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 increases in firm and job creation and firms' average startup investments. Better paid legislators increase the municipality's budget surplus while increasing expenditure in items that increase local economic productivity. Our evidence highlights the potential adverse effects on the private sector of lowering politicians' salaries.

KEYWORDS: POLITICIAN COMPENSATION, 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 for politicians. The most common view is that political activity is a civic duty and should not be lucrative. A survey from 2014 revealed that 63% of U.S. likely voters think members of Congress are overpaid.[1] Proponents of this argument are mostly concerned about not wasting public resources. They also argue that lower wages will only attract candidates genuinely interested in helping the public. Besides, lower salaries can increase turnover, which reduces the politician's entrenchment.

The argument in favor of higher politician salaries postulates that contracts must be incentive compatible. If agents are not sufficiently compensated, they may engage in activities that increase their private benefits and destroy the principal's value (Tirole (2006)). Low politicians' salaries can demotivate them to work hard, induce lower-quality candidates to run for office, and increase incentives to engage in corruption. Misbehaving politicians can misallocate resources that are important to local productivity, which can be detrimental to firms' activity and employment. Therefore, saving on politicians' salaries could be costly to society due to decreased total firm output. Given this ambiguity, it is vital 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 examine how differences in local politician salaries affect job creation, firm creation, and investment in new establishments (hereafter, startup investment). 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.[2]

We show that local politicians' wages have a meaningful impact on firm outcomes. Higher politician wages are associated with increases in firm and job creation and firms' average

[1] https://www.rasmussenreports.com/public_content/politics/general_politics/april_2014/63_think_members_of_congress_are_overpaid

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

startup investments. Better-paid local politicians affect public policy by increasing the municipality's budget surplus while increasing expenditure in items that increase voters' well-being, such as capital expenditure, education, and healthcare. We connect the changes in policy and firm outcomes using techniques from the mediation literature. According to this analysis, increases in budget surplus, capital investment, education, and healthcare are the most important channels through which politicians' wages affect economic activity. Economically, this can be interpreted as an improvement in the local business conditions generated by reducing the expected future local taxes and productivity increases.

In Brazil, tax collection and public goods provision are decentralized among 26 states and 5,570 municipalities. Municipalities receive approximately 15% of the federal government revenues to provide education, healthcare, transportation, and infrastructure. These resources are allocated by the executive and legislative branches of each municipality. Specifically, directly elected municipal legislators participate in the municipal budget production with the mayor and are solely responsible for approving its final version. They can also submit bills (that can potentially become municipal laws) and request public works. 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 cannot increase the total spending considerably unless the municipal tax revenues increase accordingly.[3]

Given their importance in the production of municipal legislation and the municipal budget execution, 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 resource allocation and improve labor productivity by increasing expenditures on education, healthcare, public safety, and public transportation. Third, they can write business-friendly laws with the objective of reducing the regulatory burden for entrepreneurs. Finally, they can guarantee the continuity of existing

[3]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.

policies, reducing political uncertainty. Hence, it is natural to ask whenever the elected legislators' quality and the incentives to legislators provided by the institutional landscape can affect local business activity through more (or less) business-friendly laws and policies.

One of the guiding principles of the 1988 Brazilian constitution is federal decentralization. This principle made Brazil one of the most decentralized governments in the world. Initially, the constitution gave cities complete independence to decide how to use their federal transfers and tax revenues. However, shortly after passing the constitution, the total independence principle led to a distributive conflict between cities and the federal government. In many cities, the payroll expenses with the mayor's office and the local legislative house exceeded the local tax revenues and required federal funds to cover the difference. In the face of this issue, the first constitutional amendment established that city legislators' wages could not exceed 75% of the state legislators' salaries. Besides, the total local legislator payroll could not exceed 5% of the total municipal revenue. This rule prevailed until 2000 when a constitutional amendment, which would take effect in 2005, established that salary and total legislature spending caps would depend on each city's population.

We use the exogenous variation in local legislators' salaries induced by the 2000 constitutional amendment to provide causal estimates of the effects of local politician wages on the real economy. Our benchmark specification, similar to the primary 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. 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 cities with populations just below the cutoffs.

The underlying identification assumption is that the other channels through which population may affect the outcome variables and local legislators' wages are locally continuous at the population cutoffs. 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. We further validate our exclusion restriction, analyzing the behavior of a set of rele-

vant variables around the cutoffs. We show that the municipality's characteristics measured prior to the amendment change smoothly around the population cutoffs. In order to alleviate concerns that cities are manipulating their population reporting, we show that the population distribution is smooth around the population cutoffs. Finally, we perform a placebo test to verify whether the salary caps explained local legislators' wages before the enactment of the constitutional amendment. We find that the salary caps do not explain the differences in local legislators' wages across cities before 2005.

