical tests of these models. Moreover, little is known about how monetary rewards affect politicians' performance (Besley 2006).

The empirical analysis exploits discontinuities in the wages of local politicians across Brazil's municipal governments that are based on population thresholds. We find that higher wages increases political competition and improves the quality of legislators, as measured by education, type of previous profession, and political experience in office. In addition to this positive selection, we find that wages also affect politicians' performance, which is consistent with a behavioral response to a higher value of holding office. We are unable, however, to identify whether this increase in performance is due to the positive selection or the incentive effects of higher wage. Future research should focus on the complementarity of improvements in selection and the adoption of appropriate incentives for elected politicians to improve public service provision.

More importantly, whether these effects ultimately translate into improvements in voters' welfare remains an open question. While we find an increase in a number of visible public goods (e.g. number of schools, computer labs, health clinics, and doctors) in municipalities that offer higher salaries, there is no improvement on others (e.g. water and sanitation). Without a more comprehensive data on public goods and services and other dimensions of political quality (e.g. honesty and competence), it is difficult to fully assess the welfare effects of increasing politicians' salaries.

In sum, this paper provides evidence that improving financial incentives can improve the quality

of government, at least in a local context, consistent with Caselli and Morelli (2004) and Besley (2004). This can occur even in an environment where agents are intrinsically motivated (Benabou and Tirole (2003); Besley and Ghatak (2005); Prendergast (2008)) or care about other aspects of the position they hold.

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Appendix A: Simple Model of Political Selection and Accountability

Consider an infinite horizon economy comprised of a finite number of citizens who are heterogenous in their ability θ. An individual's ability is private information, but the distribution of ability across the population, $F(\bar{\theta}, \sigma_\theta)$, is common knowledge. Each individual has preferences over their income y and a policy outcome g, according to a well-behaved quasi-linear utility function $U(y, g) = y + H(g)$. The policy outcome g is set by the elected official as:

$$g = \theta + e,$$

where e is the effort level put forth by the elected official. Effort is costly in terms of disutility and measured according to the following cost function: $\psi(e, \theta)$, which is increasing in effort but decreasing in ability.

Each individual can run for public office, and if elected will experience the following per-period utility while in office:

$$U^p(e, \theta) = w_p + H(g(e, \theta)) - \psi(e, \theta)$$

where w_p is the politician's wage. Individuals who were not elected for public office work in the private sector and earn a wage of $w_m(\theta)$ which is increasing in θ, i.e. $w_m(\theta_i) > w_m(\theta_j)$ for $\theta_i > \theta_j$. Thus their ex-ante utility in the private sector is:

$$U^m(\theta) = w_m(\theta) + \int_A H(g(e(\theta), \theta))dF(\theta)$$

where A is set of individuals who run for office. Assuming that there is a probability π of getting elected as a non-incumbent, in any given period an individual with ability θ will enter politics if:

$$\pi \left[w_p - w_m(\theta) + H(g(e(\theta), \theta)) - \psi(e(\theta), \theta) - \int_A H(g(e(\theta), \theta))dF(\theta) \right] \geq 0. \tag{3}$$

Note that because an individual's opportunity cost of entering politics increases with ability, if an individual of type $\hat{\theta}$ is willing to participate then every individual of ability $\theta \leq \hat{\theta}$ is also willing to enter politics.

The timing of events is as follows. In every period an incumbent runs for office knowing both his type and the effort provided in producing public goods. In addition, a set of citizens decides to become candidates before observing the level of public goods g. The level of public goods becomes publicly known and an election is held where all individuals cast their votes. Candidates vote for themselves, whereas non-candidate vote according to a voting rule r. As in Alesina and Tabellini (2007), and Ferejohn (1986), we assume that citizens vote retrospectively and will re-elect the incumbent if their utility exceeds a threshold $\bar{G}$. To set this threshold, voters understand that the

alternative to re-electing the incumbent is to randomly select another politician from the pool of candidates, and require that he exert an effort level that makes the individual indifferent between seeking re-election or exiting politics. Thus, the voting rule will be as follows:

$$r = \begin{cases} 1 & \text{if } g \geq g(\hat{e}, \theta) \\ 0 & \text{otherwise} \end{cases}$$

where $\hat{e}$ is equilibrium level of effort that will leave an individual of average ability indifferent between seeking re-election or entering the private sector.

To examine the level of effort that incumbents exert while in office, let $\bar{e}$ denote the amount of effort an incumbent of type θ must exert in order to provide $\bar{G}$. Let e^* denote the optimal level of effort an incumbent would exert in a single period without re-election concerns. Thus given this reelection rule, an incumbent will exert enough effort to be re-elected if:

$$\frac{w_p + H(g(\bar{e}, \theta)) - \psi(\bar{e}, \theta)}{1 - \delta} \geq w_p + H(g(e^*, \theta)) - \psi(e^*, \theta) + \frac{\delta}{1 - \delta} U^m \tag{4}$$

where δ is the discount rate.[39] Equation 4 can be rearranged in order to express a net utility as a function of ability, i.e. $\tilde{U}(\theta)$:

$$\begin{aligned} \tilde{U}(\theta) &= [\delta w_p + (H(g(\bar{e}, \theta)) - H(g(e^*, \theta))) - (\psi(\bar{e}, \theta) - \psi(e^*, \theta))] \\ &- \delta \left[U^m + H(g(e^*, \theta)) - \psi(e^*, \theta)\right] \geq 0 \end{aligned}$$

Figure A1 illustrates the solution to the model graphically.[40] It compares the value of holding office to the value of remaining in the private sector, assuming that the politician exerts at least the minimum level of effort required to produce $\bar{G}$. Given that $\tilde{U}(\theta)$ is concave in θ, we can separate individuals into four regions, as depicted in Figure A1.[41]

1. For individuals with $\theta \leq A1$, the effort required to get re-elected is too costly and $\tilde{U}(\theta) < 0$ (see Panel A). These individuals, if elected, will simply exert effort level e^* and enter the private sector in the next period (see panel B).

2. For individuals with $\theta \in (A1, A2]$, the benefits of office are greater than those in the private sector, i.e. $\tilde{U}(\theta) > 0$. These politicians will exert just enough effort to set public goods equal to $\bar{G}$ and get re-elected. As depicted in Panel B, effort will decline with ability up to A2.

3. For individuals with $\theta \in (A2, A3]$, the benefits of additional public goods will exceed the

[39] This model assumes that once a politician leaves office, he can no longer return to politics.

[40] The figure shows the equilibrium outcomes under the following functional form assumptions. Politician's utility: $U^p = w_p + ln(\theta + e) - \frac{1}{2}(\frac{e}{\theta})^2$. Utility in the private sector:$U^m = \alpha + \beta\theta + ln(\theta^* + e^*)$; Public Goods: $g = \theta + e$

[41] $\tilde{U}(\theta)$ is concave because of the concavity of H.

costs and thus will provide a level of public goods above $\bar{G}$, (i.e. will exert effort above the minimum need for re-election).

4. For individuals with $\theta > A3$, politics is too costly to enter.

The Effects of Wages on Political Selection and Performance

As the model illustrates, the wages politicians receive play an important role in attracting candidates and influencing politician's behavior while in office. In Figure A2, we show the effects of an increase in wages on the equilibrium outcomes of this simple model. Panel A depicts how an increase in salaries affect the decision to enter politics (Equation 3). An increase in politicians' wages has two effects. First, the benefits of holding office increases, thus attracting more able candidates. Second, as the quality of candidates improves, the expected level of public goods that will be provided also increases (i.e $\frac{\partial}{\partial w_p}\int_A H(g(\bar{e}(\theta),\theta))dF(\theta) > 0$), thus decreasing the incentives for running for office. Panel A illustrates these two opposing effects. As wages increase from w_p to w_p', the marginal individual who enters politics goes from $A3$ to $A3'$, thus increasing average ability in pool of candidates.

In panel B, we show the effects of wages on the set of elected officials that will remain in office. As shown in Panel A, an increase in wages increases the ability of the politician that is willing to stay in office from $A3$ to $A3'$. But as the quality of candidates improves, voters impose a higher standard to re-elect the incumbent politician, i.e. a higher $\bar{G}$. Consequently, a lower ability incumbent, who under the previous wage regime was willing to stay in office, now finds it too costly to exert the effort to get re-elected. Thus higher wages create a positive selection by inducing higher types to get re-elected and lower types to exit.

In panel C, we illustrate how higher wages affect effort. Individuals with ability $\theta \in [A1, A1']$ are unwilling to provide $\bar{G}$ and thus decrease effort and exit politics. For individuals that have the incentive to remain in politics, an increase in wages will increase their efforts, except for sufficiently high quality politicians where effort will remain unaffected.

In sum, this simple model of political agency predicts that higher wages will increase the quality of both those that enter politics, as well as, those that hold office. Higher wages will, however, have an ambiguous effect on performance. Given the results of our model and those the literature, the question of whether wages affect political selection and performance is an empirical one, which is the paper's main contribution.

