The Real Effects of Politicians' Compensation[1]

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Abstract

We study how politicians' compensation affects the real economy. Specifically, we investigate the effect of legislators' wages on business activity in Brazil. We identify our results using a constitutional amendment that established salary caps for legislators in a given municipality based on arbitrary population cutoffs. We find that higher politician wages are associated with stronger firm and job creation and increases in firms' revenues and investments. Better paid legislators increase the municipality's budget surplus while increasing expenditure in education and health care. Our evidence is consistent with local legislators affecting firms mainly through improvements in fiscal policy.

KEYWORDS: POLITICIAN SALARY, LOCAL ECONOMY, FIRM CREATION, JOB CREATION, INVESTMENTS

JEL CLASSIFICATIONS: G30, G38, D61, D72, H50

1 Introduction

There is a long-standing debate about the optimal level of compensation of politicians. The most common view is that political activity is a civic duty and, therefore, should not be a lucrative career. Proponents of this argument are mostly concerned about not wasting public resources. However, low salaries can demotivate politicians to work hard, induce the worst candidates to run for office, and increase incentives to engage in corruption, all of which can be detrimental to firm activity and employment. Therefore, saving on politicians' salaries could be costly to society. Given this ambiguity, it is important to understand the trade-offs of politicians' wages and firm outcomes.

In this paper, we study the effects of politicians' compensation on firm outcomes. More specifically, we study how differences in local politician salaries affect job creation, firm creation, and firms' revenues and investments. We identify our results by exploring an exogenous variation in local politicians' salaries in Brazil stemming from a constitutional amendment that introduced salary caps for local legislators based on arbitrary municipality population cutoffs[1].

We show that salary caps induce significant differences in Brazilian local legislators' salaries. Legislators in municipalities with a population slightly above the cutoffs earn significantly more than legislators in municipalities with populations just below the cutoffs. This variation allows us to identify the effects of politicians' wages on firm outcomes because the variation in salaries generated by the salary caps is greater than differences that could be explained by the small differences in population size around the cutoffs.

Using the exogenous variation stemming form the constitutional amendment, we show that local politicians' wages have a meaningful impact on firm outcomes, as measured by job and firm creation and by firms' income statement outcomes. In order to understand the possible mechanisms coming into play, we show that better-paid local politicians affect public policy by increasing the municipality's budget surplus, while increasing expenditure in education

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[1]Finan and Ferraz (2011) introduced this empirical strategy.

and health care. We connect the changes in policy and in firm outcomes using techniques from the mediation literature, finding that the increase in firm and job creation is stronger in municipalities increasing the budget surplus. Economically, this can be interpreted as an improvement in the local business conditions generated by a reduction in the expected future local taxes.

In Brazil, tax collection and public good provision are partially decentralized among to 26 states and 5,570 municipalities. Municipalities receive approximately 15% of the federal government revenues to provide education, health care, transportation, and infrastructure. These resources are allocated by the executive and legislative branches of each municipality. Specifically, municipal legislators participate in the production of the municipal budget jointly with the mayor, but are solely responsible for approving its final version. Importantly, Brazilian municipalities are not allowed to run a budget deficit. They cannot issue bonds, which implies that legislators can change the allocation of resources within the budget, but are unable to increase the total spending considerably unless the municipal tax revenues increase accordingly.[2]

Given the important role played by municipal legislators, its is natural to ask if their salaries can impact the quality of the policies they shape. Brazil's constitution establishes rules concerning the compensation of municipal legislators, which changed over time. Before 2000, there was a universal limit for the salaries of all municipal legislators of the country. A 2000 constitutional amendment, which would take effect in 2004, established that salary caps would then depend on the population of each city. We use the exogenous variation in local legislators' salaries induced by the constitutional amendment to provide causal estimates of the effects of local politician wages on the real economy. Our benchmark specification, similar to the main specification in Finan and Ferraz (2011), employs a two-stage least squares estimator, using the municipal salary cap, which is a step function of the municipality population, as an excluded instrument. The underlying identification assumption is that the other chan-

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[2]Other authors show that politicians can affect the real economy increasing expenditure (Cohen, Coval, and Malloy (2011), and Adelino, Cunha, and Ferreira (2017)). Because of the budgetary restriction, increases in expenditures are unlikely to explain our findings.

nels through which population may affect the outcome variables and local legislators' wages are locally continuous at the population cutoffs, so that the population cutoff instrument is exogenous conditionally on a flexible function of the local population.

We document meaningful effects of local politician wages on business activity. We find that in the cities where the local legislator earned wages one standard deviation higher (approximately 1000 reais or 377 dollars of 2004), the job creation from 2004 and 2008 was 10.8% higher (2.7% annually). These municipalities also present a 7.5% higher firm creation (1.9% annually). We show that these effects are stronger in municipalities with lower income. Changes in compensation have a stronger effect in places where they are more likely to be meaningful to the local legislator, given their lower outside options.

We verify whether the timing of the effects is consistent with our hypothesis by estimating an event-study version of our baseline 2SLS model, using the cumulative growth of outcomes as dependent variables. Although the constitutional amendment passed in 2000, municipal legislators' can only change the wages of the next legislature. Furthermore, official population figures for 2003 were disclosed only in 2004. For this reason, the amendment required the legislators of the 2000-2004 term to adjust the salaries of the members of the *next* legislature, based on the official 2003 population estimate. Consistent with salary caps only affecting job creation after the constitutional amendment was approved, legislators' salaries do not affect firm outcomes between 1996 and 2001. We observe a small effect in 2002 and 2003, which can be attribute to politicians reacting to expected changes in salary in the subsequent legislature. The effects of local legislator wages on the job and firm creation and GDP growth are stronger between 2006 and 2008, two years after the new wages were implemented. The lack of statistical significance in the effects prior to the application of the law helps alleviate concerns that other confounding factors drive our results. In order to explain our results, confounding factors have to affect municipalities at the same time as the law change, but not before.

The period between 2004 and 2008 was one of great economic growth in Brazil. During this period, GDP grew approximately 5% per year on average, while unemployment fell from 11.5%

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to 7.8%. Between 2004 and 2008, Brazil also experienced a decrease in the informal economy from 20.9% to 18.7% of GDP. We verify whether our results are a result of formalization and not job creation exploring variation in firm size. Informal economy firms are generally small businesses with few employees. Firms with several employees are likely to be overseen by the Ministry of Labor, which makes the use informal labor a potentially costly legal risk. We find that the increases in job creation are similar among firms with less than 10 employees, with between 10 and 20 employees and with more than 20 employees. These results mitigate the concerns that our results are driven exclusively by formalization.

We further explore the effects of local legislators' wages on firm outcomes by exploring its effects on firms' income statements. We use data from three surveys conducted by the Brazilian Institute of Geography and Statistics. These surveys cover the income statements of firms in the retail, industrial, and service sectors. Each survey samples approximately 30,000 firms in 1,000 Brazilian municipalities. We observe the annual average revenues and investment for each surveyed municipality. Because the data cover fewer municipalities (1,000 out of 5,506), these tests have less power, and our findings are less precisely estimated. We find that in municipalities where local legislator earns one standard deviation more, the retail sector experienced a 13% higher growth in revenues. The industrial sector also presents improvements in their income statement. The marginally insignificant results indicate a revenue growth of 14% and investment growth of 57%.

We also examine the effects of politicians' wages on firm outcomes by sector. We expect the impact of politicians' incentives to be stronger in industries that are more dependent on local economic conditions. We separately calculate the effects of politicians' salaries on job and firm creation growth for the non-tradable sector (retail, service, food, and accommodation), retail alone, manufacturing, and agricultural sectors. Consistent with the hypothesis that the non-tradable sector is more dependent on local economic conditions (Mian and Sufi (2014), and Adelino, Ma, and Robinson (2017)), we find that our results are stronger for the non-tradable sector, especially in retail.

Brazilian municipal legislators (*vereadores*) can affect local public policy in three main

ways. Together with the elected mayor, they can decide the budget allocation for the municipality. They can also directly request the implementation of public works. These requests usually are for infrastructure, but they can also be for additional personnel or equipment. Finally, they can also create municipal laws that establish new programs and regulations.

Finan and Ferraz (2011) explore the differences in politicians' salaries induced by the salary caps and find that higher wages improve local legislator performance. Politicians with higher wages submit more bills and petition for more public goods. We conjecture that more business-friendly laws and better provision of public goods can encourage entrepreneurs to invest more and hire more workers. Better motivated politicians might also spend public resources more efficiently, creating space for tax reductions. Measuring which bills are business-friendly or which public good generates a stronger economic effect is challenging. For this reason, we focus our attention on the effects of local legislators' wages on the municipality's budget allocation, and its subsequent effect on business activity. Better fiscal responsibility spurs economic activity by reducing the expectation of tax increases. Also, expenditures that increase workers' productivity might induce entrepreneurs to invest more.

We find that better paid local legislators are more fiscally responsible, while also increasing expenditure on education and health care. Our estimates imply that one standard deviation increase in legislators' wages is associated with a 22% increase in the municipality's budget surplus. This variation in legislators' wages is also associated with a 11% increase in education expenditure and a 10% increase in health care expenditure. We do not find any effect of local legislators' wages on investments (local infrastructure) or public safety.

We also study whether the changes in policy are contingent on the type of voters in the municipality by exploring variation in education. More educated voters are more likely to pay attention to changes in policy. Consistent with this hypothesis, we find that in municipalities with lower education levels, better-paid politicians do not increase expenditure on education and health care. Instead, they choose to spend the resources on more visible projects. One standard deviation increase in politician wages is associated with an increase of 85% on expenditure in investments (e.g., infrastructure, buildings, and machines).

We connect the effects on economic activity and the changes in local public policy employing a mediation analysis method in the context of instrumental variables introduced by Dippel, Gold, Heblich, and Pinto (2017). The evidence from the mediation analysis points to local legislators' wages mainly affecting the firm outcomes through increases in the municipality's budget surplus. Changes in education and health care expenditure do not seem to be associated with changes in firm activity. These results are coherent with the budget limitations of Brazilian municipalities. These municipalities are not allowed to issue debt and therefore, are not allowed to run a budget deficit. The only way they can increase their budget is through the increase in local taxes. A stronger budget surplus guarantees a stable tax rate and the future provision of public goods.