We find that shifts in legislators' wages are consequential for the real economy. In the cities where the local legislator earned wages one standard deviation higher (approximately 1000 reais or 377 dollars of 2005), the annual growth in firm creation was 3.5% higher. These municipalities also present a 4.6% higher annual job creation. Finally, a similar change in legislators' salaries induces a 9.3% increase in the average startup investment growth.

To strengthen our findings' causal interpretation, we explore cross-sectional variation on the city's level of income and education. We expect salaries to be more important to the politician in places with lower income and labor productivity. Consistent with our estimates' causal interpretation, we show that the impact of local legislators' wages on real economic activity is stronger in municipalities with lower incomes and education. Changes in compensation have a more substantial effect in places where they are more likely to be meaningful to the local legislator, given their lower outside options. The results also indicate that the politician's actions might be more effective in more precarious communities, where the population is more dependent on local government policies.

Between 2004 and 2008, Brazil experienced substantial economic growth. During this period, GDP grew approximately 5% per year, while unemployment fell from 11.5% 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 explore variations in firm size to verify whether our results are a byproduct of formalization. Informal economy firms are generally small businesses with few employees. Firms with several employees are likely to be overseen by the Ministry of Labor, making the use of informal labor a potentially costly legal risk. We find that firm

creation increases are similar among firms with less than 10 employees, and between 10 and 20 employees. We also find that politician wages have a similar impact on small, medium, and large (more than 20 employees) firms' job creation. The fact that legislator wages affect firms of all sizes mitigate the concerns that our results are driven exclusively by formalization.

We also examine the effects of politicians' wages on firm outcomes by sector. We expect the impact of politicians' compensation to be more substantial in industries that are more dependent on local economic conditions. We separately calculate the effects of politicians' salaries on job and firm creation for the retail, service, and manufacturing 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 retail and service sectors.

We further explore the effects of local legislators' wages on firm outcomes by studying 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) and are aggregated at the city and sector level, these tests suffer from measurement error and lack statistical power, which makes these findings less precisely estimated. We find that a one standard deviation increase in local legislators' salaries is associated with a 4.2% rise in gross revenue growth and 4.5% in net revenues in the manufacturing sector.

To understand the channels behind our previous results, we need to answer two questions. First, how wages affect politicians? And second, how politicians affect the real economy?

We start this analysis by answering, first, how changes in wages affect politician selection. Higher salaries could affect politicians' performance by improving their motivation or by attracting better candidates. We find that a one standard deviation increase in legislators' wages is associated with an average increase of 0.4 in the local legislators' years of schooling. Our results also indicate that salary increases are associated with an increase in diversity. A

one standard deviation increase in wages is associated with a 2.9% reduction in the number of males in the legislature. We do not find evidence that higher salaries attract novice politicians, nor politicians with a business background (measured by previous management experience). In short, increases in wages are associated with a more educated and more diverse legislature.

We further explore the effects of wages on the selection of legislators by analyzing the effects on the political composition of the legislature. We examine this possibility by looking at how concentrated is the power in the legislature amongst parties. We calculate power concentration using the Herfindahl-Hirschman index of the legislature's concentration seats in each party's hands. We find that a one standard deviation increase in local legislators' wages is associated with a reduction of 16% in party concentration. Therefore, larger parties are losing seats to smaller parties after the amendment. The lower concentration can induce more competition among parties. It may also lead to less partisan politics, as local legislators will need to reach a consensus to pass their law changes. The changes in party concentration are not associated with a significant shift in political views. Our results indicate that higher wages are not associated with significant changes in the legislature's average political ideology.

Next, we turn to the second question: how politicians affect the real economy? Brazilian municipal legislators (*vereadores*) can change 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 better public goods provision, better budget management, and more business-friendly laws can encourage entrepreneurs to invest more and hire more workers.