Appendix B: Data Sources

The data used in the paper comes from a variety of sources. The data is at the level of the municipality, the lowest government unit below a state in Brazil. The main data source is the legislative census collected during 2005 by the Interlegis, a branch of Brazil's senate. Although Brazil's had 5,564 municipalities recorded as of 2005 by Brazil's Statistical Office (IBGE), the legislative census only recorded information from 5,414 municipalities. Next, we describe the source of each variable used in the analysis.

Legislature characteristics: Characteristics of the legislature come from the 2005 legislative census. Next to the answers to the questions on the wages there was a question to whether the person answering the question was sure about the wages. We restricted our analysis to answers where the informant was sure about the wage and removed some remaining outliers that represented less than 1 percent of the sample. The variables used in the analysis are as follows: *Legislator's salary* – monthly salary paid to local legislators, expressed in Reais; *Number of legislators* – the size of the legislature in 2005; *Weekly hours* – the number of hours per week the legislature is open; *Assistants per legislator* – the average number of assistants each legislator has; *Bills submitted per legislator* – the number of bills submitted in 2005 divided by the size of the legislature; *Bills approved per legislator* – the number of bills approved divided by the size of the legislature; *Functioning Commission* – an indicator variable for whether the legislature has a commission that functions; *% female legislator* – the number of female legislators divided by the size of the legislature; *% legislators age* < 40 – share of the legislature that is less than 40 years old;*% legislators age* $40-49$ – share of the legislature that is between $40-49$ years old;*% legislators age* > 49 – share of the legislature that is older than 40 years old;*% legislators in 1-2 mandate* – share of the legislature with 1-2 terms of experience; *% legislators in 3-7 mandate* – share of the legislature with 3-7 terms of experience; *Years of schooling* – the average years of schooling of legislators.

Politician's Characteristics: the Tribunal Superior Eleitoral (TSE) provides basic demographic information on each candidate that ran in the 2004 municipal elections. These data is available at www.tse.gov.br. We use this information to create the following municipal level indicators: *Number of candidates per seat* – the number of candidates that ran for local legislator divided by the size of the legislature; *Age* – the average age of the candidates that ran for office in 2004; *% female* – the share of candidates that were female; *Years of Schooling* – the average years of schooling for the candidates.

Municipal demographic characteristics: Demographic characteristics of the municipality come from 2000 population census, available at IBGE (www.ibge.gov.br). The estimate for the 2003 population was obtained from the IBGE inter-census population estimates. The variables used in the analysis are: *% Urban population* – the number of inhabitants that live in urban areas divided by the population; *Gini coefficient* – income inequality based on household income in 2000; *Literacy Rate* – share of the population that is literate; *% households with electricity* – share of households

with access to electricity; *Household income per capita* – Total household income divided by the number of persons residing in the household.

Municipal institutional and public management characteristics: the 2002 and 2005 surveys of the *Perfil dos Municípios Brasileiros: Gestão Pública* provide information on various aspects of the public administration, such as budgetary and planning procedures, the number of public employees. It also provides us with structural features such as the existence of local radio and the presence of a judge and public prosecutors.

Municipal public finance information: the National Treasury (Secretaria do Tesouro) provides information of spending and revenues through the FINBRA dataset. It contains municipal spending by categories and revenues by sources (i.e. local taxes, intergovernmental transfers). See www.tesouro.com.br

Private sector wages: the RAIS provides information of public and private sector wages for all (formal) firms in Brazil. We use this data to construct a measure of the average wage of private sector employees in municipalities.

School data: information on the number of primary schools (Ensino fundamental), their characteristics (whether they have a science or computer lab), and their teacher's characteristics is available from Edudata (www.edudata.gov.br), based on yearly school census undertaken by INEP.

Health data: information on the number of clinics managed by the municipal government and the number of doctors was taken from the Cadastro Nacional de Estabelecimentos de Saúde (CNES). The information is only available at www.datasus.gov.br for 2006. Data on the average number of medical visits for 2004 and 2006, was obtained from the Indicadores do Pacto de Atenção Básica 2006 and are available at www.datasus.gov.br.

Water and Sanitation data: information on sanitation and water network extension and connections was obtained by the *Sistema Nacional de Informações sobre Saneamento* (SNIS). The information is available at www.snis.gov.br. The information is collected using a survey of sanitation service providers in a representative sample of municipalities.

Appendix C: Examples from Legislators' Webpages

Vereadora Ana Selma, Câmara Municipal de Cabo de Santo Agostinho, PE
http://anaselma.blogspot.com/

Vereadora Ana Selma visita Cidade Garapu

Na sexta-feira passada, 22, Ana Selma e equipe estiveram, mais uma vez, em visita ao Loteamento Cidade Garapu. Na oportunidade, foram distribuídos panfletos, cujo teor tem o objetivo de prestar contas aos moradores da localidade sobre as iniciativas da Vereadora nos últimos três anos. Presença constante no Loteamento Cidade Garapu, a Vereadora Ana Selma tem se colocado ao lado dos moradores na luta por melhorias para o Bairro, realizando visitas aos moradores; Gabinete na Rua e reuniões com lideranças e representantes de entidades.

Veja algumas das iniciativas da Vereadora na Câmara para Garapu:

- Indicação solicitando a construção de uma **Escola de Ensino Fundamental e Educação Infantil**;
- Indicação solicitando providências para instalação de um **Posto do Programa Saúde da Família - PSF**;
- Indicação solicitando a **intensificação de rondas policiais** no Loteamento Cidade Garapu e adjacências;
- Indicação solicitando **a instalação de abrigos para a espera do transporte coletivo**;

Vereador Romério, Câmara Municipal de Resende, RJ
http://www.vereadorromerio.blogspot.com/

Luta por melhor qualidade na educação

Ao longo do seu mandato, Romério, conseguiu a aprovação de diversas indicações que trariam mais qualidade à Educação Pública no Município, dentre elas temos:

- A **aquisição de jornais e revistas** para as bibliotecas das escolas;
- **Implantação do ensino de informática** desde a 5 série até o 3 ano do ensino médio;
- **Construção de laboratórios de ciências e informática** nas escolas, entre outras.

Infelizmente, nada foi feito pelo Poder Executivo, neste sentido, mas Romério garante continuar lutando para diminuir a distância entre o ensino público e o particular.

Vereador José Damaso, Câmara Municipal de Palmas, TO
http://damasovereador.blogspot.com

Este é o blog do vereador Damaso. Aqui você vai encontrar as notícias sobre seu mandato e suas ações em benefício da população palmense.

A exemplo do que ocorreu em 2005, nessa legislatura na Câmara Municipal de Palmas, o vereador Damaso (PDT) já apresentou diversos requerimentos que levam benefícios para a região Sul de Palmas:

- O vereador também apresentou requerimento que solicita a **construção de salas** para alunos com necessidades especiais na área disponível da Escola Municipal Tiago Barbosa.
- Em outra propositura, o parlamentar solicitou a **implantação de um posto da Polícia** Comunitária no setor Taquari.
- Em requerimento apresentado nesta quarta-feira, na Câmara Municipal de Palmas, o vereador Damaso (PDT) solicitou a **abertura de um ambulatório médico** em Taquaralto.