Our paper contributes to the literature that studies the effects of monetary incentives on legislators' performance and selection. Finan and Ferraz (2011) also explore variation on local legislators' wages generated by the 2000 constitutional amendment in Brazil. They find a positive effect of wages on Brazilian local legislators' political effort and small effects on selection of more qualified politicians. Other authors explore variation in salaries in the European Parliament and also find evidence consistent with wages positively affecting effort and not improving selection (Braendle (2015) and Fisman, Harmon, Kamenica, and Munk (2015))[3]. Our paper contributes to this literature by showing that legislator incentives associated with improvements in political performance have positive spillover to the real economy.

We also contribute to the literature that studies the firm-level effects of institutional political settings. This literature focus on the effect of corruption on economic conditions (Shleifer and Vishny (1994), Mauro (1995), Fisman and Svensson (2007), Smith (2016)). Colonnelli and Prem (2019) show that decreases in corruption are associated with improvements in firm creation and revenues, especially in sectors connected to the government. We contribute to this literature showing that incentivizing politicians, rather than monitoring them, can also have positive consequences on the local economy.

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[3]The literature also provides evidence of the effects of wages on politicians of the executive branch (Gagliarducci and Nannicini (2013), Pique (2019))

Finally, we contribute to the literature that studies the effects of politicians in firms' outcomes. It is well established that being politically connected brings many benefits to firms[4]. It is also well known that political uncertainty have a significant impact on firms decisions.[5] We contribute to this literature by providing causal evidence that firms not connect to politicians can benefit from their actions.

2 Data and Methodology

2.1 Brazilian Municipalities

In the Brazilian federalism, four entities participate in the political-administrative organization: the federal government, the federal district, the states, and the municipalities. The municipalities are administrative divisions of the states equipped with a local government and a legislative body. In this context, municipalities are run independently and have control over local legislation, provision of public goods, and taxation.

Relatively to the provision of public goods, municipalities are responsible for investments in infrastructures such as water, sewage, waste management, public transportation, and road construction and maintenance. They are also responsible for pre and elementary public schooling. Although universal health care is a federal government responsibility, municipalities are responsible for managing universal health care locally and implementing public health policies. These expenses are funded through a combination of transfers from the federal government and municipal taxes. Transfers from the federal government to municipalities are approximately 3% of Brazil's GDP. Also, municipalities rely on sales and property taxes, which represent approximately 2% of Brazil's GDP. Therefore, municipalities control approximately 5% of Brazil's GDP. Municipalities are not allowed to issue debt and are also not allowed

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[4]A non-exhaustive list of examples include: Khwaja and Mian (2005), Leuz and Felix (2006), Claessens, Feijen, and Laeven (2008), Li, Meng, Wang, and Zhou (2008), Faccio, Masulis, and McConnell (2006), Duchin and Sosyura (2012), Goldman, Rocholl, and So (2009), Tahoun (2014), Fisman and Wang (2015), Colonnelli, Lagaras, Ponticelli, Prem, and Tsoutsoura (2019).

[5]A non-exhaustive list of examples include: Julio and Yook (2012), Gulen and Ion (2016), Akey and Lewellen (2017), Colak, Durnev, and Qian (2017), Jens (2017), and Bonaime, Gulen, and Ion (2018)

to run a budget deficit. Therefore, the only way municipalities can increase spending is by increasing taxes.

2.1.1 Brazilian Municipal Legislators

The allocation of the municipal budget is made by a directly elected mayor and a local council of directly elected municipal legislators (called *vereadores*). The council of local legislators comprise a minimum of 9 legislators (for cities with less than 47,619 inhabitants) and a maximum of 55 legislators (for cities with more than 6.5 million inhabitants). Mayors and legislators are directly elected for a 4-year term. Their election happens in the middle of the presidential cycle (2 years after the presidential election).

The primary attribution of the Brazilian municipal legislators is proposing and voting municipal laws. Laws proposed by municipal legislators typically pertain to the creation of new programs and regulations or new local councils that will monitor the mayor's office during the implementation of a specific program. Municipal legislators also participate in the formulation of the municipal budget. The mayor's office presents a detailed budget proposal, which will be analyzed by the municipal legislators. Legislators can either approve or amend specific line-items, which determines the maximum amount of resources the local executive branch can spend in each item. Another attribution of the municipal legislators, according to the Brazilian constitution, is the external control of the mayor's administration. They are responsible for verifying if the resources are being allocated according to the legal system. Finally, local legislators can directly request the implementation of public works. These requests usually are for infrastructure, but they can also be for additional personnel or equipment.

Given their importance on the production of municipal legislation and on the execution of the municipal budget, municipal legislators can meaningfully affect local business activity in several ways. First, they can guarantee that the municipality has a well-balanced budget, which reduces the expected future taxes. Second, they can improve the allocation of resources and improve labor productivity by increasing expenditures on education, healthcare, public safety, and public transportation. Third, they can write more business-friendly laws with the

objective of reducing the regulatory burden for entrepreneurs. Finally, they can guarantee the continuity of existing policies, reducing the political uncertainty. Hence, it is natural to ask whenever the incentives to legislators provided by the institutional landscape can affect local business activity through more (or less) business-friendly laws and policies

We use municipal legislators' wages as a proxy for incentives to exercise effort and for the attractiveness of the political carrier for skilled individuals. This choice is motivated by previous findings of the Poltical Economy literature: Braendle (2015) and Fisman, Harmon, Kamenica, and Munk (2015) show, in the context of the European Parliament, that increasing the wages of legislators can attract better qualified individuals to the political career. In addition to that, Finan and Ferraz (2011) show, in the Brazilian context, that an increase in the municipal legislators' wages increases the competition in the coming elections, leading to higher legislative activity and more efficient allocation of public goods.

2.2 Sample and Descriptive Statistics

Data on wages of municipal legislators used in this study comes from the Census of Brazil's Municipal Councils, which was collected in 2005 by *Interlegis*, an organ of the Brazilian Senate. As described by Table 1, the monthly wages of legislators 5,227 Brazilian cities averaged to 1,711 reais, which corresponds to 644 dollars (of 2004) per month. The Census also shows that the legislators have, on average, 5 assistants and worked for 11 hours every week.

In our empirical analysis, we control for demographic factors potentially correlated with local business activity. Panel B of Table 1 reports data from the 2000 Brazilian Census and shows that the average municipality has a population of 32 thousand people. Monthly aggregate municipal income is around 9 million Brazilian reais, which corresponds to 281 reais (or 106 dollars) per capita in a city with average population size. Therefore, local legislators earnings are 6 times higher than those of an average individual. Similarly to other emerging economies, Brazilian cities have high income inequality (average Gini of .55), a large urban population (60% of the total), and severe infrastructure deficiencies (e.g., 40% of the

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residencies without water.) The fraction of literates in the population is around 80%.

We can divide the outcome variables in our analysis into two categories: labor market outcomes and income statement outcomes. We obtain labor market outcomes from a database called RAIS (Relação Anual de Informações Sociais), which is managed by the Brazilian Ministry of Labor. RAIS is a nationwide employer-employee matched database containing annual compensation, starting date, termination date, and type of industry. It covers the universe of formalized firms employing at least one worker – henceforth referred to as active firms. We aggregated the total number of workers in RAIS for each municipality, each sector, and each year. Panel C of Table 1 shows that the average city had 177 formal workers for every 1,000 adults in the municipal election year of 2004. This number is low when compared to number of workers per 1,000 adults in developed countries because of the high rate of informality in Brazil.[6] The three main sectors of the economy (manufacture, agriculture, and retail) employ approximately 13% of the formal workforce each. Service firms employed a smaller fraction of 8% of the formal workforce. Regarding firm density, Panel D shows that the average municipality has 19 firms for every 1,000 people. Klapper, Amit, Guillen, and Quesada (2007) reports that this ratio is around 29 for Latin America countries, and around 64 for industrialized countries.

We obtain data on Income statement outcomes from the IBGE (Instituto Brasileiro de Geografia e Estatística). This data is provided aggregated at the municipality level from three surveys conducted by the Brazilian Institute of Geography and Statistics. The *Annual Survey of Trade* surveys firms in the retail sector. We drop municipalities that have less than three surveyed firms. In our sample, the survey covers, on average, 36,393 firms (30,137 in 2003 and 43,022 in 2008) in 1089 municipalities (973 in 2003 and 1221 in 2008). The *Annual Survey of Industry* surveys firms in the manufacturing sector. In our sample, the survey covers, on

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[6]The total Brazilian population in 2004 was approximately 185 million. From this group, 65 million are workers (adults, economically-active, not business owners). According to the census, 45% of workers were informal. Therefore, the total number of formal workers in 2004 was approximately 36 million, and the number of formal workers for every 1,000 people was approximately 277. In our summary statistics, we find a lower number (172 per 1,000 adults) because we calculate an equally-weighted average across municipalities, which gives a higher weight for small and with a higher rate of informality municipalities.

average, 29,053 firms annually (23,425 in 2000 and 33,503 in 2008) in 1,258 municipalities (1043 in 2000 and 1393 in 2008). The *Annual Survey of Services* surveys firms in the service sector. In our sample, the survey covers, on average, 43,671 firms annually (35,345 in 2003 and 48,985 in 2008) in 910 municipalities (822 in 2003 and 960 in 2008).

2.3 Economics of Politicians' Compensation

The main objective of this paper is to estimate the effect of changes in local legislators' wages on firm-related outcome variables: employment, firm creation, investment, and revenues. if i represents municipalities, y_i represents a outcome variable, e_i represents the average legislative effort in i, θ_i represents the average quality of the legislators in i, and $\mathbf{v}_i$ represents confounding factors. One can define the "production function" of the legislative activity as:

$$y_i = f(e_i, \theta_i, \mathbf{v}_i^y). \tag{1}$$

The incentive to exercise effort will depend on several factors. According to Finan and Ferraz (2011), higher wages increase the competition in the next election, increasing the incentives to commit effort. Therefore, we can write $e_i = e(w_i, \mathbf{v}_i^e)$, where w_i is the wage of legislators in the city i, $\mathbf{v}_i^e$ is a second set of confounding factors. Similarly, the quality of the legislators in a given municipality will depend on several characteristics of i, including the wage w_i, from which we can assume $\theta_i = \theta(w_i, \mathbf{v}_i^\theta)$, where $\mathbf{v}_i^\theta$ is a third set of confounding factors. Therefore, we can write:

$$y_i = f(e(w_i, \mathbf{v}_i^e), \theta(w_i, \mathbf{v}_i^\theta), \mathbf{v}_i^y) \tag{2}$$

The parameter of interest of this paper is the partial derivative of the outcome variable with respect to wages, holding the confounding factors constant: $\partial y_i / \partial w_i$. Calculating the

partial derivative with respect to w_i in both sides of 2 leads to the following relationship:

$$\underbrace{\frac{\partial y_i}{\partial w_i}}_{\substack{\text{total} \\ \text{effect}}} = \underbrace{\frac{\partial f}{\partial e} \frac{\partial e}{\partial w_i}}_{\substack{\text{effort} \\ \text{channel}}} + \underbrace{\frac{\partial f}{\partial \theta} \frac{\partial \theta}{\partial w_i}}_{\substack{\text{quality} \\ \text{channel}}}$$

Economically, higher wages act through the incentive channel by increasing the legislative effort and through the quality channel by attracting more qualified individuals, which in turn affects the outcome variable.