We focus our attention on the effects of local legislators' wages on the municipality's budget allocation and its subsequent impact on business activity. Better fiscal responsibility might

spur economic activity by reducing the expectation of tax increases. Also, expenditures that increase workers' productivity might induce entrepreneurs to invest more.[4]

We find that better paid local legislators are more fiscally responsible. Our estimates imply that one standard deviation increase in legislators' wages is associated with a 3.1% rise in the municipality's budget surplus. This increase in the budget surplus is partially explained by increases in the discretionary transfers from the federal government to the cities. Municipalities in Brazil receive two types of funds from the federal government. They have the constitutional right to a portion of the total federal budget (*Participação na Receita*) and receive discretionary funds that will generally be allocated by members of congress. Consistent with Cohen, Coval, and Malloy (2011), we find that better politicians are more capable of negotiating with members of congress and bring more resources for their city. We find that one standard deviation in the politicians' wages is associated with a 2.4% increase in the discretionary federal transfers to the municipality.

Better paid politicians also increase expenditure on items that increase local economic productivity, such as infrastructure, education, and healthcare. We find that a one standard deviation increase in the local legislators' wage is associated with a 6.4% rise in education, a 5.2% increase in healthcare expenditure, and a 3.1% surge in capital expenditure. They also increase spending on items that increase the population's disposable income. Higher disposable income can immediately affect the amount of money people have to spend and improve local economic conditions. Our results indicate that one standard deviation increase in local legislators' wages is associated with a 5.4% increase in payroll expenses and a 3.4% increase in welfare expenses.

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 (pathway analysis) introduced by Imai, Keele, and Yamamoto (2010) and Heckman and Pinto (2015) and used in Maccini and Yang (2009), Andonov, Hochberg, and Rauh (2018), and Butler and Yi (2019).

[4]Another alternative would be accessing the contents of municipal bills, measuring which bills are business-friendly. However, this is strategy infeasible, given (i) the absence of a centralized repository of municipal bills in Brazil, and (ii) the intrinsic difficulty in assessing the contents of a large number of municipal laws.

The evidence from the pathway analysis points to the increases in budget surplus as the most important mediating factor of the effects of politician wages on firm outcomes. Total spending, and expenditure in Education, Healthcare, and capital also play a role, albeit smaller, as pathways. Economically, this can be interpreted as an improvement in the local business conditions generated by a reduction in the expected future local taxes, and increases in productivity. Changes in budget surplus might also be proxying for other unobserved changes in policy. If the local legislators are better able to manage their financial resources, they may also be better at making other city decisions.

Our paper contributes to the literature that studies the effects of monetary incentives on legislators' performance and selection. Finan and Ferraz (2011) also explore variations on local legislators' wages generated by the 2000 constitutional amendment in Brazil. They find a positive effect of salary on Brazilian local legislators' political effort, arguing that the selection of better-qualified politicians does not drive this effect. 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)).[5] Our paper contributes to this literature by showing that legislator incentives associated with political performance improvements 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.

Finally, we contribute to the literature that studies the effects of politicians in firms'

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

outcomes. It is well established that being politically connected brings many benefits to firms.[6] It is also well known that political uncertainty have a significant impact on firms decisions.[7] 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[8], 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, 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 and state government and municipal taxes. Transfers from the federal and state government to municipalities are approximately 3% of Brazil's GDP. Also, municipalities rely on sales and property taxes, representing approximately 2% of Brazil's GDP. Therefore, cities control approximately 5% of Brazil's GDP.

[6] 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), Colonnelli, Prem, and Teso (2020), Ovtchinnikov and Valta (2020)

[7] 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)

[8] The Federal District is the federal unit of Brazil containing the federal capital, Brasília.

2.1.1 Brazilian Municipal Legislators

A directly elected mayor and a local council of directly elected municipal legislators (called *vereadores*) decide how to allocate the municipal budget. The council of local legislators comprises 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 (i.e., 2 years after the presidential election).

One of the attributions of the Brazilian municipal legislators is proposing and voting municipal laws. Laws proposed by municipal legislators typically pertain (i) the creation of new programs and regulations, or (ii) the creation of legislative committees that will monitor the mayor's office during the implementation of a specific program. Furthermore, 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 on 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 in the production of municipal legislation and the municipal budget execution, 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 resource allocation and improve labor productivity by increasing expenditures on education, healthcare, public safety, and public transportation. Third, they can write business-friendly laws with the objective of reducing the regulatory burden for entrepreneurs. Finally, they can guarantee the continuity of existing

policies, reducing 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 Political 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.