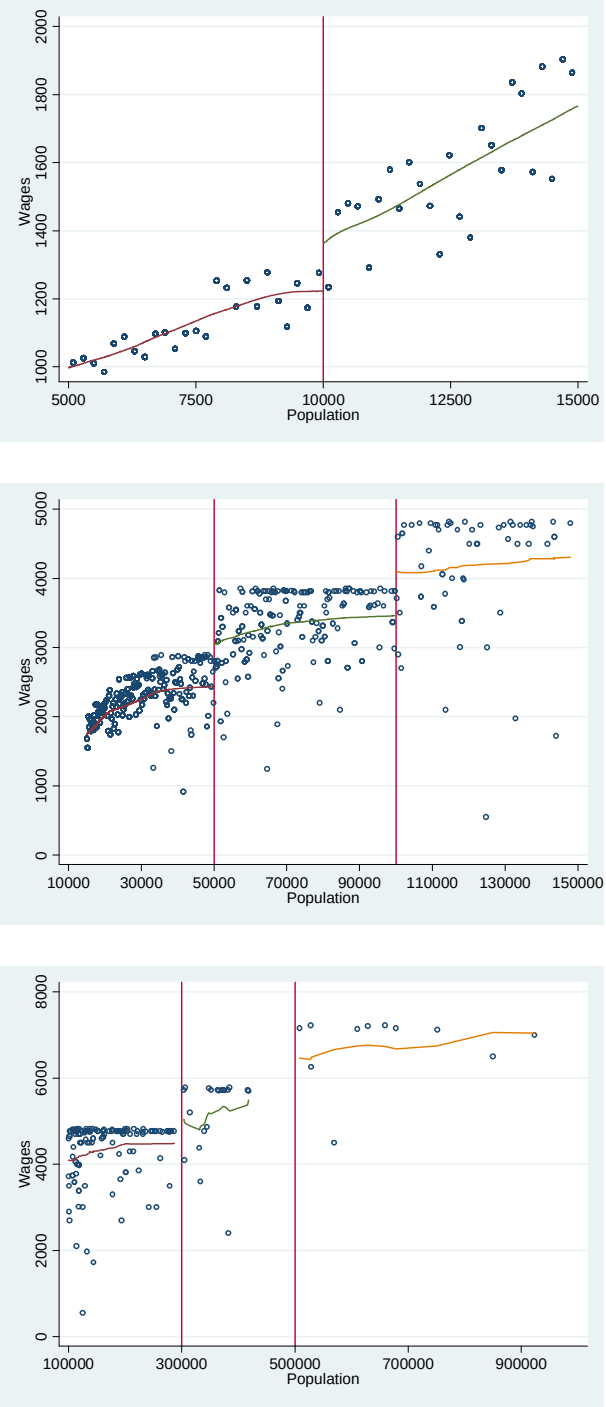
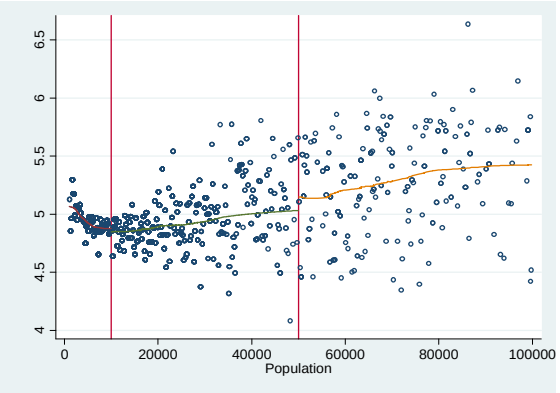
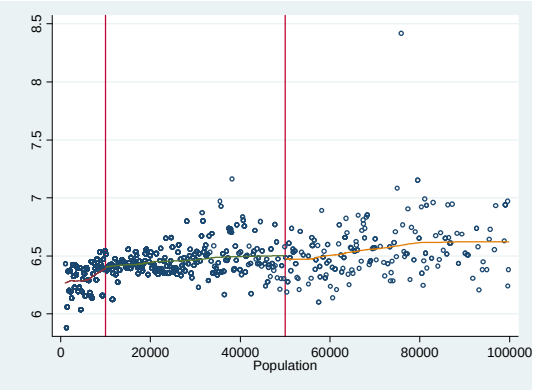


FIGURE 1: LEGISLATORS' SALARIES BY POPULATION

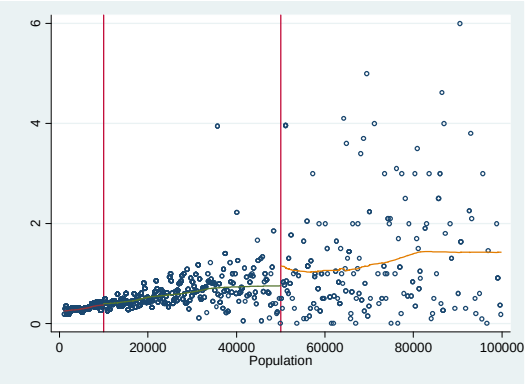
Notes: Figure shows legislators' salaries by population. Each figure presents the mean wage for a bin size of 200 inhabitants (hollow-circles) along with a locally weighted regression calculated within each population segment with a bandwidth of 0.5. The vertical lines denote the various cutoff points.



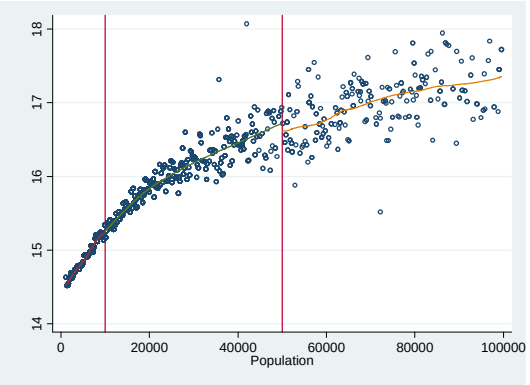
Income per capita (log)



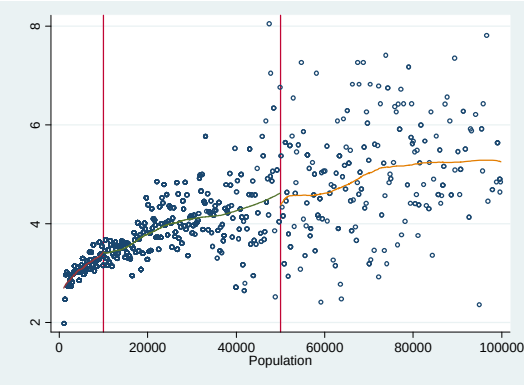
Private Sector Wages (logs)



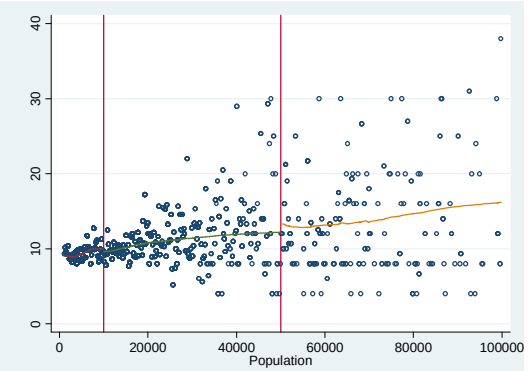
Assistants per legislators



Total Expenditure 2000



Effective Number of Political Parties in 1996 Elections



Hours in session

FIGURE 2: MUNICIPAL CHARACTERISTICS BY POPULATION

Notes: The figure shows municipal characteristics by population. Each figure presents the mean of the municipal characteristic for a bin size of 200 inhabitants (hollow-circles) along with a locally weighted regression calculated within each population segment with a bandwidth of 0.5. The vertical lines denote the various cutoff points.

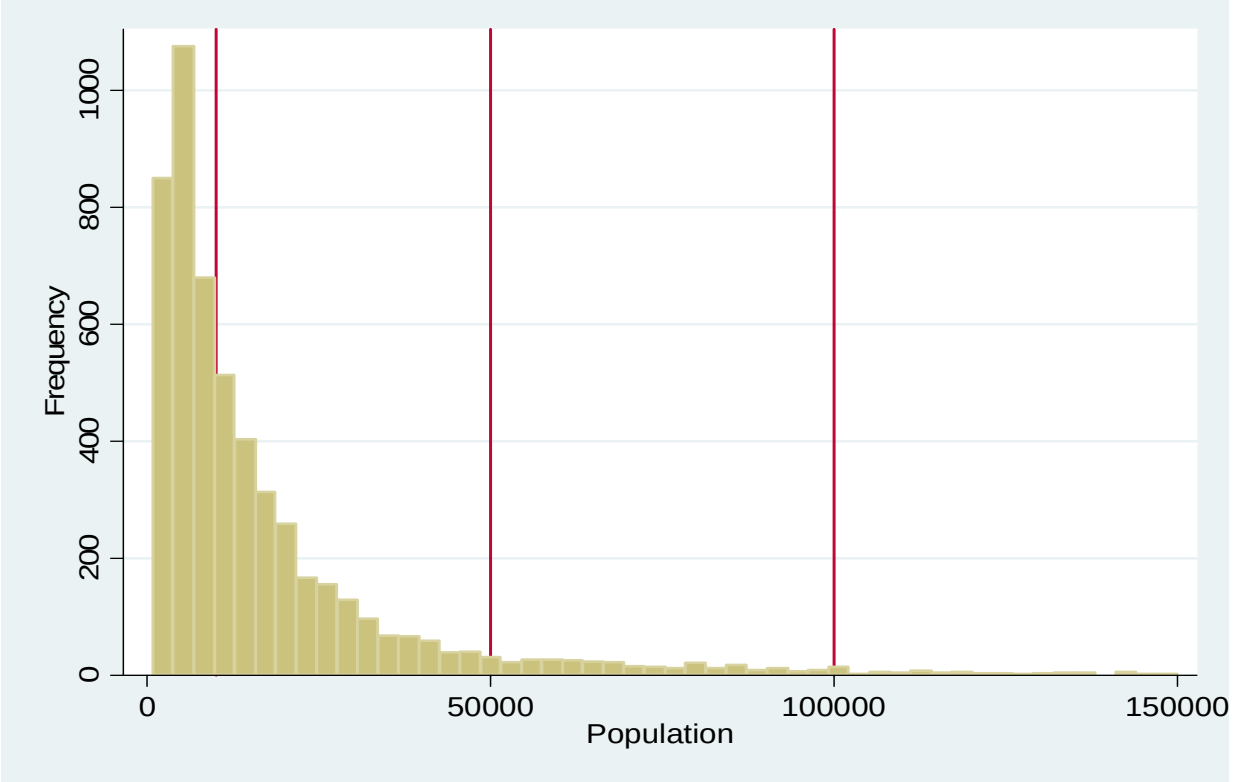
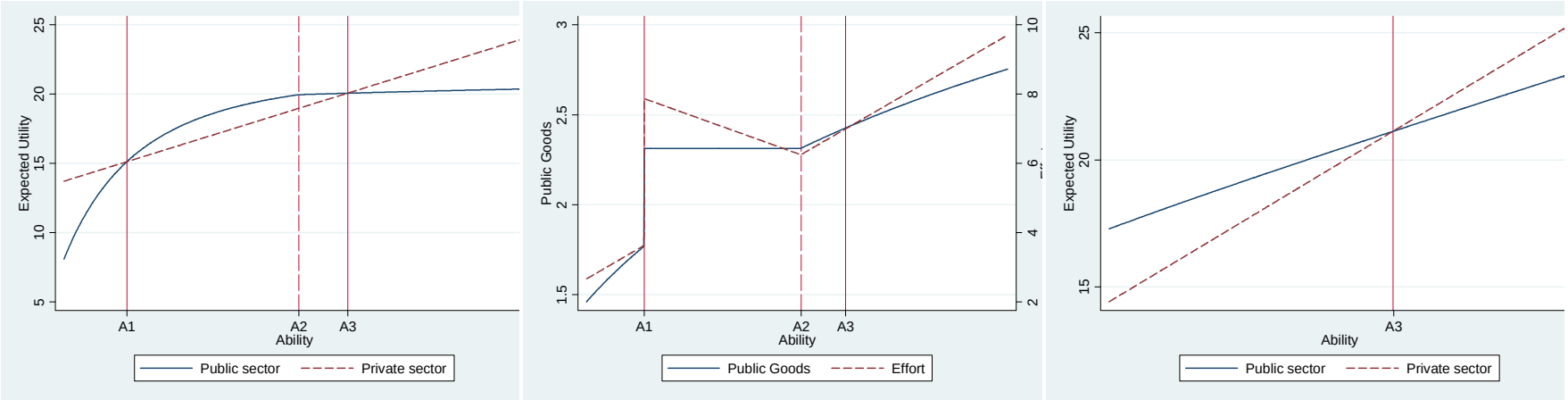