In a first naive attempt to estimate the causal effect of legislative wages on outcomes, we estimate the regression model:

$$y_i = \beta_0 + \beta_1 w_i + x_i^\top \gamma + \varepsilon_i \tag{3}$$

where w_i is the municipal legislative wage of the municipality i in the year 2005, x_i is a set of municipality-level controls (all measured before the 2004 election) including income, percentage of urban population, percentage of households with water, percentage of literate adults, gini coefficient, average wage, number of assistants per legislator, and number of weekly hours of functioning legislature. Outcome variable y_i represents the log growth during the 2005-2008 political cycle of the following variables: number of formal jobs and number of formal firms. We focus on the 2005-2008 cycle because we only observe the wages of legislators for 2005. However, it is possible that predictable changes in the wages in 2005 could affect outcomes in the 2001-2004 cycle through the effort channel.

Table 2 presents the OLS estimates of the equation and shows that the sensitivities of all outcome variables with respect to the legislative wage are positive and statistically significant. The estimates imply that one standard deviation increase in local politicians' salaries (approximately 1000 reais) is associated with a 2.27% increase in job creation, and 1.23% increase in firm creation. However, there are several identification issues potentially affecting these results. For instance, it is reasonable to assume that the economic growth of a city

might affect legislators' wages, which leads to a reverse causality bias.

2.4 Identification

In order to obtain exogenous variation in the legislators' wages, we exploit a constitutional amendment setting caps for municipal legislators. This amendment was approved in the end of the year of 2000 and defined caps as a percentage of the wages of the corresponding state legislators. Importantly, changes in municipal legislators' wages in Brazil can only take effect on the next legislature. Therefore, the amendment required the legislators of the 2000-2004 term to adjust and vote the salaries of the legislators of the *next* term, which started in 2005. Table 3 shows the population cutoffs and their corresponding salary caps. The amendment created considerable cross-sectional variation in the maximum possible wage across different municipalities in terms of arbitrary population cutoffs. The caps vary from 1,927 reais to 7,226 reais. Figure 1 plots the 2005 municipal legislators' wages on the 2003 official population, and smooth curves fitted in each population interval. Except for the first population cutoff, we can observe discontinuities in the smooth functions of legislator's wages. Given the arbitrary nature of the cutoffs chosen in the constitutional amendment, they can be used as instruments in the estimation of the causal effect of municipal legislators' wages.

Similarly to Finan and Ferraz (2011), we estimate the causal effect of wages in our outcome variables using the following two-stage least squares (2SLS) model:

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\begin{aligned}
y_i &= \beta_0 + \beta_1 w_i + x_i^\top \gamma + g(P_i, \theta_y) + \varepsilon_i^y \\
w_i &= \alpha_0 + \alpha_1 cap_i + x_i^\top \delta + g(P_i, \theta_w) + \varepsilon_i^w
\end{aligned}
\tag{4}
$$

where cap_i is the maximum possible wage of legislators in the city i (as defined by the Table 3), and $g(\cdot, \theta)$ is a flexible function of the municipal population P_i depending linearly on a parameter θ.

In the second equation of the model 4, both cap_i and $g(P_i)$ are functions of the municipal population. Given that cap_i is a step function of the population, the causal parameter β_1 can

be identified as long as we make the reasonable assumption that the function $g(\cdot, \theta)$ is locally continuous at the population cutoffs for $\theta \in \{\theta_y, \theta_w\}$. The identification assumption is that the functions $g(\cdot, \theta_w)$ and $g(\cdot, \theta_y)$ are capturing all the potential effects of the population on the wages of legislators and on the outcome variable not associated with the wage cap. If this assumption is satisfied, the instrument cap_i satisfies the exclusion restriction.

The identification assumption of local continuity of $g(\cdot, \theta)$ on the wage caps could fail if factors affecting the outcome variables jumps discontinuously at the thresholds. We investigate this possibility by analyzing the behavior of a set of relevant variables around the cutoffs. We use data from 2004, before the changes in wages were effective. Figure 2 shows that municipal spending, municipal investment, municipal surplus, number of jobs, number of firms, and total GDP change smoothly around the population cutoffs.

Similarly to Finan and Ferraz (2011), we also consider an alternative form of the first stage equation as a further test of robustness, which uses all the population cutoffs as excluded instruments:

$$w_i = \alpha_0 + \sum_{k=1}^{5} \alpha_k 1\{P_i > T_k\} + x_i^\top \delta + g(P_i, \theta_w) + \varepsilon_i^w \tag{5}$$

where T_k represents the kth population cutoff. Table 4 reports the first stage estimates using our preferred formulation in Equation 4 and the alternative formulation in Equation 5 under different specifications of the population function $g(\cdot, \theta)$. Column (1) shows the results for the alternative specification, assuming a linear spline form for the population function, reporting a large R^2 and large F-stat, which confirms the validity of the excluded instruments. Column (2) show that using our preferred first stage specification (Equation 4) yield similar R^2. Therefore, our preferred formulation in Equation 4 is more parsimonious and delivers the same explanatory power in the first stage, motivating our choice of this model for the remaining of this paper. In columns (3) and (4) we proceed to use more flexible functional forms for the population function, namely a cubic polynomial with a quadratic spline in the first cutoff (column 3) and with a quadratic spline in the first two cutoffs (column 4). The significance of

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the instrument survives to this additional test, providing further evidence of the relevance of the salary cap as an excluded instrument. Motivated by these results, we will use the models in columns (2) to (4) as our baseline specifications for the first stage of our two-stage least squares model.

3 The Real Effects of Politician Incentives

3.1 Effects on Job and Firm Creation

We examine whether local legislator wages (instrumented by population salary caps) affect job and firm creation. Finan and Ferraz (2011) show, within the same empirical setting, that higher wages increase local politicians' productivity. They find that municipalities with higher local legislator salaries experience an increase in the number of legislative bills and on the provision of public goods. We expect that these differences in the quality of government will have spillovers on the real economy: entrepreneurs in better-governed cities might be more inclined to start a new business or to invest in their existing companies.

Table 5 presents the estimates of instrumental variables regressions of the effects of local legislator salaries on changes in the local economic activity. Panel A focuses on estimates of the impact of local legislators' wages on the growth of formal employment. More precisely, the dependent variable is the log change in the number of jobs from 2004 to 2008 (the legislative cycle). Columns (1) to (3) present variations on the functional form assumption on population. The results in column (2) imply that the growth in the number of formal workers between 2004 and 2008 is 10.8% (2.7% annually) higher in municipalities where legislators' wages are one standard deviation higher (approximately 1000 reais). Panel B presents the results for firm creation. The results imply that the increase in the number of firms between 2004 and 2008 is 7.47% (1.87% annually) higher in municipalities where legislators' wages are one standard deviation higher.

We provide evidence that the effects are stronger in municipalities where the salary changes

are likely to be more meaningful for the local legislators. Table 6 presents the estimates for the effects of local legislators' wages on firm and job creation separately for municipalities above and below-median income. According to column 2 in Panel A1, a one standard deviation increase in local legislators' salary is associated with an increase of 13.3% in job creation. This number is marginally significant, because it is imprecisely estimated due to the reduced sample. The results in Panel A2 provide an interesting contrast: for the sub-sample of municipalities with income above the median, one standard deviation increase in politicians' wages is associated with a small and statistically insignificant increase in job creation of 3.3%. We interpret this result as evidence that wages have stronger effects in regions where politicians have lower outside options. In Panels B1 and B2 we do not find meaningful differences when we explore differences in municipalities' income on firm creation.

We verify whether the timing of the effects is consistent with our identification hypothesis by plotting event study versions of our instrumental variable regressions. Figure 3 summarizes the cumulative effect of legislator wages on our primary outcome variables between 1996 and 2008. The plotted points are the estimates of the impact of 2005 legislator wages – instrumented by the wage caps – on the log changes relative 2004 to a given year. For instance, in Panel A, to plot the point for 2000, we run an instrumental regression of wages on the log differences in the number of workers between 2000 and 2004.

Panel A of figure 3 shows that legislators' salaries do not affect job creation between 1996 and 2001 (the years before the passing of the constitutional amendment). Although the constitutional amendment passed in 2000, municipal legislators' can only change the wages of the next legislature. Furthermore, official population figures for 2003 were disclosed only in 2004. For this reason, the amendment required the legislators of the 2000-2004 term to adjust the salaries of the members of the *next* legislature, based on the official 2003 population estimate. We observe a small effect of politician wages on firm creation between 2002 and 2004. This increase can be attribute to politicians reacting to expected (but uncertain) changes in salary in the subsequent legislature. The effects of local legislator wages on the job and firm creation and GDP growth are stronger between 2006 and 2008, two years after the new wages

were implemented.

In Panel B of figure 3, we explore the dynamics of firm creation. Similarly to job creation, we do not observe a significant effect of wages on firm creation between 1996 and 2001. We also find a small increase in firm creation between 2002 and 2004. Similarly to job creation, the effects of local legislator wages on the job and firm creation are stronger between 2006 and 2008, two years after the new wages were implemented. The lack of statistical significance in the effects prior to the application of the law helps alleviate concerns that other confounding factors drive our results.