2.1.2 Brazilian 25^{th} Constitutional Amendment

One of the guiding principles of the 1988 Brazilian constitution is federal decentralization. This principle made Brazil one of the most decentralized governments in the world. Initially, the constitution gave cities complete independence to decide how to use their federal transfers and tax revenues. However, shortly after passing the constitution, the total independence principle led to a distributive conflict between cities and the federal government. In many cities, the payroll expenses with the mayor's office and the local legislative house exceeded the local tax revenues. These municipalities relied on both federal and state transfers to be able to pay for these expenses. In the face of this issue, the first constitutional amendment established that city legislators' wages could not exceed 75% of the state legislators' salaries. Besides, the total local legislator payroll could not exceed 5% of the total municipal revenue.

The first constitutional amendment was not enough to contain the fraction of municipal resources spent on local politicians' wages on a number of cities, specially on small cities with low tax reveues. In 1998, Senator Epiridiao Amin proposed a new constitutional amendment to limit local legislators' salaries further. In the justification of the constitutional amendment, Senator Amin provided data from 1995, showing that more than half of the Brazilian Munic-

ipalities did not generate enough tax revenues to pay for the expenses with mayors and local legislators.

The constitutional amendment established caps for the total legislative expense and the local legislators' salaries. Column (1) of Table 1 shows the local legislator's salary caps. The constitutional amendment replaces the unique cap for the entire state (75% of the state legislator's salary) with limits conditional on population size. In addition to the salary caps, the total payroll expenses could not exceed 70% of the total expenditure with the municipal legislative chamber. Column (2) of Table 1 provides the maximum value of the local legislator's salary. This value is calculated based on the maximum salary allowed in the constitution for state legislators. Column (3) of Table 1 shows the limits for total legislative expenses. The percentages are calculated using the municipal tax revenues and the municipalities' shares of the state and federal tax revenues. The amendment established a total expense cap that is inversely proportional to the population size.

Another fiscal responsibility law was approved around the same time of the constitutional 25^{th} amendment. The *Lei de Responsabilidade Fiscal* (LRF) established that municipalities could not run a budget deficit. The total payroll expenses (with active and retired employees) with the municipal legislative chambers could not exceed 6% of current revenues.

Therefore, when calculating their salary, local legislators need to consider the city's salary cap and ensure that the total expenses do not exceed the constitutional amendment and the LRF's limits. For this reason, not every city is able to set their local legislator's wages at the constitutional cap. Figure 1 plots the 2005 municipal legislators' wages on the 2003 official population, and smooth curves fitted in each population interval.[9] The Figure shows that there is substantial variation in the local legislators' salaries and that the amendment indeed limited the maximum salary paid for the 2005-2008 legislature's legislators. In Figure 2 we plot the distribution of legislator salaries for the 2001-2004 legislature (in white)[10] and 2005-2008

[9] As we explain in more detail in the identification section, the 2005-2008 legislators' wages are defined in the year of 2004 taking into account the official population count of 2003. This motivates the use of the population in 2003 in the x-axis.

[10] We only have salary data for a subset of municipalities for the 2001-2004 legislature

(in green). Despite the constitutional amendment, we observe an increase in salaries. However, the Figure shows that there is bunching around the salary caps. The high concentration of salaries around the caps indicates that the rise in wages would likely be higher in the amendment's absence.

The new law did not face challenges in the House of Representatives nor the Senate. In the House, 99% of the representatives voted in favor of the constitutional amendment. In the Senate, 94% of senators voted to approve. This shows a consensus of the federal legislators in adapting the spending of small cities with legislators' salaries to their tax revenues.

2.2 Sample and Descriptive Statistics

Data on municipal legislators used in this study comes from three sources. First, we use wages and legislators characteristics from the Census of Brazil's Municipal Councils, which was collected in 2005 by *Interlegis*, an organ of the Brazilian Senate. Second, we increase our sample of legislator's wages using a database called RAIS (Relação Anual de Informações Sociais), which is managed by the Brazilian Ministry of Labor and contains wages for virtually all formal workers of the country, including elected officials. Whenever the legislator wage is not available for a given municipality in the Census of Brazil's Municipal Councils, we use the municipal legislators' median salary of the same city in RAIS. Finally, we further enrich our set of municipal legislator characteristics by collecting data from the Superior Electoral Court (TSE - *Tribunal Superior Eleitorial*), the official repository of Brazilian electoral data. Panel A of Table 2 shows the characteristics of the municipal legislators. Their average monthly wage – across the 5,383 Brazilian cities – is 1,704 reais, which corresponds to 642 dollars (of 2005) per month. The average legislator is male, 43 years old, with 12 years of education. Half of the legislators completed high school, and only 16% went to college.