FIGURE 3: DISTRIBUTION OF 2003 POPULATION

Notes: Figure shows the distribution of the population of each municipality in our sample for the first three cutoff points (denoted by vertical lines).



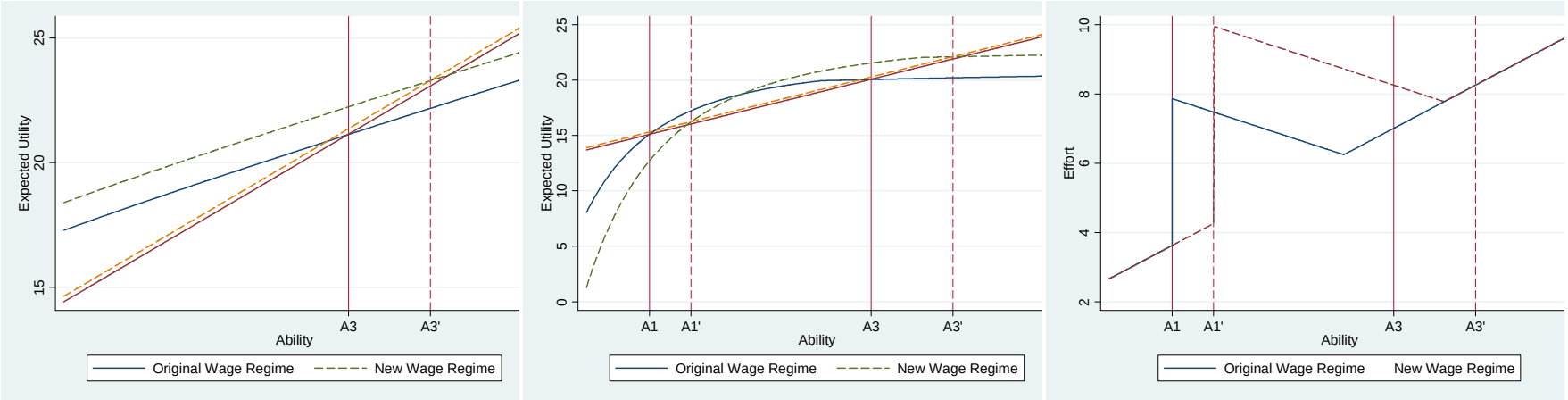
Panel A: Incentive Compatibility Constraint

Panel B: Public Good Provision and Effort

Panel C: : Participation Constraint

FIGURE A1: OUTCOMES OF THE MODEL

Notes: Figure shows the equilibrium outcomes of the model under the following functional form assumptions. Politician's utility: $U^p = w_p + \ln(\theta + e) - \frac{1}{2}\left(\frac{e}{\theta}\right)^2$; Utility in the private sector:$U^m = \alpha + \beta\theta + \ln(\theta^* + e^*)$; Public Goods: $g = \theta + e$. In Panels A and C, the y-axis is the utility that an individual will receive in each sector. For the public sector, the utility is computed assuming that the individual will exert enough effort to get re-elected. For the private sector, utility is computed for the expected amount of public goods that a randomly selected challenger will provide.



Panel A: Effects of Wages on Entry

Panel B: Effects of Wages on Selection

Panel C: Effects of Wages on Performance

FIGURE A2: THE EFFECTS OF A WAGE INCREASE ON POLITICAL SELECTION AND PERFORMANCE

Notes: Figure shows the equilibrium outcomes of the model under the following functional form assumptions. Politician's utility: $U^p = w_p + \ln(\theta + e) - \frac{1}{2}\left(\frac{e}{\theta}\right)^2$; Utility in the private sector: $U^m = \alpha + \beta\theta + \ln(\theta^* + e^*)$; Public Goods: $g = \theta + e$. In Panels A and C, the y-axis is the utility that an individual will receive in each sector. For the public sector, the utility is computed assuming that the individual will exert enough effort to get re-elected. For the private sector, utility is computed for the expected amount of public goods that a randomly selected challenger will provide.

Table 1. Constitutional Amendment No. 25, 2000

Population bracket	Cap on salary as a percentage of state legislators salary	Value of maximum allowed salary in 2004	Cap on legislative spending as a proportion of revenues	Average legislative spending as a proportion of revenues	Cap on salary spending as a proportion of legislative spending
0 to 10,000	20%	1927.1	8%	3.6%	75%
10,001 to 50,000	30%	2890.6	8%	3.0%	75%
50,001 to 100,000	40%	3854.2	8%	2.8%	75%
100,001 to 300,000	50%	4817.7	7%	2.6%	75%
300,001 to 500,000	60%	5781.2	6%	2.7%	75%
500,000 plus	75%	7226.6	5%	2.6%	75%

Notes: The population brackets and the caps on the salaries are defined by the Constitutional Amendment No. 25, 2000. The approximate salaries in 2004 are calculated based on the salary of Federal Deputies of R$ 12,847.2. The maximum legislative spending is defined as a proportion of revenues, defined as the sum of tax revenues and intergovernmental transfers in the previous year.