3.2   Effects According to Firm Size

The period between 2004 and 2008 was one of great economic growth of the Brazilian economy. In this cycle, GDP grew approximately 5% per year, while unemployment fell from 11.5% to 7.8%. Concomitantly, Brazil also experienced a shrinkage in the informal economy from 20.9% to 18.7% of GDP. This raises concerns about the interpretation of our results, which could be partially driven by the labor formalization within firms expecting to growth, and not by the actual creation of new posts.

We verify whether our results are driven by formalization or by real job creation by exploring variations in firm size. Informal firms are generally small businesses with few employees, which can bypass the scrutiny of the labor ministry more easily. Firms with several employees, on the other hand, are more likely to be overseen by the labor ministry, which makes the use of informal labor a potentially costly legal risk. Therefore, we expect the use of informal labor only in firms with few employees.

Table 7 presents the results for the effects of local politicians' wages on job and firm creation separately for three groups of firms: firms with less than 10 employees, firms with between 10 and 20 employees, and firms with more than 20 employees. Panel A1 shows that one a standard deviation increase in local legislators' wages is associated with an 8.9% increase in the number of jobs among firms with 10 employees or less. A part of these new

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hires may be just the formalization of existing employees. When we focus on firms with between 10 and 20 employees, which are less likely to use informal labor, in Panel A2, we find statistically insignificant results. However, the magnitudes of the point estimates are similar to those in Panel A1. They indicate that one standard deviation in wages is associated with a 10.6% increase in job creation. According to Panel A3, the effects are similar for firms with more than 20 employees: A 1,000 reais increase in politicians' salary is associated with a 9.36% increase in job creation among these firms. The fact that politician wages seem to be similarly affecting firms with different sizes alleviate concerns that our results are driven purely by formalization.

We also explore the differences in firm creation among firms with different sizes. Table 7 shows that politician wages only affected firm creation among small firms. Panel B1 shows that a 1000 reais increase in local politicians' wages is associated with a 7% increase in firm creation among firms with less than 10 employees. Panels B2 and B3 show that the effects on firm creation for firms with more than 10 employees are both statistically and economically insignificant.

3.3 Effects on Income Statement

We further explore the effects of local legislators' wages on business activity by exploring its effects on firms' income statements.

Table 8 presents the instrumental variable regression estimates of the effects of legislator wages using *Net Revenues* and *Net Investments* as the dependent variable. In this table, each estimate is obtained from a different regression. For instance, in Panel A, the net revenues estimates are obtained from regressions using *Net Revenues* as the dependent variable. The net investment results are obtained from different regressions, using *Net Investments* as the dependent variable. Columns (1) to (3) present variations on the assumption of the population function.

Panel A presents the estimates for the effects of legislators' wages on revenues and in-

vestments of the retail sector. We find that politicians' wages have a positive and significant impact on the retail sector revenue growth. The estimate in column (2) implies that this growth is 13.0% higher in municipalities where local legislators earn one standard deviation more. We do not find evidence that politicians' salaries affect the investment growth of retail firms, which is likely due to the fact that this sector is not capital intensive. Panel B of table 8 presents the result for the manufacturing sector. In these tests, the sample size is smaller – of about 1,080 municipalities. In addition, this data is provided in aggregated terms at the municipality level, which hinder us from filtering any data errors at the firm level. Although our results are statistically insignificant due to these limitations, the magnitudes are economically important. The results in column (2) imply that manufacturing firms in municipalities where local legislators make one standard deviation more experience a 13.7% higher growth in their revenues, and a 57.0% higher growth in their investments. In Panel C, we present the effects of local legislators' wages on revenues and investments of the service sector, without any noteworthy results for revenues or investments.

3.4   Job and Firm Creation by Sectors

The evidence presented so far indicates that higher politicians' salaries are associated with greater economy-wide growth in job and firm creation, revenues, and investments. Next, we examine the effects of politicians' wages on real economic activity by sector. We expect the impact of politicians' incentives to be stronger in industries that are more dependent on local economic conditions. We separately estimate the effects of politicians' salaries on job and firm creation for the non-tradable sector (retail, service, food, and accommodation), retail alone, manufacturing, and agricultural sectors.

Table 9 presents the results separately for sectors. In Panel A, we explore the effect of politicians' salaries on job creation, while column (1) presents the results for the non-tradable sector. Consistent with the hypothesis that the non-tradable sector is more dependent on local economic conditions (Mian and Sufi (2014); Adelino, Ma, and Robinson (2017)), we find that

a one standard deviation increase in local legislators' salary is associated with a 7.5% higher job creation. Column (2) shows that the retail sector drives the effects on the non-tradable sector: a one standard deviation increase in local politicians' salary is associated with a 12.1% higher job creation growth in retail firms. The results for the manufacturing sector in column (3) are negative and statistically insignificant, consistent with the idea that this sector is dependent on more disperse economic conditions. Column (4) shows that politicians' wages also affect the agricultural sector. The results imply that a one standard deviation growth in politicians' salaries is associated with an increase of 10.2% on the growth of job creation in this sector.

Panel B of Table 9 shows the results for firm creation. The results are stronger for firms in the retail sector. A one standard deviation growth in local legislators' salaries is associated with a 4.5% increase in the firm creation growth in the non-tradable sector, and a 7.8% increase in the retail sector alone between 2004 and 2008. The manufacturing sector presents a negative and statistically insignificant effect. Finally, similarly to the results for job creation, the agricultural sector experiences a 7.98% increase in their firm creation growth when politicians' wages are one standard deviation higher. In the tests presented in this section, we only use the 3rd order polynomial with a quadratic spline on the first cutoff assumption for the population function. Appendix Table IA.1 presents the results using the other functional forms used in the paper.

4 How Do Politicians Affect the Real Economy

Brazilian municipal legislators (*vereadores*) can affect local public policy in three main ways. First, together with the elected mayor, they can decide the budget allocation for the municipality. Second, they can directly request the implementation of public works. These requests usually are for infrastructure, but they can also be for additional personnel or equipment. Third, they can create municipal laws that establish new programs and regulations.

Finan and Ferraz (2011) show that local legislators with higher wages propose more bills to change the municipality law, and increase the provision of certain public goods. More business-friendly laws and more efficient provision of public goods can encourage entrepreneurs to invest and hire more workers. Measuring which bills are business-friendly or which public good generates a stronger economic effect is challenging. For this reason, in this section, we focus our attention on the effects of local legislators' wages on the municipality's budget allocation, and its subsequent effect on local economic conditions. We expect that better fiscal responsibility spurs economic activity by reducing the expectation of tax increases. Also, expenditures that increase workers' productivity might induce entrepreneurial investment.

4.1 Effects on Expenditure Policy

Table 10 presents the effects of legislator wages on municipal expenditure. The estimates in this table are obtained from instrumental variable regressions of municipal legislators' wages on changes in per capita expenditure in each category, in hundreds of reais.

In Column (1), we study the effects of wages on the budget surplus. The results show that better paid local legislators are more fiscally responsible. The estimates imply that one standard deviation increase in legislators' wages (approximately 1,000 reais) is associated with an increase of 38 reais on the per capita budget surplus. This change corresponds to a 20% improve relative to the average surplus in our sample.

In Columns (2) and (3) of Table 10, we explore the effects on education and health care expenditure. Increases in health care and education expenditure can improve workers' productivity in the long run, which may motivate investments by business owners. We find that higher legislator wage is associated with increases in per capita expenditure on education and healthcare. The estimate in Column (2) implies that one standard deviation increase in municipal legislators' salary is associated with an increase of 25.6 reais in per capita public spending in education. The estimate in Column (3) implies that a similar increase in wages is associated with an increase of 18.1 reais in per capita public spending in health care.

These changes represent 11% and 10% increases relative to the average expenditure in these categories, respectively.

Finally, Columns (4) and (5) of Table 10 explore the effects on investments and public safety expenditure. Increases in expenditure in these categories can improve economic activity by improving workers' productivity in the short term. We do not find a significant effect of local legislators' wages on either investments or public safety.[7]

4.1.1   Effects According to Education Levels

We explore variation in education to study whether the changes in policy are contingent on the type of voters in the municipality. This is motivated by the idea that more educated voters are more likely to pay attention to changes in policy, and are also more likely to correctly attribute the changes in the municipality that were induced by changes in policy.

Table 11 presents the results for the effects of local politicians' salaries on public policy separately for municipalities with below and above the median percentage of high-school graduates.[8] Panel A shows that, consistently with the previous results, higher wages are associated with increases in budget surplus for municipalities with lower fraction of school graduates. However, the similarities stop there. Better paid politicians do not increase expenditure in education and health in low education municipalities. Instead, they choose to spend the resources on more visible projects. One standard deviation increase in politician wages is associated with an increase of 81.7 reais on expenditure in investments (e.g., infrastructure, buildings, machines). These changes represent a 85% increases relative to the average expenditure in these categories. In contrast, in more educated municipalities, higher wages are not associated with increases in investments. Instead, these politicians increase expenditure on education and health care.

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[7]In the tests presented in this section, we only use the 3rd order polynomial with quadratic on the first cutoff assumption for the population. Table IA.2 presents the results using the other functional forms used in the paper.

[8]According to the 2000 census, on average, 8.9% of the population of Brazilian municipalities have high school degrees.

4.2   Mediation Analysis

Our results indicate that higher local politicians' wages are associated with stronger economic activity, improvements in fiscal responsibility, and increases in per capita expenditure on education and health care. However, our results presented so far do not allow us to conclude which changes in public policy contributed more (in a causal sense) to the effect on business activity, given the joint determination of the outcome variables.