We assess the political composition of the legislature using two measures. First, we calculate party concentration using the Herfindahl-Hirschman index of the legislature's concentration seats in each party's hands. In order to measure how progressive or conservative the

legislature is, we explore an ideology index for Brazilian parties from Maciel, Alarcon, and Gimenes (2018). This index is obtained from a survey of members of the congress. In this survey, politicians are are asked to rank themselves from 1 to 10, where 1 corresponds to the left, 5 to the center, and 10 to the right. As Panel A of Table 2 shows, the average legislature have a concentration of 0.26, which is equivalent to a highly concentrated industry in the industrial organization literature, and an average ideology index of 4.54, indicating a tendency towards the center in the political spectrum.

Given that local legislators participate in the development of the municipal budget, we also collect data on the municipal government spending and revenue from the Sinconfi (*Sistema de Informações Contábeis e Fiscais do Setor Público Brasileiro*). Panel B of Table 2 shows that, in the spending category, the payroll is the largest rubric. The three main sources of revenue are: (i) transfers from the federal government (averaging to 7M reais), (ii) transfers from the state government (6M reais), and (iii) local taxes (4M reais). A large proportion of the federal government transfers are part of a program called FPM (Fundos de Participação dos Municípios), which distributes national resources to all Brazilian municipalities, proportionally to a mathematical formula known as the FPM coefficient of each city. The FPM coefficient is a step function of the population that jumps discontinuously on specific population cutoffs.[11] The FPM population groups' width is shorter than those of the 25^{th} constitutional amendment, and each coefficient jump is less substantial. However, given the potential confounding issue introduced by this policy, we control for the FPM coefficient in all regressions in this paper.

We also control for demographic factors potentially correlated with local business activity. Panel C of Table 2 reports data from the 2000 Brazilian Census and shows that the average municipality has a population of 32 thousand people. Monthly per capita income is around 566 reais, which corresponds to 213 dollars of 2005. Therefore, local legislators' wages are 3 times higher than the total income of an average individual. Similarly to other emerging economies, Brazilian cities have high-income inequality (average Gini of .55) and a large urban

[11] Table IA.1 in the internet appendix show the FPM population cutoffs

population (60% of the total), The fraction of literates in the population is around 80%.

We can divide the business outcome variables in our analysis into three categories: entrepreneurship, labor market outcomes, startup investment, and income statement outcomes. We obtain entrepreneurship and labor market outcomes from a database called RAIS (*Relação Anual de Informações Sociais*). RAIS is a nationwide employer-employee matched database containing annual compensation, starting date, termination date, and industry type. It covers the universe of formalized firms employing at least one worker – hereafter referred to as active firms. We aggregated the total number of RAIS workers for each municipality, each sector, and each year. Panel D of Table 2 shows that the average city had 177 formal workers for every 1,000 adults in the municipal election year of 2004.[12] Panel D also 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 American countries and around 64 for industrialized countries.

We obtain data on the investment in new establishments – hereafter referred to as startup investment – from the Receita Federal do Brasil (RFB) . RFB provides administrative data of all Brazilian establishments when they start their operations, including the amount invested. We start by deleting all firms that did not report any investment to the RFB, which partially skews our data towards large firms with appropriate reporting. Then we collapse this measure to the municipality level by calculating the average startup investment, which averages 465 thousand reais. We include only cities with more than 15 establishments reporting investment in a given year.

We obtain data on Income statement outcomes from the Brazilian Institute of Geography and Statistics (IBGE - *Instituto Brasileiro de Geografia e Estatística*). This data is aggregated at the municipality level from three sector-level surveys. Panel E of Table 2 reports the

[12]Brazil has a high rate of informality when compared to developed countries. 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 the 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 around 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.

summary statistics of the variables from these three surveys used in the paper. 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 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: firm creation, employment, startup investment, and firms' income statement variables. Assume that: i represents municipalities, y_i represents an 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 exert 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:

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

This paper's parameter of interest 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 Equation (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 the quality channel by attracting more qualified individuals, which 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 the urban population, percentage of literate adults, Gini coefficient, average wage, number of assistants per legislator, number of weekly hours of the functioning legislature, and the FPM coefficient. We are interested in the following outcome variables y_i in our main specification: (i) the log growth in the number of firms during the 2005-2008 political cycle, (ii) the log growth in the number of formal workers during the 2005-2008 political cycle, and (iii) the log growth average startup investment from the 2001-2004 cycle to the 2005-2008 cycle. We focus on the 2005-2008 cycle because the wage established at the start of the cycle is, by law, constant during the entire period, thus affecting the behavior of legislators only

within the political cycle.