Table 2. Descriptive Statistics

Variable	Mean	S.D.	Quantiles 0.10	0.25	0.50	0.75	0.90
Legislature characteristics:							
Number legislators	9.21	1.21	9.00	9.00	9.00	9.00	9.00
Legislator wages	1641.56	975.04	750.00	930.00	1320.00	2100.00	2862.00
Weekly hours	10.49	7.33	4.00	8.00	8.00	12.00	20.00
Assistants per legislator	0.49	0.71	0.00	0.11	0.33	0.56	1.00
Bills submitted per legislator	0.86	1.95	0.00	0.11	0.33	0.89	2.00
Bills approved per legislator	0.69	1.31	0.00	0.11	0.33	0.78	1.60
Functioning commissions (1/0)	0.84	0.36	0.00	1.00	1.00	1.00	1.00
Legislators Characteristics:							
Average campaign spending ($)	10858.89	16930.59	2000	3000	5000	10000	20000
% female legislators	0.13	0.12	0.00	0.00	0.11	0.22	0.27
Years of schooling	9.78	2.09	7.06	8.28	9.83	11.25	12.50
% legislators without high school	0.44	0.22	0.11	0.27	0.44	0.56	0.78
% legislators with high school	0.55	0.22	0.22	0.33	0.56	0.67	0.89
% legislator from white collar	0.27	0.20	0.00	0.11	0.22	0.44	0.56
% legislators with 1 mandate	0.47	0.21	0.22	0.33	0.44	0.67	0.78
% legislators in 2-3 mandate	0.38	0.19	0.11	0.22	0.36	0.56	0.67
% legislators in 4-7 mandate	0.10	0.13	0.00	0.00	0.05	0.11	0.22
Candidates Characteristics:							
Number of candidates per seat	6.10	3.68	2.56	3.44	5.00	7.67	11.30
Number of parties per seat	1.08	0.45	0.56	0.78	1.00	1.33	1.73
Campaign spending	9644	14573	2000	3000	5000	10000	20000
Years of schooling	9.04	1.55	6.98	7.97	9.09	10.17	11.02
% candidates without high school	0.51	0.16	0.30	0.39	0.51	0.63	0.72
% candidates with high school	0.48	0.16	0.26	0.36	0.48	0.60	0.69
% candidates from white collar	0.19	0.11	0.06	0.12	0.19	0.26	0.33
% candidates female	0.20	0.07	0.11	0.16	0.21	0.25	0.29
Municipal Characteristics:							
Average municipal wages	648.08	197.45	446.52	518.12	616.65	737.87	870.11
Population in 2003 (10000s)	0.23	0.64	0.03	0.05	0.10	0.20	0.42
% Urban population	0.60	0.23	0.27	0.41	0.60	0.79	0.91
Gini coefficient	0.56	0.06	0.49	0.52	0.56	0.60	0.63
Literacy rate	0.78	0.13	0.60	0.68	0.82	0.88	0.92
% households with electricity	0.87	0.17	0.60	0.80	0.94	0.99	1.00
Household income per capita	4.96	0.57	4.18	4.45	5.05	5.44	5.67
Revenues per capita	998.70	516.05	548.08	656.69	855.34	1174.91	1627.45
School and health characteristics:							
Health center	0.68	0.47	0.00	0.00	1.00	1.00	1.00
Doctors per 1000 persons	1.72	1.23	0.48	0.84	1.42	2.30	3.33
Average number of doctor visits	1.60	1.00	0.48	0.92	1.46	2.09	2.84
Number of schools per school-aged children in 2006 (x1000)	4.04	3.48	0.86	1.50	3.00	5.62	8.67
Share of schools with a science laboratory in 2006	0.03	0.13	0.00	0.00	0.00	0.00	0.06
Share of schools with a computer lab in 2006	0.41	0.40	0.00	0.03	0.23	0.89	1.00
Sanitation network extension per capita (x100)	0.06	0.13	0.00	0.00	0.00	0.04	0.27
Water network extension per capita (x100)	0.30	0.22	0.09	0.15	0.27	0.39	0.53
Sanitation connections per capita (x100)	4.36	8.97	0.00	0.00	0.00	2.32	21.00
Water connections per capita (x100)	18.81	8.84	8.09	12.69	18.66	24.64	29.56

Notes: This table reports the mean political and socio-economic characteristics of the all the municipalities in our sample. Column 1 reports the mean of each variable and column 1 reports the standard deviation. The characteristics of the legislature are based on 2005 Brazilian Legislative Census (Censo do Legislativo). The candidate characteristics were constructed using data from Brazil's electoral commission (Tribunal Superior Eleitoral: http://www.tse.gov.br/index.html). The socio-economic characteristics were constructed using data from Brazil's statistical bureau (Instituto Brasileiro de Geografia e Estatistica: http://www.ibge.gov.br). For more information on the variables see the data appendix.

Table 3. The Effects of Politicians' Wages on Candidate Entry - OLS

Dependent variables:	Candidate characteristics					Legislators' characteristics			
	Number Candidates per Seat	Log Candidate Years of Schooling	Share of skilled occupation candidates	Share of female candidates	Log Candidates campaign spending	Log Legislators Years of Schooling	Share of skilled occupation legislators	Share of female legislators	Log Legislators campaign spending
	(1)	(2)	(4)	(3)	(5)	(6)	(8)	(7)	(9)
Log wages	2.707	0.718	0.002	0.013	0.594	0.812	0.032	-0.009	0.650
	[0.123]***	[0.043]***	[0.003]	[0.002]***	[0.029]***	[0.060]***	[0.006]***	[0.004]**	[0.031]***
Population (1/100000)	1.107	0.184	0.009	-0.001	0.220	0.245	0.028	0.000	0.226
	[0.260]***	[0.033]***	[0.002]***	[0.001]	[0.032]***	[0.048]***	[0.005]***	[0.002]	[0.034]***
Log income per capita	-0.686	0.329	0.028	-0.007	0.307	0.445	0.019	-0.010	0.330
	[0.167]***	[0.084]***	[0.007]***	[0.004]*	[0.050]***	[0.117]***	[0.012]	[0.008]	[0.053]***
% urban population	4.156	1.510	0.046	0.076	-0.136	2.267	0.112	0.026	-0.106
	[0.196]***	[0.099]***	[0.008]***	[0.005]***	[0.062]**	[0.138]***	[0.014]***	[0.009]***	[0.064]*
Gini	-0.871	1.400	0.029	0.021	0.007	1.842	0.011	0.053	0.214
	[0.722]	[0.353]***	[0.029]	[0.018]	[0.218]	[0.493]***	[0.054]	[0.034]	[0.232]
% households with energy	-1.183	1.233	0.027	-0.005	0.008	0.946	-0.003	0.002	0.069
	[0.286]***	[0.166]***	[0.014]*	[0.009]	[0.094]	[0.226]***	[0.025]	[0.016]	[0.100]
% literate	5.746	0.773	-0.105	-0.008	-1.558	0.475	-0.058	-0.071	-1.784
	[0.644]***	[0.350]**	[0.030]***	[0.018]	[0.202]***	[0.488]	[0.053]	[0.033]**	[0.216]***
Log (wages municipality)	1.312	-0.028	0.027	0.007	0.271	0.205	0.044	-0.008	0.285
	[0.192]***	[0.088]	[0.009]***	[0.005]	[0.058]***	[0.126]	[0.015]***	[0.008]	[0.062]***
Hours functioning legislature	0.004	0.005	0.000	0.000	0.004	0.008	0.001	0.000	0.003
	[0.006]	[0.002]**	[0.000]	[0.000]	[0.002]**	[0.003]**	[0.000]**	[0.000]	[0.002]
Assistants per legislator	0.447	0.163	0.006	0.005	0.092	0.194	0.023	0.003	0.094
	[0.094]***	[0.032]***	[0.002]***	[0.001]***	[0.019]***	[0.059]***	[0.004]***	[0.003]	[0.020]***
Mean of dependent variable	6.103	9.037	0.193	0.205	8.739	9.780	0.273	0.128	8.808
Observations	4889	4887	4890	4889	4824	4888	4890	4892	4818
R-squared	0.54	0.38	0.06	0.10	0.27	0.33	0.10	0.02	0.28

Notes: This table reports the OLS estimates for the effects of wages on the characteristics of those that ran and were elected for legislature in the 2004 elections. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets.

Table 4. First-Stage Results

Dependent variable	Log wages		
	(1)	(2)	(3)
$1\{x>10{,}000\}$	0.208	0.213	0.213
	[0.019]***	[0.019]***	[0.019]***
$1\{x>50{,}000\}$	-0.052	-0.025	0.02
	[0.037]	[0.036]	[0.029]
$1\{x>100{,}000\}$	0.115	0.129	0.23
	[0.063]*	[0.061]**	[0.033]***
$1\{x>300{,}000\}$	0.024	0.048	0.143
	[0.079]	[0.084]	[0.057]**
$1\{x>500{,}000\}$	0.142	0.102	0.142
	[0.214]	[0.227]	[0.086]*
x	4.932	4.407	4.407
	[0.275]***	[0.276]***	[0.276]***
$(x-10{,}000)*1\{x>10{,}000\}$	-3.056	-2.667	-2.67
	[0.286]***	[0.287]***	[0.287]***
$(x-50{,}000)*1\{x>50{,}000\}$	-1.567	-1.486	-1.717
	[0.151]***	[0.145]***	[0.081]***
$(x-100{,}000)*1\{x>100{,}000\}$	-0.219	-0.188	
	[0.133]*	[0.128]	
$(x-300{,}000)*1\{x>300{,}000\}$	-0.006	0.013	
	[0.133]	[0.143]	
$(x-500{,}000)*1\{x>500{,}000\}$	-0.076	-0.071	
	[0.127]	[0.138]	
Municipal characteristics	No	Yes	Yes
Observations	4892	4892	4892
R-squared	0.67	0.68	0.68
F-test	29.10	29.72	39.00
(P-values)	[0.00]	[0.00]	[0.00]

Notes: This table reports the OLS estimate of the effects of the population cutoff on log wages. The running variable x refers to the population in 2003. All regressions control for the number of hours the legislature functions per week and assistants per legislator from the 2005 Brazilian Legislative Census (Censo do Legislativo). Municipal Characteristics include Log household income per capita, % urban population, Gini coefficient, % households with energy, % literate population and Log average wages in municipality. All regressions control for log(average wage in private and public sector in municipality). * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The reported F-test refers to the cut-off indicators.