Model I:	*Model II:*	*Model III:*	*Model IV:*
IV for Economic Activity Y	*IV for Gov't Expenditure M*	*General Mediation*	*Restricted Mediation*
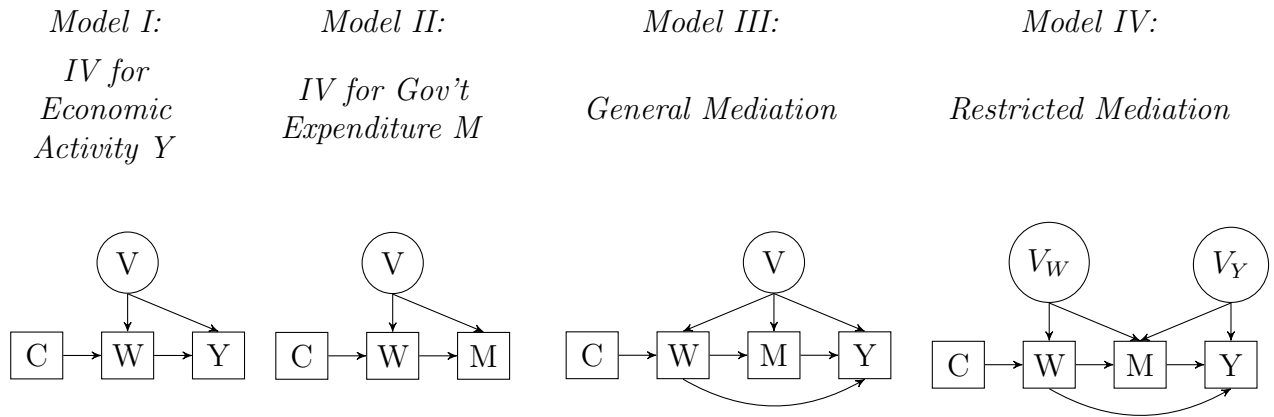
In order to connect the effects on economic activity and the changes in local policy, we employ the mediation method in the context of instrumental variables introduced by Dippel, Gold, Heblich, and Pinto (2017). Their method can be summarized in the Directed Acyclic Graph (DAG) representation bellow.

In this figure, C denotes the wage cap instrument, W represents the actual wages of legislators, M represents a local government expenditure variable, Y represents an outcome variable, and V represents a confounding variable. Model 1 represents the standard IV model to estimate the causal effect of legislators' wages on an outcome, using the cap as an excluded instrument. Similarly, Model II represents the IV to estimate the causal effect of legislators' wages on the policy variable M. Model III represents the general mediation model, under which legislators' wages can affect the outcome variable by two channels: through the causal effect on the mediation variable M, which by its turn affects the outcome variable; and through a direct effect, represented by the curved line. This model allows for a general confounding

variable affecting wages, spending, and the outcome simultaneously. Unfortunately, as Dippel, Gold, Heblich, and Pinto (2017) proves, the mediated effect of W on Y through M cannot be identified in this model. They solve this econometric issue by proposing an alternative, restricted Model IV, under which the mediation effect and the direct effect can be jointly identified. The underlying identification assumption requires that no confounding factor can affect both W, M, and Y simultaneously. In mathematical terms, a first confounding factor V_W is allowed to affect both W and M, while a second confounding factor V_Y (statistically independent from V_W) is allowed to affect M and Y. In our context, this assumption would fail if a confounding variable could affect legislators' wages, local government spending, and local economic activity simultaneously. We believe that this assumption is reasonable in our context, given that W and M are jointly affected by political shocks (e.g., the rise of a new political party), while M and Y are jointly affected productivity shocks. The results presented in this section are valid as long as the correlation between such shocks is not large.

We implement the mediation analysis from Dippel, Gold, Heblich, and Pinto (2017) using two steps. First, we run an instrumental regression of the effects of politicians' wages on local public spending, using the following specification.

$$M_{it} = \beta_W^M \times W_{it} + \beta_X^M \times X_{it} + \epsilon_{it}^M \tag{6}$$

Where W_{it} is the politicians' wages instrumented by the salary cap C_{it}. The results for the first step are presented in section 4.1 and table 10. Second, we calculate the effects of changes in public expenditure on the outcome variables (job and firm creation), controlling for politicians' wages using the following second stage equation.

$$Y_{it} = \beta_W^{Y|W} \times W_{it} + \beta_M^{Y|W} \times M_{it} + \beta_X^{Y|W} \times X_{it} + \epsilon_{it}^{Y|W} \tag{7}$$

Where W_{it} are the politician wages, M_{it} are changes in public spending, and X_{it} is a set of

controls. In order to estimate $\beta_M^{Y|W}$ we employ the following first stage regression:

$$M_{it} = \beta_M^{M|W} \times C_{it} + \beta_W^{M|W} \times W_{it} + \beta_X^{M|W} \times X_{it} + \epsilon_{it}^{M|W} \tag{8}$$

The mediation effect is calculated by multiplying $\beta_M^{Y|W}$ and β_W^{M}. We calculate this multiplication using a Generalized Method of Moments (GMM) in which we simultaneously estimate equations (6) and (7)

Table 12 presents the estimates of equation 7. In Panel A, we use the job creation as our outcome variable. The only mediator that significantly affects economic conditions after we control for politicians' wages is the budget surplus. The effects of Education and Health expenditure are statistically insignificant. We calculate the effects of politicians' wages on the growth of the number of jobs that are mediated by changes in the budget surplus. The estimates imply that a one standard deviation increase in wages is associated with a 7.48% increase in the growth of job creation through the increases in the municipality's budget surplus. When we compare this result with the findings in table 5 we conclude that approximately 76% of the effect of wages on the job creation growth is mediated by the budget surplus (7.48%/10.8%).

In Panel B, the outcome variable is the growth in the number of firms. Similarly to the results for job creation growth, only improvements in budget surplus controlled for politician wages has a significant effect on the growth in firm creation. The estimates imply that a one standard deviation increase in wages is associated with a 6.29% increase in the growth of firm creation through the increases in the municipality's budget surplus. When we compare this result with the findings in table 5 we conclude that approximately 85% of the effect of wages on firm creation growth is mediated by the budget surplus (6.29%/7.47%). In the tests presented in this section, we only use the 3rd order polynomial with quadratic on the first cutoff assumption for the population. Apendix Table IA.3 presents the results using the other functional forms used in the paper.

5 Conclusions

We show that politicians' compensation can affect real economic activity. In particular, we find that higher politician wages are associated with a stronger firm and job creations, and increases in firms' revenues and investments. Local legislators that receive higher salaries manage the municipality's resources more carefully, increasing the municipality's budget surplus while still increasing expenditure on education and health care. Using techniques from the mediation literature, we find evidence that increases in the budget surplus are associated with stronger increases in business activity.

We identify our results using a constitutional amendment in Brazil that established salary caps for municipal legislators based on the municipality's population. We show that local legislators' wages affect firm policies in ways that are unlikely to be related to variation in unobserved municipality characteristics or macroeconomic conditions.

Our results have implications for public resources management. They show that saving on politicians' salaries can have negative consequences on the local firms. The losses in real economic activity can offset the savings in wages, generating a negative net effect for taxpayers. Governments and the general public should be aware of the potential adverse effects of lowering politician wages on the private sector and should factor these externalities while setting their wages.

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Table 1: Descriptive Statistics

This table presents the number of observations, the mean, median, standard deviation and the quantiles of the main variables used in the paper.

	N	Mean	S.D.	Quantiles				
				p10	p25	p50	p75	p90
Panel A: Legislature Characteristics: (2005)								
Legislators Monthly Wages	5,227	1,711	1,043	750	950	1,400	2,260	2,891
Assistants per legislator	5,499	5.02	22.69	0.00	1.00	3.00	5.00	10.00
Hours of legislature	5,499	10.97	7.17	8.00	8.00	8.00	12.00	20.00
Panel B: demographics (2000)								
Population	5,506	32,058	192,223	3,153	5,166	10,576	21,833	49,668
Municipality income	5,506	9,058	104,677	373	641	1,342	3,318	9,801
Gini	5,507	0.55	0.07	0.47	0.51	0.55	0.60	0.64
% urban population	5,506	58.83	23.33	27.00	40.00	59.00	78.00	90.00
% households with water	5,482	58.39	23.77	25.34	42.09	61.11	77.45	87.74
% literate	5,506	81.11	11.19	64.64	72.29	84.48	90.15	93.52
Panel C: Formal Jobs (2004)								
Jobs per 1000 Adults	5,506	176.87	158.46	51.29	79.48	133.43	226.35	350.57
Total Number of Jobs	5,586	5,736.24	61,129.20	168.00	298.00	673.00	2,068.00	6,616.00
Manufacture (% of Total)	5,563	14.32	17.97	0.00	0.64	6.46	22.23	41.79
Agriculture (% of Total)	5,563	13.33	15.84	0.00	1.17	7.06	20.66	36.62
Non-Tradable (% of Total)	5,563	23.52	18.39	2.98	8.15	19.68	35.22	50.00
Retail (% of Total)	5,563	12.10	9.79	1.23	4.30	10.14	18.16	25.66
Services (% of Total)	5,563	8.30	8.90	0.56	1.77	5.77	12.23	19.47
Panel D: Formal Firms (2004)								
Firms per 1000 Adults	5,506	19.12	15.47	1.96	5.06	16.33	30.25	40.22
Total Number of Firms	5,586	449.04	3,595.88	8.00	24.00	76.00	230.00	688.00
Manufacture (% of Total)	5,563	8.50	8.45	0.00	2.42	6.54	11.86	19.26
Agriculture (% of Total)	5,563	26.92	23.32	0.00	5.83	21.89	44.72	62.50
Non-Tradable (% of Total)	5,563	53.61	21.33	23.68	38.50	55.68	70.36	80.16
Retail (% of Total)	5,563	33.74	16.31	12.20	22.64	34.38	44.44	54.55
Services (% of Total)	5,563	15.51	9.39	4.92	9.52	14.75	20.00	25.23
Panel E: Income Statement Variables (2004)								
Services Gross Revenue	897	408.11	4362.49	2.04	5.43	17.36	71.65	276.21
Services Investments	897	32.36	351.07	0.00	0.02	0.56	4.34	17.52
Trade Gross Revenue	1,007	655.89	5857.29	11.67	24.94	69.49	244.54	793.00
Trade Investments	1,007	5.97	59.54	0.00	0.02	0.28	1.47	5.81
Manufacture Gross Revenue	1,295	1049.34	9801.00	4.85	14.84	79.14	356.63	1275.20
Manufacture Investment	1,295	46.79	518.92	0.01	0.31	2.30	12.39	54.74

Table 2: OLS Evidence

This table presents the estimates of linear regressions of the effects of Legislators Wages (in thousands of Brazilian Real) on job creation and firm creation. The dependent variables are the differences in the logarithm of the number of jobs and the number of firms between 2004 and 2008. Controls include the city's population, income, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
	Dependent variables	
	Δ Log(Num. of Employees)	Δ Log(Num. of Firms)
Legislators Wages (1/1000)	0.0227***	0.0123***
	[0.00725]	[0.00409]
Controls	Yes	Yes
Observations	5,201	5,201
R-squared	0.023	0.132
Mean of dependent variable	.237	.144

Table 3: Salary Cap of Municipal Legislators

This table presents the constitutional salary cap on the wages of municipal legislators by population size. Caps were defined by a 2000 constitutional amendment affecting wages of legislators elected in 2004.