Appendix Table IA.2 presents the OLS estimates of the equation (3) and shows that the sensitivities of all outcome variables with respect to the legislative wage are statistically insignificant. However, there are several identification issues potentially affecting these results. For instance, rent-seeking politicians could act as an omitted variable, simultaneously increasing their salaries and worsening business conditions. If this is the case, the OLS estimates could be downward biased.

2.4 Identification

To obtain exogenous variation in the legislators' wages, we exploit the 25^{th} constitutional amendment setting caps for municipal legislators. This amendment was approved at the end of the year 2000 and defined caps as percentages of the corresponding state legislators' wages. Importantly, changes in municipal legislators' wages in Brazil can only take effect on the next legislature. Therefore, the amendment required the legislators of the 2001-2004 term to vote the salaries of the legislators of the *next* term, using the official 2003 population count. Table 1 shows the population cutoffs and their corresponding salary caps. The amendment created considerable cross-sectional variation in the maximum possible wage across different municipalities around 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 the legislator's wages. Given the arbitrary nature of the cutoffs chosen in the constitutional amendment, they can be used as instruments to estimate 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:

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

where $cap(P_i)$ is the maximum possible wage of legislators in the city i (as defined by in terms of the municipal population P_i as described by the Table 1), 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 $cap(P_i)$ and $g(P_i)$ are functions of the municipal population. Given that $cap(P_i)$ 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 legislators' wages and on the outcome variable not associated with the wage cap. If this assumption is satisfied, the instrument $cap(P_i)$ 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 3 shows that municipal spending, municipal investment, municipal surplus, number of jobs, number of firms, and total GDP change smoothly around the population cutoffs. We also investigate the possibility that the municipal governments are manipulating their population reporting. Suppose mayors and local legislators are able to report fraudulent population counts. This could be problematic to our identification strategy because cities would be able to self-select into a salary cap bin. Figure 4 plots the result of the density discontinuity test of McCrary (2008), showing that the population distribution is smooth around all population cutoffs, without evidence of density discontinuity. The lack of bunching in the population distribution alleviates concerns that municipalities manipulate the reported number of citizens in their cities.

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, where T_k represents the k^{th} population cutoff. :

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

Table 3 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 alternative specification results, assuming a linear spline form for the population function, reporting a large R^2 and a statistically significant F-stat, which confirms the excluded instruments' validity. Columns (1) and (2) show that a similar R^2 is obtained in the models using the dummies or the caps as excluded instruments, which motivates our preference for the later, as it is more parsimonious and less prone to overfitting. 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 instrument's significance survives to this additional test, providing further evidence of the relevance of the salary cap as an excluded instrument. Model (4) controls for nonlinearities of the population's impact on wages more rigorously, so we use it as our preferred specification throughout this paper.

Our identification strategy relies on the assumption that we control all channels – other than the population cutoffs — through which population could affect wages. We provide evidence consistent with this assumption. We run a placebo test using the previous political cycle before the wage caps defined by the constitutional amendment were in place. For this exercise, we calculate the hypothetical salary caps in place if the constitutional amendment was in effect in 1999, and we non-linearly control for the population. As shown by table 4, the cutoffs calculated using the cities' population in 1999 have no relation with the legislator's salaries on the term before the constitutional amendment. Therefore, the salary cap's coeffi-

cient stems from the constitutional changes, not by some residual effect of the population on wages.

3 The Real Effects of Politicians' Compensation

3.1 Effects on Firm and Job Creation, and Startup Investment

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

Table 5 presents the estimates of instrumental variables regressions of the effects of local legislator salaries on changes in the local economic activity. The first column shows that the (log) annual growth in firm creation is 3.5% higher in municipalities where legislators' wages are one standard deviation higher (approximately 1000 reais). Column (2) analyses the effect on job creation, showing that the (log) annual increase in job creation is 4.6% higher in municipalities where legislators' wages are one standard deviation higher. Finally, column (3) of Table 5 presents the effects on the growth of startup investments (investments used to open a new firm or a new subsidiary). The dependent variable is the log annual average growth in startup investment from the 2001-2004 cycle to the 2005-2008 cycle divided by 4. The results imply that one standard deviation in local legislators' salary is associated with 9.3% increase in the log annual growth of average startup investment. In Table IA.3 in the Internet Appendix, we replicate the results in Table 5 using the alternative functional form assumptions on population presented in Table 3. Our results remains quantitatively similar.[13]