Table 5. Robustness Test – Smoothness

Dependent variable	Log private Sector Wages	Log income per capita	Gini Coefficient	% urban population	% households with electricity	% households with water	Literacy rate	Years of schooling mayor	Age of mayor	Mayor in second term	Male mayor	% population secondary education	Number of assistants per legislator	Hours legislative functions per week
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1{x>10,000}	0.011	0.02	-0.004	-0.016	0.004	-0.69	0.004	-0.088	-0.271	0.027	-0.017	0.21	-0.016	-0.626
	[0.034]	[0.033]	[0.003]	[0.013]	[0.010]	[1.735]	[0.007]	[0.257]	[0.568]	[0.026]	[0.016]	[0.430]	[0.022]	[0.379]*
1{x>50,000}	-0.078	0.014	-0.018	-0.022	0.002	2.713	0.005	-0.528	1.863	0.045	0.006	-0.362	0.094	-1.353
	[0.033]**	[0.076]	[0.007]**	[0.026]	[0.020]	[3.585]	[0.016]	[0.435]	[1.322]	[0.059]	[0.037]	[1.271]	[0.193]	[1.150]
1{x>100,000}	-0.004	-0.001	-0.008	0.01	-0.023	1.083	-0.01	1.416	3.988	-0.092	-0.002	1.082	0.023	-1.754
	[0.056]	[0.101]	[0.011]	[0.029]	[0.020]	[4.312]	[0.018]	[0.664]**	[1.919]**	[0.098]	[0.043]	[1.740]	[0.394]	[2.327]
1{x>300,000}	-0.018	0.059	-0.022	-0.005	-0.004	7.759	0.024	-0.21	2.072	-0.212	0.066	-0.448	-0.28	4.713
	[0.093]	[0.182]	[0.019]	[0.023]	[0.010]	[3.676]**	[0.016]	[1.947]	[3.828]	[0.161]	[0.061]	[4.201]	[0.873]	[6.705]
1{x>500,000}	-0.095	-0.174	0.033	0.045	0.003	0.291	-0.008	-2.47	3.203	-0.565	0.186	-5.675	-1.969	6.034
	[0.263]	[0.448]	[0.038]	[0.035]	[0.006]	[5.882]	[0.032]	[3.061]	[9.329]	[0.471]	[0.190]	[9.689]	[1.950]	[12.773]
x	1.898	-2.895	0.478	0.712	-0.708	-178.844	-0.832	16.838	17.494	-1.356	0.274	-11.922	1.865	17.788
	[0.679]***	[0.474]***	[0.050]***	[0.202]***	[0.151]***	[25.983]***	[0.104]***	[4.087]***	[8.862]**	[0.410]***	[0.239]	[6.027]**	[0.282]***	[5.320]***
(x-10,000)*1{x>10,000}	-1.558	3.618	-0.414	-0.189	0.819	194.57	0.918	-10.474	-14.26	1.386	-0.35	32.675	-0.462	-7.685
	[0.683]**	[0.494]***	[0.052]***	[0.208]	[0.155]***	[26.861]***	[0.108]***	[4.184]**	[9.165]	[0.423]***	[0.249]	[6.412]***	[0.316]	[5.618]
(x-50,000)*1{x>50,000}	0.115	0.068	-0.083	-0.234	0.099	15.169	0.122	-7.041	-7.321	0.158	0.229	-0.646	-0.519	-0.757
	[0.136]	[0.286]	[0.028]***	[0.091]**	[0.071]	[13.316]	[0.057]**	[1.771]***	[5.272]	[0.238]	[0.129]*	[4.674]	[0.778]	[5.281]
(x-100,000)*1{x>100,000	-0.403	-0.714	0.021	-0.254	-0.191	-29.145	-0.197	0.467	2.151	-0.193	-0.17	-17.891	-0.558	-6.598
	[0.122]***	[0.258]***	[0.026]	[0.077]***	[0.061]***	[11.741]**	[0.049]***	[1.602]	[4.909]	[0.226]	[0.115]	[4.326]***	[0.858]	[5.328]
(x-300,000)*1{x>300,000	0.057	0.097	0.01	-0.045	-0.02	-5.553	-0.016	1.484	1.724	0.371	-0.077	4.991	0.03	-3.721
	[0.150]	[0.291]	[0.023]	[0.027]	[0.011]*	[3.945]	[0.020]	[2.311]	[5.234]	[0.273]	[0.107]	[6.554]	[1.262]	[8.715]
(x-500,000)*1{x>500,000	-0.103	-0.161	-0.009	0.009	0.001	3.474	0.005	-1.226	-0.035	-0.367	0.094	-6.481	-0.378	0.061
	[0.144]	[0.285]	[0.021]	[0.022]	[0.004]	[3.006]	[0.017]	[2.263]	[5.108]	[0.263]	[0.099]	[6.433]	[1.201]	[8.542]
Observations	4894	4894	4894	4894	4894	4894	4894	4464	4894	4894	4894	4894	4894	4894
R-squared	0.03	0.08	0.07	0.16	0.03	0.05	0.07	0.06	0.01	0.01	0	0.28	0.2	0.08
F-test	1.28	0.24	2.00	0.98	0.46	1.25	0.88	1.86	1.06	0.93	0.69	0.6	0.29	0.88
(P-values)	0.26	0.94	0.08	0.42	0.81	0.28	0.49	0.11	0.38	0.46	0.63	0.70	0.92	0.49

Notes: The dependent variable is specified in each column. The running variable x refers to the population in 2003. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The reported F-test refers to the cut-off indicators.

Table 6: The Effects of Wages on Number Candidates and Parties

Dependent variable:	Number of Candidates per Seat		Number of parties per seat		Log Campaign spending per candidate		Log Campaign spending per elected legislator	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log wages	1.424	1.327	0.183	0.177	0.477	0.389	0.46	0.368
	[0.597]**	[0.547]**	[0.089]**	[0.086]**	[0.203]**	[0.201]*	[0.210]**	[0.208]*
F-test (exc. instruments)	29.52	29.45	29.86	29.79	28.82	28.95	28.6	28.73
Municipal characteristics	No	Yes	No	Yes	No	Yes	No	Yes
Observations	4889	4889	4890	4890	4824	4824	4818	4818

Notes: The table reports the TSLS estimates for the effects of wages on the number of candidates and parties that participated in the 2004 elections. All regressions control for the number of hours the legislature functions per week and assistants per legislator. Municipal Characteristics include Log household income per capita, % urban population, Gini coefficient, % households with energy, % literate population, log average wage in private and public sector in municipality, and a linear spline in population. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The instruments used are the indicators for the cutoffs at 1{x>10,000}, 1{x>50,000}, 1{x>100,000}, 1{x>300,000} and 1{x>500,000}. The reported F-test refers to these excluded instruments.

Table 7. The Effects of Politicians' Wages on Candidate Selection

Dependent variable:	Log Years of schooling		Share with at least a high school education		Share skilled occupations		Share of female	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Candidate characteristics								
Log wages	0.584	0.602	0.062	0.068	0.062	0.062	0.026	0.028
	[0.352]*	[0.318]*	[0.037]*	[0.035]*	[0.028]**	[0.027]**	[0.017]	[0.017]*
F-test (exc. instruments)	29.12	29.76	29.12	29.76	30.03	29.93	29.12	29.76
Panel B. Legislators' characteristics								
Log wages	0.885	0.876	0.107	0.11	0.084	0.079	0.039	0.043
	[0.478]*	[0.444]**	[0.053]**	[0.051]**	[0.049]*	[0.048]	[0.031]	[0.031]
F-test (exc. instruments)	29.12	29.76	29.12	29.76	30.03	29.93	29.12	29.76
Municipal characteristics	No	Yes	No	Yes	No	Yes	No	Yes
Observations	4887	4887	4889	4889	4890	4890	4889	4889

Notes: The table reports the TSLS estimates for the effects of wages on the characteristics of those that ran and were elected as legislators in the 2004 elections. All regressions control for the number of hours the legislature functions per week and assistants per legislator. Municipal Characteristics include Log household income per capita, % urban population, Gini coefficient, % households with energy, % literate population, log average wage in private and public sector in municipality, and a linear spline in population. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The instruments used are the indicators for the cutoffs at 1{x>10,000}, 1{x>50,000}, 1{x>100,000}, 1{x>300,000} and 1{x>500,000}. The reported F-test refers to these excluded instruments.