Population	Maximum Percentage of state legislator salary	Maximum Value in 2004 (BRL)	Maximum legislative spending as a proportion of revenues
0 to 10,000	20%	1927.1	8%
10,001 to 50,000	30%	2890.6	8%
50,001 to 100,000	40%	3854.2	8%
100,001 to 300,000	50%	4817.7	7%
300,001 to 500,000	60%	5781.2	6%
500,000 plus	75%	7226.6	5%

Table 4: First Stage

This table presents the estimates of the first stage of the instrumental variable regressions used in the paper. Legislator Wages is instrumented using the city's salary cap. In column (1) we instrument Legislator Wages using indicator variables for the city's salary cap. $1\{x>V\}$ is an indicator variable that takes the value of one if the city's population is above V. In columns (2) to (4) we instrument Legislator Wages by the city's salary cap. Columns (2) to (4) present variations on the functional form assumption on population. Controls include income, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
$1\{x>10,000\}$	0.338***			
	[0.0242]			
$1\{x>50,000\}$	0.185**			
	[0.0751]			
$1\{x>100,000\}$	0.654***			
	[0.155]			
$1\{x>300,000\}$	0.582**			
	[0.229]			
$1\{x>500,000\}$	1.401***			
	[0.241]			
Salary cap		0.393***	0.516***	0.336***
		[0.0254]	[0.0249]	[0.0272]
Controls	Yes	Yes	Yes	Yes
Functional form assumption on population	Linear spline	Linear spline	3rd-order polynomial with quadratic on first cutoff	3rd-order polynomial with quadratic on first 2 cutoffs
Observations	5,201	5,201	5,201	5,201
R-squared	0.800	0.797	0.777	0.798
F-stat	54.51	239.20	428.25	153.50

Table 5: The Effects of Local Legislator's Wages on Job and Firm Creation, and GDP Growth

This table presents the estimates of instrumental variable regressions of the effects of Legislators Wages (in thousands of Brazilian Real) on job and firm creation. Legislator Wages is instrumented using the city's salary cap. The dependent variables are the differences in the logarithm of the number of jobs and the number of firms between 2004 and 2008. Columns (1) to (3) present variations on the functional form assumption on population. Controls include the income, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Functional form assumption on population		
	Linear spline	3rd-order polynomical with quadratic on first cutoff	3rd-order polynomial with quadratic on first 2 cutoffs
Panel A: Dependent Variable - Δ *Log(Num. of Employees)*			
Legislators Wages (1/1000)	0.112***	0.108***	0.107**
	[0.0411]	[0.0317]	[0.0486]
Controls	Yes	Yes	Yes
Observations	5,201	5,201	5,201
Mean of dependent variable	.237	.237	.237
Panel B: Dependent Variable - Δ *Log(Num. of Firms)*			
Legislators Wages (1/1000)	0.0620***	0.0747***	0.0540**
	[0.0227]	[0.0178]	[0.0263]
Controls	Yes	Yes	Yes
Observations	5,201	5,201	5,201
Mean of dependent variable	.144	.144	.144

Table 6: The Effects of Local Legislator's Wages on Job and Firm Creation - Income Sub-samples

This table presents the estimates of instrumental variable regressions of the effects of Legislators Wages (in thousands of Brazilian Real) on job and firm creation separately for municipality's above and below median income. Legislator Wages is instrumented using the city's salary cap. The dependent variables are the differences in the logarithm of the number of jobs and the number of firms between 2004 and 2008. Panels A1 and B1 use the subsample of cities with income below median. Panels A2 and B2 use the subsample of municipalities with income above median. Columns (1) to (3) present variations on the functional form assumption on population. Controls include the income, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Functional form assumption on population		
	Linear spline	3rd-order polynomical with quadratic on first cutoff	3rd-order polynomial with quadratic on first 2 cutoffs
Panel A1: Dependent Variable - Δ Log(Num. of Employees) - Below Median Income			
Legislators Wages (1/1000)	0.197**	0.133	0.132
	[0.0865]	[0.0892]	[0.102]
Controls	Yes	Yes	Yes
Observations	2,414	2,414	2,414
Panel A2: Dependent Variable - Δ Log(Num. of Employees) - Above Median Income			
Legislators Wages (1/1000)	0.0187	0.0332	0.0220
	[0.0366]	[0.0345]	[0.0437]
Controls	Yes	Yes	Yes
Observations	2,426	2,426	2,426
Panel B1: Dependent Variable - Δ Log(Num. of Firms) - Below Median Income			
Legislators Wages (1/1000)	0.0939*	0.0477	0.0333
	[0.0492]	[0.0517]	[0.0583]
Controls	Yes	Yes	Yes
Observations	2,414	2,414	2,414
Panel B2: Dependent Variable - Δ Log(Num. of Firms) - Above Median Income			
Legislators Wages (1/1000)	0.0287	0.0452**	0.0318
	[0.0193]	[0.0182]	[0.0228]
Controls	Yes	Yes	Yes
Observations	2,426	2,426	2,426

Table 7: The Effects of Local Legislator's Wages on Job and Firm Creation - Firm Size Sub-samples

This table presents the estimates of instrumental variable regressions of the effects of Legislators Wages (in thousands of Brazilian Real) on job and firm creation separately for firms with different sizes. Legislator Wages is instrumented using the city's salary cap. The dependent variables are the differences in the logarithm of the number of jobs and the number of firms between 2004 and 2008. Panels A1 and B1 use the subsample of firms with less than 10 employees. Panels A2 and B2 use the subsample of firms with between 10 and 20 employees. Panels A3 and B3 use the subsample of firms with more than 20 employees. Columns (1) to (3) present variations on the functional form assumption on population. Controls include income, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
		Functional form assumption on population	
	Linear spline	3rd-order polynomical with quadratic on first cutoff	3rd-order polynomial with quadratic on first 2 cutoffs
Panel A1: Dep. Var. - Δ Log(Num. of Emp.) - Firms with less than 10 emp.			
Legislators Wages (1/1000)	0.0781**	0.0893***	0.0719*
	[0.0330]	[0.0261]	[0.0380]
Controls	Yes	Yes	Yes
Observations	5,201	5,201	5,201
Panel A2: Dep. Var. - Δ Log(Num. of Emp.) - Firms with between 10 and 20 emp.			
Legislators Wages (1/1000)	0.138	0.106	0.105
	[0.124]	[0.0961]	[0.145]
Controls	Yes	Yes	Yes
Observations	5,201	5,201	5,201
Panel A3: Dep. Var. - Δ Log(Num. of Emp.) - Firms with more than 20 emp.			
Legislators Wages (1/1000)	0.101*	0.0936**	0.101
	[0.0534]	[0.0410]	[0.0635]
Controls	Yes	Yes	Yes
Observations	5,201	5,201	5,201
Panel B1: Dep. Var. - Δ Log(Num. of Firms) - Firms with less than 10 emp.			
Legislators Wages (1/1000)	0.0537**	0.0704***	0.0459
	[0.0253]	[0.0199]	[0.0293]
Controls	Yes	Yes	Yes
Observations	5,201	5,201	5,201
Panel B2: Dep. Var. - Δ Log(Num. of Firms) - Firms with between 10 and 20 emp.			
Legislators Wages (1/1000)	0.00190	0.00971	-0.0310
	[0.0512]	[0.0390]	[0.0612]
Controls	Yes	Yes	Yes
Observations	5,201	5,201	5,201
Panel B3: Dep. Var. - Δ Log(Num. of Firms) - Firms with more than 20 emp.			
Legislators Wages (1/1000)	-0.0252	-0.0123	-0.0274
	[0.0350]	[0.0264]	[0.0424]
Controls	Yes	Yes	Yes
Observations	5,201	5,201	5,201

Table 8: The Effects of Local Legislator's Wages on Revenues and Investments

This table presents the estimates of instrumental variable regressions of the effects of Legislators Wages (in thousands of Brazilian Real) on municipality level average of revenues and investments. Legislator Wages is instrumented using the city's salary cap. The dependent variables are the differences in the logarithm of firms' net revenues and net investment between 2004 and 2008. Therefore, each estimate presented in this table is obtained from a different regression using legislator wages as the independent variable. Columns (1) to (3) present variations on the functional form assumption on population. Controls include income, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variables	(1)	(2)	(3)
	Functional form assumption on population		
	Linear spline	3rd-order polynomical with quadratic on first cutoff	3rd-order polynomial with quadratic on first 2 cutoffs
Panel A: Retail (Annual Survey of Trade)			
Net Revenues	0.114*	0.130*	0.130*
	[0.0692]	[0.0716]	[0.0715]
Observations	899	899	899
Net Investments	-0.0892	-0.148	-0.101
	[0.385]	[0.388]	[0.362]
Observations	781	781	781
Panel B: Manufacturing (Annual Survey of Industry)			
Net Revenues	0.109	0.137	0.122
	[0.0997]	[0.100]	[0.0940]
Observations	1083	1083	1083
Net Investments	0.663	0.570	0.545
	[0.411]	[0.405]	[0.392]
Observations	1,070	1,070	1,070
Panel C: Service (Annual Survey of Services)			
Net Revenues	-0.0229	-0.0155	-0.0131
	[0.0714]	[0.0775]	[0.0759]
Observations	719	719	719
Total Investment	0.0373	-0.00768	0.0296
	[0.402]	[0.443]	[0.432]
Observations	719	719	719

Table 9: Effects on Sectors

This table presents the estimates of instrumental variable regressions of the effects of Legislators Wages (in thousands of Brazilian Real) on job and firm creation separately by sector. Legislator Wages is instrumented using the city's salary cap. The dependent variables are the differences in the logarithm of the number of jobs and the number of firms between 2004 and 2008 in the nontradable, retail, manufacturing and agricultural sectors. We control for population using a 3rd-order polynomial with a quadratic spline in first cutoff. Controls include income, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
		Sectors		
	Non-Tradable	Retail	Manufacturing	Agricultural
Panel A: Dependent Variable - Δ *Log(Num. of Employees)*				
Legislators Wages (1/1000))	0.0755**	0.121***	-0.109	0.102*
	[0.0380]	[0.0394]	[0.0722]	[0.0594]
Controls	Yes	Yes	Yes	Yes
Observations	5,201	5,201	5,201	5,201
Panel B: Dependent Variable - Δ *Log(Num. of Firms)*				
Legislators Wages (1/1000))	0.0449**	0.0783***	-0.0452	0.0798***
	[0.0220]	[0.0264]	[0.0310]	[0.0298]
Controls	Yes	Yes	Yes	Yes
Observations	5,201	5,201	5,201	5,201