[13]Ponticelli and Alencar (2016) explore a 2005 bankruptcy reform in Brazil, and show that court congestion affect the impact of the reform on firm outcomes. In Table IA.4 we replicate our main results controlling for

To strengthen our findings' causal interpretation, 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 interacted with measures of city's income and education. In Panel A, we replicate the results in Table 5 interacting the Legislator Wages variable with an indicator variable that takes the value of one if the municipality's income is above the median. For all three dependent variables, the effect of Legislator Wages is both statistically and economically insignificant for cities with income above the median. In Panel B, we interact the wage variable with an indicator variable that takes the value of one if the city's average education level is above the median. Like Panel A, wages' effects on economic outcomes are statistically and economically insignificant in cities with higher education levels. We interpret this result as evidence that wages have stronger effects in regions where politicians have lower outside options. The results also indicate that the politician's actions might be more effective in more precarious communities. Cities with lower income and education are likely more depend on politicians.

3.2 Effects According to Firm Size

Brazil experienced substantial economic growth between 2004 and 2008. 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 that our results could be driven by the labor formalization within firms expecting to grow, and not by the creation of new posts.

We verify whether our results are driven by formalization or real job creation by exploring firm size variations. Informal firms are generally small businesses with few employees, and therefore are able to bypass the labor ministry's scrutiny more easily. On the other hand, firms with several employees are likely to be overseen by the labor ministry more tightly,

court congestion. Although the sample is substantially smaller, our results remain statistically significant. These results alleviate concerns that our results are driven by the contemporaneous bankruptcy reform.

making the use of informal labor a potentially costly legal risk. Therefore, we expect that only firms with few employees use informal labor.

Table 7 presents the results for the effects of local politicians' wages on job and firm creation separately for firms with different sizes. In Panel A, we restrict our sample to firms with less than 10 employees (hereafter, small firms), in Panel B, between 10 and 20 employees (hereafter, medium firms), and in Panel C, to firms with more than 20 employees (hereafter, large firms). In Column (1), we find that firm creation growth magnitudes are similar for small and medium firms. A one standard deviation increase in local legislators' wages is associated with a 3.9% increase in log growth of firm creation among small firms and a 2.3% increase among medium firms. The effect on large firms' creation is both statistically and economically insignificant. The results in column (2) indicate that legislator wages positively and significantly affect job creation of all types of firms. A one standard deviation increase in local legislators' wages is associated with a 4.4% rise in the growth of job creation among small firms, 5% in medium firms, and 7.5% in large firms. In Column (3), we find that the impact of politician wages on startup investment is strongest among medium firms. A one standard deviation increase in local legislators' salaries is associated with a 10.1% increase in startup investment among medium firms. The fact that politician wages affect firms of different sizes alleviates concerns that our results are driven purely by formalization.

3.3 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 and startup 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 retail, service, and manufacturing sectors.

Table 8 presents the results separately for sectors. In Panel A, we restrict the sample

to firms in the retail sector. In Panel B, we restrict the sample to firms in the service sector. And in Panel C, we restrict the sample to the manufacturing sector. The results in column (1) show that firms in the retail sectors drive firm creation growth. 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)), a one standard deviation increase in local politician salaries is associated with a 3.7% increase in the firm creation growth in the retail sector. Consistent with the idea that these sectors are dependent on more disperse economic conditions, the effect on the service and manufacturing sector is both statistically and economically insignificant. The results in column (2) show that firms in the retail sector also drive the effects on job creation. A one standard deviation growth in the politicians' wages is associated with a 5.5% increase in job creation growth among retail firms. A similar variation in wages is associated with a 2.6% increase in the growth of job creation in the service sector and a statistically and economically insignificant effect in the manufacturing sector. Column (3) shows the results for startup investments. Our sample for this variable is smaller, and for this reason, we do not have statistical power to perform the tests using subsamples. All the estimates in this column are statistically insignificant.

3.4 Effects on Income Statement

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

Table 9 presents the instrumental variable regression estimates of the effects of legislator wages using log growth in Gross Revenues, Net Revenues, and Net Investments as the dependent variable. In Panel A, we restrict our sample to firms in the retail sector, in Panel B, the service sector, and in panel C, the manufacturing sector. We only have income statement data aggregated at the sector and city level, and we only have data for a small sub-sample of cities. Therefore, the results in this table suffer from both measurement error and lack of statistical power.

In columns (1) and (2), we study the effects of politician wages on log growth of gross and net revenue. We do not find statistically significant effects of wages on firms' revenues in the retail and service sectors. The estimates in Panel C imply that a one standard deviation increase in local legislators' salaries is associated with a 4.2% rise in gross revenue growth, and 4.5% in net revenues in the manufacturing sector. In column (3), we do not find any statistically significant effect of wages on total sector investment.