Table 8. The Effects of Politicians' Wages on Re-election and Tenure

Dependent variable:	Reelection rate		Reelection rate less educated		Reelection rate more educated		Average Number of Terms		Share of legislators in 1st term		Share of legislators in 2nd-3rd terms		Share of legislators in 4th-7th terms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Panel A: IV estimates														
Log Wages	0.060	0.063	0.036	0.038	0.126	0.132	0.382	0.41	-0.037	-0.038	0.009	0.010	0.082	0.087
	[0.038]	[0.037]*	[0.060]	[0.058]	[0.078]	[0.077]*	[0.155]**	[0.151]***	[0.053]	[0.053]	[0.049]	[0.049]	[0.031]***	[0.031]***
F-test (excl. instruments)	29.31	29.47	25.81	27.17	25.8	26.53	29.68	29.62	29.68	29.62	29.68	29.62	29.68	29.62
Panel B: OLS estimates														
Log Wages	0.053	0.048	0.04	0.038	0.071	0.068	0.136	0.132	-0.055	-0.052	0.017	0.016	0.031	0.031
	[0.007]***	[0.007]***	[0.011]***	[0.011]***	[0.014]***	[0.014]***	[0.028]***	[0.030]***	[0.010]***	[0.010]***	[0.009]*	[0.009]*	[0.006]***	[0.006]***
R-squared	0.05	0.12	0.03	0.05	0.02	0.05	0.03	0.06	0.03	0.06	0.01	0.01	0.04	0.07
Municipal characteristics	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	4890	4890	3884	3884	3733	3733	4892	4892	4892	4892	4892	4892	4892	4892

Notes: The table reports the TSLS and OLS estimates for the effects of wages on re-election rates for 2004 elections. The dependent variable in columns 1 and 2 is the proportion of legislators that were re-elected in 2004. The dependent variable in columns 3-4 is the proportion of legislators with less than a high school degree that were re-elected in 2004. The dependent variable in columns 5-6 is the proportion of legislators with at least a high school degree that were re-elected in 2004. All regressions control for the number of hours the legislature functions per week and assistants per legislator. Municipal Characteristics include Log household income per capita, % urban population, Gini coefficient, % households with energy, % literate population, log average wage in private and public sector in municipality, and a linear spline in population. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The instruments used are the indicators for the cutoffs at 1{x>10,000}, 1{x>50,000}, 1{x>100,000}, 1{x>300,000} and 1{x>500,000}. The reported F-test refers to these excluded instruments.

Table 9. The Effects of Wages on Legislative Productivity

Dependent variable:	Log Number of Bill Submitted		Log number of Bill Approved		Share of Bills Approved		Functioning Commission	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: IV estimates								
Log Wages	0.466	0.436	0.495	0.506	0.275	0.297	0.208	0.206
	[0.254]*	[0.251]*	[0.263]*	[0.264]*	[0.096]***	[0.099]***	[0.097]**	[0.098]**
F-test (exc. instruments)	27.18	26.63	25.29	24.51	20.62	19.91	29.83	29.72
Panel B: OLS estimates								
Log Wages	0.531	0.502	0.438	0.411	-0.022	-0.023	0.101	0.09
	[0.044]***	[0.041]***	[0.035]***	[0.035]***	[0.011]**	[0.011]**	[0.011]***	[0.012]***
R-squared	0.18	0.24	0.15	0.18	0.03	0.05	0.02	0.03
Municipal characteristics	No	Yes	No	Yes	No	Yes	No	Yes
Observations	4471	4471	4216	4216	3392	3392	4894	4894

Notes: The table reports the OLS and TSLS estimates for the effects of wages on legislative productivity. The dependent variable in columns 1 and 2 is the log of one plus the number of bills submitted. The dependent variable in columns 3-4 is the log of one plus the number of bills approved. All regressions control for the number of hours the legislature functions per week and assistants per legislator. Municipal Characteristics include Log household income per capita, % urban population, Gini coefficient, % households with energy, % literate population, log average wage in private and public sector in municipality, and a linear spline in population. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The instruments used are the indicators for the cutoffs at 1{x>10,000}, 1{x>50,000}, 1{x>100,000}, 1{x>300,000} and 1{x>500,000}. The reported F-test refers to these excluded instruments.

Table 10. The Effects of Wages on Public Good Provision

	Education			Health			Sanitation and Water			
Dependent variable:	Number of schools per school aged child (x1000)	Share of schools with a science lab	Share of schools with a computer lab	Health Clinic	Number of doctors per capita (x1000)	Average number of doctor visits	Sanitation network extension per capita (x100)	Water network extension per capita (x100)	Sanitation connections per capita (x100)	Water connections per capita (x100)
	(1)	(2)	(3)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A: IV estimates										
Log Wages	1.27	0.068	0.175	0.242	0.639	0.521	0.073	0.028	3.201	0.457
	[0.688]*	[0.029]**	[0.073]**	[0.129]*	[0.279]**	[0.241]**	[0.036]**	[0.052]	[2.353]	[1.741]
F-test (exc. instruments)	26.21	26.21	26.21	27.31	28.59	30.23	21.54	26.49	22.05	26.68
Panel B: OLS estimates										
Log Wages	-0.292	-0.015	-0.064	0.104	0.142	-0.088	-0.033	-0.063	-2.371	-2.028
	[0.093]***	[0.005]***	[0.011]***	[0.016]***	[0.033]***	[0.035]**	[0.005]	[0.006]	[0.328]	[0.221]
R-squared	0.48	0.07	0.54	0.04	0.31	0.16	0.27	0.27	0.31	0.50
Municipal characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4736	4736	4736	4012	4857	4825	3479	3928	3483	3935

Notes: The table reports the OLS and TSLS estimates for the effects of wages on the provision of certain public goods. The dependent variables refer to 2006 levels. In column 5, the dependent variable is an indicator for whether or not a health clinic exists. All regressions control for the number of hours the legislature functions per week and assistants per legislator. Municipal Characteristics include Log household income per capita, % urban population, Gini coefficient, % households with energy, % literate population, log average wage in private and public sector in municipality, and a linear spline in population. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The instruments used are the indicators for the cutoffs at 1{x>10,000}, 1{x>50,000}, 1{x>100,000}, 1{x>300,000} and 1{x>500,000}. The reported F-test refers to these excluded instruments.

Table 11. The Effects of Wages and Legislative Characteristics on Legislative Productivity

Dependent variable:	Log number of Bill Submitted	Log number of Bill Approved	Share of Bills Approved	Functioning Commission	Number of schools	Share of schools with a science lab	Share of schools with a computer	Health Clinic	Number of doctors per capita (x1000)	Average number of doctor visits
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(9)	(10)	(11)
Log Wages	0.384	0.476	0.312	0.224	1.173	0.064	0.164	0.259	0.559	0.496
	[0.255]	[0.270]*	[0.100]***	[0.100]**	[0.698]*	[0.029]**	[0.074]**	[0.133]*	[0.282]**	[0.245]**
Share of legislator with 3 or more terms	0.136	0.082	-0.034	-0.111	0.379	0.013	0.022	-0.111	0.249	0.142
	[0.096]	[0.099]	[0.030]	[0.032]***	[0.288]	[0.010]	[0.024]	[0.046]**	[0.097]**	[0.080]*
Share of female legislators	-0.352	-0.32	-0.011	0.002	0.189	0.006	0.022	-0.037	-0.29	-0.204
	[0.119]***	[0.132]**	[0.048]	[0.044]	[0.345]	[0.015]	[0.034]	[0.062]	[0.123]**	[0.114]*
Share of legislator with at least high school	0.323	0.228	-0.05	-0.006	-0.162	0.02	0.079	-0.026	0.369	0.106
	[0.074]***	[0.076]***	[0.028]*	[0.028]	[0.207]	[0.010]**	[0.022]***	[0.040]	[0.081]***	[0.072]
Share of legislators with a white collar professio	0.006	0.022	-0.012	-0.013	0.681	0.001	-0.034	-0.001	0.109	0.085
	[0.075]	[0.075]	[0.028]	[0.029]	[0.209]***	[0.009]	[0.021]	[0.041]	[0.079]	[0.070]
Average age of legislators	0	-0.002	0	0	0.01	0	0	0	0.004	0.001
	[0.001]	[0.002]	[0.000]	[0.000]	[0.004]***	[0.000]	[0.000]	[0.001]	[0.001]***	[0.001]
Municipal characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4467	4212	3387	4890	4801	4539	4539	4010	4855	4890

Notes: The table reports the TSLS estimates for the effects of wages on legislative productivity controlling for the characteristics of the legislators. All regressions control for the number of hours the legislature functions per week and assistants per legislator. Municipal Characteristics include Log household income per capita, % urban population, Gini coefficient, % households with energy, % literate population, log average wage in private and public sector in municipality, and a linear spline in population. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The instruments used are the indicators for the cutoffs at 1{x>10,000}, 1{x>50,000}, 1{x>100,000}, 1{x>300,000} and 1{x>500,000}. The reported F-test refers to these excluded instruments.