Table 10: Effects on Public Policy

This table presents the estimates of instrumental variable regressions of the effects of Legislators Wages (in thousands of Brazilian Real) on per capita surplus and per capita municipal expenditure by category. Legislator Wages is instrumented using the city's salary cap. The dependent variables are the differences in the logarithm of the municipal per capita surplus and per capita expenditure in education, health care, investments and public safety (in hundreds of reais) between 2004 and 2008. We control for population using a 3rd-order polynomial with a quadratic spline in first cutoff. Controls include income, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable - Expenditure Type				
	Budget Surplus	Education	Health	Investments	Public Safety
Legislators Wages (1/1000)	0.377***	0.256***	0.181**	0.113	-0.00195
	[0.137]	[0.0870]	[0.0828]	[0.131]	[0.00501]
Controls	Yes	Yes	Yes	Yes	Yes
Observations	4,784	4,784	4,784	4,784	4,784

Table 11: Effects on Public Policy - Education Sub-Samples

This table presents the estimates of instrumental variable regressions of the effects of Legislators Wages (in thousands of Brazilian Real) on per capita municipal surplus and per capita expenditure by category separately for municipalities below and above median of fraction of high school graduates. Legislator Wages is instrumented using the city's salary cap. Panel A uses the subsample of municipalities below median fraction of high school graduates. Panel B uses the subsample of municipalities with above median fraction of high school graduates. The dependent variables are the differences in the logarithm of the municipal per capita surplus and per capita expenditure in education, health care, investments and public safety (in hundreds of reais) between 2004 and 2008. We control for population using a 3rd-order polynomial with a quadratic spline in first cutoff. Controls include income, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
		Dependent Variable - Expenditure Type			
	Budget Surplus	Education	Health	Investments	Public Safety
Panel A: Below median fraction of high school graduates					
Legislators Wages (1/1000))	0.883*	-0.0946	0.365	0.817*	0.0120
	[0.493]	[0.323]	[0.296]	[0.464]	[0.00907]
Controls	Yes	Yes	Yes	Yes	Yes
Observations	2,326	2,326	2,326	2,326	2,326
Panel B: Above median fraction of high school graduates					
Legislators Wages (1/1000)	0.560***	0.294***	0.287***	0.154	-0.00586
	[0.181]	[0.111]	[0.109]	[0.172]	[0.00834]
Controls	Yes	Yes	Yes	Yes	Yes
Observations	2,457	2,457	2,457	2,457	2,457

Table 12: Mechanism - Mediation Analysis

This table presents the estimates of instrumental variable regressions of the effects of changes in per capita budget surplus and per capita expenditure in education and health on job and firm creation. Changes in per capita surplus and expenditure are instrumented using the city's salary cap. Legislator wages are included as a control. The dependent variables are the differences in the logarithm of the number of jobs and the number of firms between 2004 and 2008. Mediated Effect is obtained using the methodology in Dippel, Gold, Heblich, and Pinto (2017). It represents the effects of Legislator wages on firm and job creation that are mediated by increases in budget surplus. Controls include income, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Panel A: Dependent Variable - $\Delta\ Log((Num.\ of\ Employees)$			
Budget Surplus	0.202*		
	[0.108]		
Education		0.563	
		[0.419]	
Health Care			0.868
			[0.873]
Mediated Effect ($\beta_M^{Y|W} \times \beta_W^M$)	0.0748***		
	[0.0301]		
Observations	4,784	4,784	4,784
Panel B: Dependent Variable - $\Delta\ Log((Num.\ of\ Firms)$			
Budget Surplus	0.176**		
	[0.0798]		
Education		0.492	
		[0.334]	
Health Care			0.758
			[0.734]
Mediated Effect ($\beta_M^{Y|W} \times \beta_W^M$)	0.0629***		
	[0.0174]		
Observations	4,784	4,784	4,784

Figure 1: 2005 Municipal Legislators Salaries by Population

This figure plots the wages of legislators in the y-axis and the municipality population in the x-axis in log scale. Vertical lines correspond to the population cutoffs of the 2000 constitutional amendment. Curves were fitted in each interval using locally weighted scatterplot smoothing.
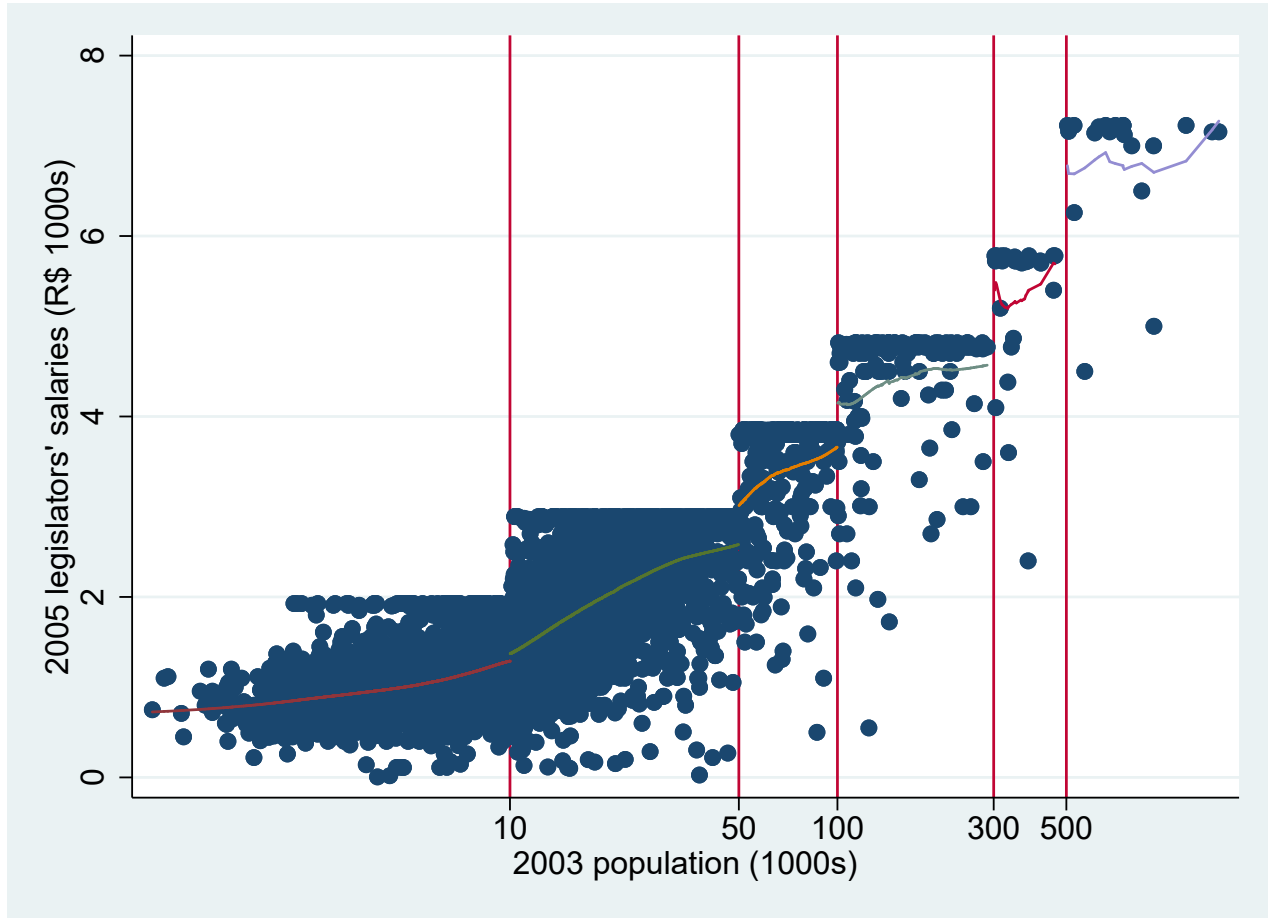
Figure 2: Baseline Municipal Characteristics by Population

This figure plots several municipalities characteristics measured in the year 2003 (y-axis) and the municipality population (x-axis, log scale). Vertical lines correspond to the population cutoffs of the 2000 constitutional amendment. Curves were fitted in each interval using locally weighted scatterplot smoothing.