Table 12. Robustness Test – Functional form assumption

	Linear Spline	Flexible polynomial on population (quartic)				Linear Spline	
	Flexible control for municipal characteristics	Full Sample	5 percent sample	10 percent sample	Salary Cap as Instrument	Flexible control for federal block grant	Control for council size
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Candidates							
Number of Candidates per Seat	1.539	3.767	4.971	4.282	3.535	2.425	1.331
	[0.528]***	[0.223]***	[1.132]***	[0.962]***	[0.272]***	[0.664]***	[0.528]**
			(499)	(719)			
Number of Political Parties per Seat	0.206	0.584	0.559	0.596	0.479	0.357	0.143
	[0.083]**	[0.030]***	[0.131]***	[0.111]***	[0.037]***	[0.104]***	[0.084]*
			(499)	(719)			
Campaign Spending	0.481	0.609	0.815	0.95	0.483	0.427	0.323
	[0.196]**	[0.065]***	[0.271]***	[0.226]***	[0.082]***	[0.231]*	[0.199]
			(491)	(710)			
Average Years of Schooling	0.684	1.353	1.123	1.417	1.2	0.842	0.54
	[0.303]**	[0.096]***	[0.399]***	[0.336]***	[0.119]***	[0.362]**	[0.308]*
			(499)	(719)			
At least a high school education	0.07	0.137	0.126	0.145	0.122	0.091	0.06
	[0.033]**	[0.010]***	[0.045]***	[0.037]***	[0.013]***	[0.040]**	[0.034]*
			(499)	(719)			
White collar	0.056	-0.01	0.005	0.009	-0.004	0.035	0.057
	[0.026]**	[0.008]	[0.032]	[0.027]	[0.010]	[0.031]	[0.027]**
			(499)	(719)			
Share of female candidates	0.031	0.02	0.022	0.01	0.018	0.024	0.027
	[0.016]*	[0.005]***	[0.019]	[0.016]	[0.006]***	[0.020]	[0.017]
			(499)	(719)			
Panel B:: Legislators							
Campaign Spending	0.452	0.655	0.774	0.93	0.527	0.439	0.33
	[0.203]**	[0.068]***	[0.265]***	[0.235]***	[0.085]***	[0.240]*	[0.207]
			(488)	(707)			
Average education	0.907	1.673	1.673	2.078	1.416	1.227	0.835
	[0.427]**	[0.134]***	[0.573]***	[0.485]***	[0.166]***	[0.518]**	[0.434]*
			(499)	(719)			
Share with at least high school	0.11	0.173	0.168	0.21	0.15	0.158	0.099
	[0.050]**	[0.015]***	[0.068]**	[0.057]***	[0.019]***	[0.060]***	[0.050]**
			(499)	(719)			
White collar	0.072	0.033	0.061	0.062	0.012	0.071	0.07
	[0.047]	[0.015]**	[0.067]	[0.056]	[0.018]	[0.056]	[0.048]
			(499)	(719)			
Share of female legislators	0.037	0.014	0.048	0.055	0.01	0.018	0.039
	[0.030]	[0.010]	[0.043]	[0.035]	[0.012]	[0.036]	[0.031]
			(499)	(719)			

Table 12. Robustness Test – Functional form assumption (continued…)

	Linear Spline	Flexible polynomial on population (quartic)				Linear Spline	
	Flexible control for municipal characteristics	Full Sample	5 percent sample	10 percent sample	Salary Cap as Instrument	Flexible control for federal block grant	Control for council size
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel C: legislative productivity							
Log number of bills submitted	0.463	0.567	0.553	0.784	0.47	0.621	0.373
	[0.244]*	[0.102]***	[0.586]	[0.486]	[0.117]***	[0.300]**	[0.249]
			(467)	(676)			
Log number of bills approved	0.523	0.655	1.181	1.147	0.615	0.671	0.454
	[0.257]**	[0.084]***	[0.360]***	[0.304]***	[0.104]***	[0.326]**	[0.262]*
			(442)	(642)			
Share of bills approved	0.291	0.059	0.136	0.106	0.111	0.303	0.305
	[0.096]***	[0.029]**	[0.110]	[0.096]	[0.040]***	[0.120]**	[0.098]***
			(380)	(552)			
Functioning commission	0.194	0.175	0.101	0.13	0.164	0.231	0.18
	[0.095]**	[0.029]***	[0.123]	[0.101]	[0.035]***	[0.112]**	[0.097]*
			(499)	(719)			
Panel D: Public goods provision							
Number of schools per school-aged child (x1000)	1.337	0.38	3.744	1.446	0.638	0.48	1.489
	[0.653]**	[0.732]	[2.766]	[2.096]	[0.774]	[0.754]	[0.679]**
			(427)	(643)			
Share of schools with a science lab	0.062	0.021	-0.007	0.012	0.031	0.038	0.063
	[0.027]**	[0.026]	[0.080]	[0.066]	[0.028]	[0.029]	[0.028]**
			(427)	(643)			
Share of schools with a computer lab	0.163	0.144	0.352	0.275	0.178	0.077	0.18
	[0.068]**	[0.085]*	[0.306]	[0.242]	[0.088]**	[0.078]	[0.071]**
			(427)	(643)			
Health clinic	0.198	0.184	0.402	0.28	0.194	0.291	0.218
	[0.128]	[0.037]***	[0.145]***	[0.123]**	[0.047]***	[0.167]*	[0.130]*
			(464)	(659)			
Number of doctors per capita (x1000)	0.668	0.275	0.619	0.425	0.345	0.361	0.663
	[0.270]**	[0.090]***	[0.460]	[0.399]	[0.101]***	[0.310]	[0.275]**
			(493)	(713)			
Average number of doctor visits	0.501	0.019	-0.798	-0.696	0.133	0.034	0.527
	[0.232]**	[0.259]	[0.942]	[0.740]	[0.273]	[0.288]	[0.239]**
			(430)	(650)			

Notes: All regressions control for the number of hours the legislature functions per week and assistants per legislator and the full set of municipal characteristics. Column 1 controls for a linear-spline in population and a 4^{th} order polynomial in all of the municipal characteristics. Columns 2-5 controls for 4^{th} order polynomial in population. * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The instruments used are the indicators for the cutoffs at 1{x>10,000}, 1{x>50,000}, 1{x>100,000}, 1{x>300,000} and 1{x>500,000}. The reported F-test refers to these excluded instruments.

Table A1. The Effects of Block Grants on Political Selection and Performance

	Total Number of Candidates per Seat	Average Years of Schooling	Average Number of Terms	Average Education	Log number of Bill Submitted	Log number of Bill Approved	Change in number of schools	Change in share of schools with a science lab	Change in share of schools with a computer lab	Number of health clinics per capita (x1000)	Number of doctors per capita (x1000)	Change in the average number of doctor visits
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1{x>13584}	0.38	-0.003	-0.008	-0.33	-0.043	0	-0.594	0.001	0.015	0.025	0.11	-0.095
	[0.336]	[0.158]	[0.076]	[0.405]	[0.136]	[0.140]	[0.564]	[0.005]	[0.020]	[0.023]	[0.127]	[0.111]
1{x>16980}	-0.436	0.054	-0.038	0.195	0.064	0.059	-0.707	0.003	0.012	-0.014	0.133	-0.05
	[0.366]	[0.162]	[0.081]	[0.454]	[0.145]	[0.143]	[0.673]	[0.006]	[0.020]	[0.022]	[0.119]	[0.107]
1{x>23772}	-0.151	0.159	-0.054	0.872	-0.187	-0.023	-0.996	0.005	0.006	-0.002	-0.038	0.177
	[0.390]	[0.158]	[0.106]	[0.549]	[0.147]	[0.146]	[0.974]	[0.008]	[0.022]	[0.020]	[0.126]	[0.115]
1{x>30564}	0.367	0.179	-0.119	1.266	-0.199	-0.222	0.637	-0.001	-0.024	-0.026	-0.168	-0.043
	[0.542]	[0.190]	[0.168]	[0.658]*	[0.175]	[0.168]	[1.302]	[0.009]	[0.022]	[0.025]	[0.169]	[0.152]
1{x>44148}	0.069	0.269	-0.089	1.732	0.113	0.131	2.319	0.003	-0.007	0.001	0.03	-0.06
	[0.600]	[0.211]	[0.261]	[0.748]**	[0.202]	[0.202]	[1.604]	[0.007]	[0.022]	[0.028]	[0.196]	[0.142]
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
F-test (excluded instruments	0.91	0.57	0.18	1.86	0.72	0.7	0.96	0.17	0.45	0.74	0.57	0.79
P-value	0.47	0.72	0.97	0.10	0.61	0.62	0.44	0.97	0.82	0.60	0.72	0.56
Observations	1999	1999	2001	2001	1832	1721	1831	1984	1984	1841	1999	1993
R-squared	0.34	0.32	0.06	0.06	0.16	0.12	0.03	0	0.05	0.07	0.37	0.01

Notes: This table present OLS estimates for the effects of the block grant cutoffs on various characteristics of political selection and performance, for municipalities with a population of 10,000-50,000, where wages are held constant. All regressions control for the number of hours the legislature functions per week and assistants per legislator. Municipal Characteristics include Log household income per capita, % urban population, Gini coefficient, % households with energy, % literate population and Log average wages in municipality. All regressions control for log(average wage in private and public sector in municipality). * indicates statistical significance at the 10% level, ** at the 5% level and *** at the 1% level. Robust standard errors are reported in brackets. The instruments used are the indicators for the cutoffs at 1{x>10,000}, 1{x>50,000}, 1{x>100,000}, 1{x>300,000} and 1{x>500,000}. The reported F-test refers to cutoffs.