(a) *Annual Spending per Capita*

(b) *Municipal Investment per Capita*

(c) *Municipal Surplus per Capita*

(d) *Formal Jobs per 1,000 people*

(e) *Formal Firms per 1,000 people*
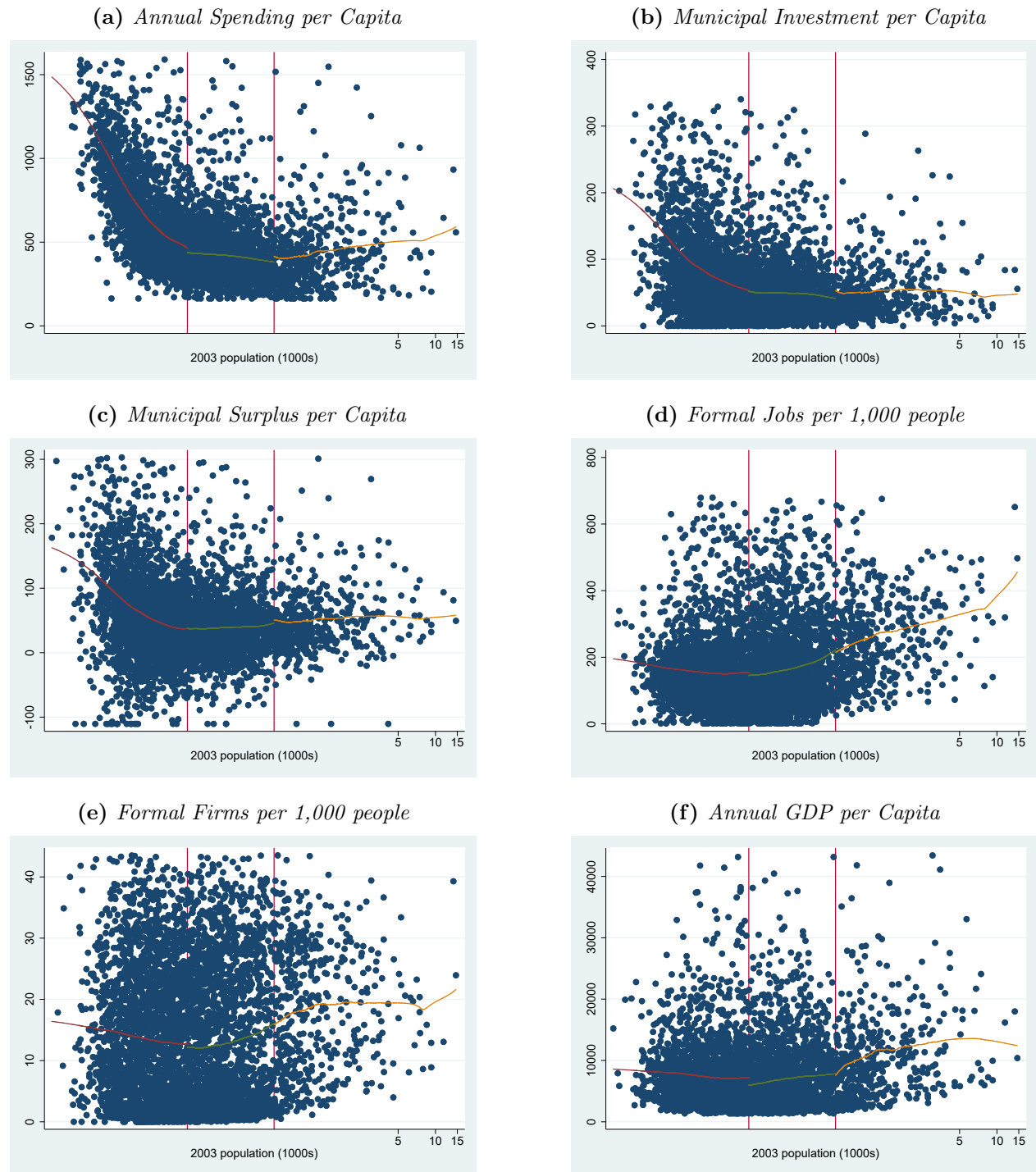

(f) *Annual GDP per Capita*

Figure 3: Parallel Trends

This figure presents the regression coefficients of instrumental variable regressions of the effects of Legislators Wages (in thousands of Brazilian Real) on firm and job creation. Legislator Wages is instrumented using the city's salary cap. Each point in the graph is the estimate of a regression in which the dependent variable is the difference in the logarithm of the number of jobs and the number of firms between 2004 and the plotted year. Controls include the city's population, Log income per capita, percentage of urban population, gini coefficient, percentage of households with energy, percentage of literate, average wages, hours functioning legislature and the number of assistant per legislator. The gray area represents the 90% confidence interval calculated using robust standard errors.

Panel A: Dependent Variable - Δ $Log(Num.\ of\ Employees)$
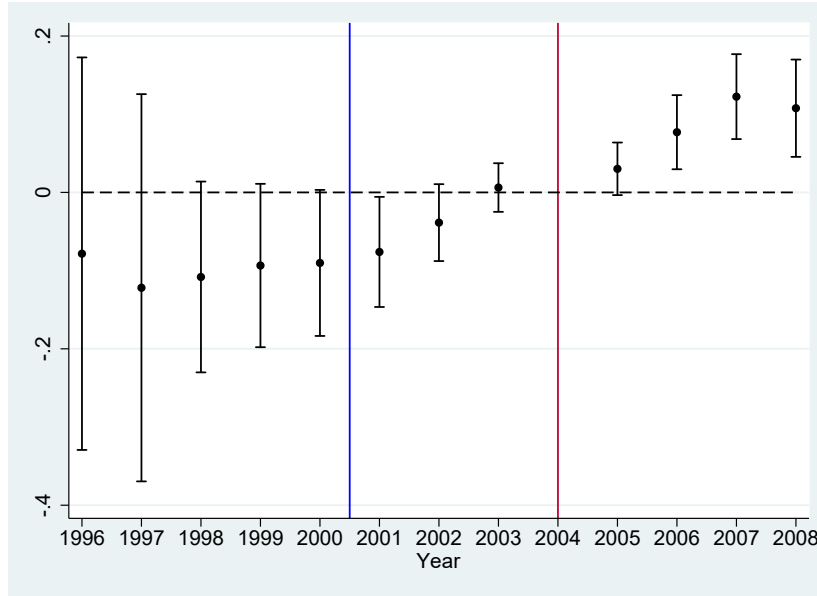
Panel B: Dependent Variable - Δ $Log(Num.\ of\ Firms)$
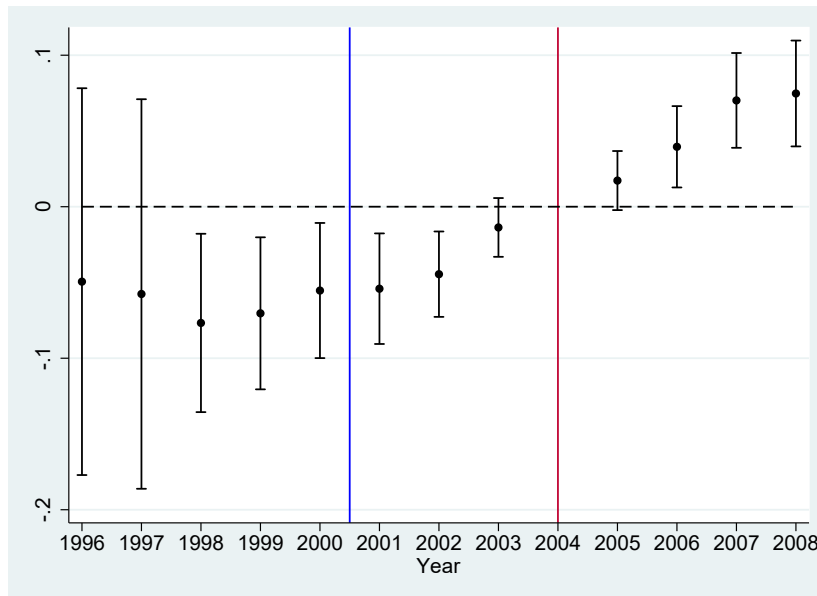
Internet Appendix to:
"The Real Effects of Politicians' Incentives"

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Table IA.1: Effects on Sectors - Alternative functional form assumption on population

This table presents estimates of instrumental variable regressions similar to those in Table 9 using alternative functional form assumption on population.

	(1) Linear spline	(2) 3rd-order polynomical with quadratic on first cutoff	(3) 3rd-order polynomial with quadratic on first 2 cutoffs
Panel A: Number of Workers Growth			
Retail	0.122**	0.121***	0.106*
	[0.0502]	[0.0394]	[0.0580]
Other Non-Trade	0.0147	0.0166	0.0219
	[0.0647]	[0.0505]	[0.0766]
Manufct.	-0.0850	-0.109	-0.0997
	[0.0942]	[0.0722]	[0.113]
Agro	0.0930	0.102*	0.0680
	[0.0789]	[0.0594]	[0.0941]
Panel B: Number of Firms Growth			
Retail	0.0729**	0.0783***	0.0663*
	[0.0336]	[0.0264]	[0.0388]
Other Non-Trade	-0.0302	-0.0148	-0.0381
	[0.0315]	[0.0251]	[0.0369]
Manufct.	-0.0598	-0.0452	-0.0778
	[0.0411]	[0.0310]	[0.0494]
Agro	0.0762*	0.0798***	0.0499
	[0.0393]	[0.0298]	[0.0467]

Table IA.2: Effects on Public Policy - alternative functional form assumption on population

This table presents estimates of instrumental variable regressions similar to those in Table 10 using alternative functional form assumption on population.

	(1)	(2)	(3)	(4)	(5)
			Expenditure Type		
	Budget Surplus	Education	Health	Investments	Public Safety
Panel A: Linear Spline					
Legislators Wages (1/1000)	0.303*	0.196*	0.138	0.132	-0.012*
	[0.170]	[0.109]	[0.106]	[0.160]	[0.006]
Observations	4,784	4,784	4,784	4,784	4,784
R-squared	0.232	0.077	0.193	0.124	0.081
Mean of dependent variable	1.86	1.862	1.637	1.2	.016
Panel B: 3rd-order polynomial with quadratic on first cuttoff					
Legislators Wages (1/1000)	0.377***	0.256***	0.181**	0.113	-0.002
	[0.137]	[0.0870]	[0.0828]	[0.131]	[0.005]
Observations	4,784	4,784	4,784	4,784	4,784
R-squared	0.228	0.073	0.190	0.125	0.084
Mean of dependent variable	1.86	1.862	1.637	1.2	.016
Panel C: 3rd-order polynomial with quadratic on first 2 cuttoffs					
Legislators Wages (1/1000)	0.452**	0.148	0.184	0.275	-0.006
	[0.209]	[0.133]	[0.128]	[0.195]	[0.009]
Observations	4,784	4,784	4,784	4,784	4,784
R-squared	0.224	0.079	0.190	0.116	0.083
Mean of dependent variable	1.86	1.862	1.637	1.2	.016

Table IA.3: Mediation - alternative functional form assumption on population

This table presents estimates of instrumental variable regressions similar to those in Table 12 using alternative functional form assumption on population.

	(1) Linear spline	(2) 3rd-order polynomical with quadratic on first cutoff	(3) 3rd-order polynomial with quadratic on first 2 cutoffs
Panel A: Number of Workers Growth			
Budget Surplus	0.227	0.202*	0.168
	[0.153]	[0.108]	[0.120]
Education	0.773	0.563	1.276
	[0.874]	[0.419]	[2.786]
Health Care	1.129	0.868	0.803
	[1.718]	[0.873]	[1.090]
Panel B: Number of Firms Growth			
Budget Surplus	0.173*	0.176**	0.122
	[0.105]	[0.0798]	[0.0766]
Education	0.589	0.492	0.912
	[0.638]	[0.334]	[1.962]
Health Care	0.861	0.758	0.582
	[1.291]	[0.734]	[0.768]