4 How Politicians' Wages Affect the Real Economy

To understand the mechanisms behind the effects of politicians' wages on the real economy, we need to explain two questions. First, how wages affect politicians? And second, how politicians affect the real economy?

We start our analysis by answering the first question, i.e., how wages affect politicians. More specifically, we explore how changes in wages affect politician selection. Table 10 presents the effects of wages on local legislators' characteristics. In Column (1), we focus on the impact of salaries on politicians' educational attainment. We find that a one standard deviation increase in legislators' wages is associated with an average increase of 0.4 in the local legislators' years of schooling. Our results also indicate that salary increases are associated with an increase in diversity. A one standard deviation increase in wages is associated with a 2.9% reduction in the number of males in the legislature. Therefore, increases in wages are associated with a more educated and more diverse legislature.

We also study if higher salaries attract novice candidates and candidates with a business background. Higher wages might incentivize citizens to abandon their private-sector jobs and seek a career as a local politician. Having a business background might be a useful skill for new local legislators. Columns (3) and (4) of Table 10 explore this possibility by looking at the effect of local legislator wages on the percentage of first-term local legislator and the rate of the local legislators with previous business experience. We do not find evidence that higher salaries affect these variables.

We explore whether wages affect the political composition of the legislature. We examine this possibility by looking at how concentrated is the power in the legislature amongst parties. We calculate power concentration using the Herfindahl-Hirschman index of the legislature's concentration seats in each party's hands.[14] Column (5) shows that one standard deviation increase in local legislators' wages is associated with a reduction of .042 in party concentration, which represents a 16% reduction relatively to the average. Therefore, larger parties are losing seats to smaller parties after the amendment. The lower concentration can induce more competition among parties. It may also lead to less partisan politics, as local legislators will need to reach a consensus to pass their law changes.

The changes in party concentration are not associated with a significant shift in political views. We explore an ideology index for Brazilian parties from Maciel, Alarcon, and Gimenes (2018)[15] and find that higher wages are not associated with significant changes in the legislature's average political ideology.

4.1 Effects on Fiscal Responsibility and Expenditure Policy

Now we turn to the second question: how politicians affect the real economy? Brazilian municipal legislators (*vereadores*) can change local public policy in three 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.

In this section, we focus our attention on the impact 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

[14] In 2004, Brazil had 24 parties with at least one member of congress

[15] This index is obtained from a survey of members of the congress. In this survey, politicians are presented with a line and are asked: Let's assume that number 1 corresponds to the left, number 5 to the center, and number 10 to the right. As you can see, a person in the extreme left would be at number 1, one in the extreme right, in number 10. Where would you place yourself? The party index is the average response of its members of congress.

of tax increases. Also, expenditures that increase workers' productivity might induce entrepreneurial investment.

Table 11 presents the effects of legislator wages on municipal fiscal responsibility and expenditure. The estimates in this table are obtained from instrumental variable regressions of municipal legislators' salaries changes in spending and revenues from the 2001-2004 term to the 2005-2008 term.

In Columns (1) to (3), we study the effects of wages on fiscal responsibility. In Column (1), 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 3.1% on the log growth of the budget surplus. These effects can be driven by both better resource management and by increases in the total revenue.

We investigate whether better-paid politicians can get more funds from the federal government. Municipalities in Brazil receive two types of funds from the federal government. They have the constitutional right to a portion of the total federal budget (*Participação na Receita*) and receive discretionary funds that will generally be allocated by members of congress. Better politicians might be more capable of negotiating with members of congress and bring more resources for their city (Cohen, Coval, and Malloy (2011)). To test that, we study the effects of politician wages on discretionary transfers from the federal government. We calculate the discretionary transfer as the total federal transfer minus the constitutional transfers due to the municipality's share of the federal budget. Column (2) of Table 11 shows that one standard deviation in the politicians' wages is associated with a 2.4% increase in the log growth of discretionary federal transfers to the municipality. We also perform a similar exercise using state government transfer. The majority of the state's transfers to the municipality come from the municipality's share on the state's budget.[16] We do not find any significant effect of politician wages on state's discretionary transfers.

In Columns (4) and (5) of Table 11, we explore the effects of politician wages on education

[16] 96% of state transfers and 77% of the federal transfers to municipalities come from the municipality's share of the state and federal budget

and health care expenditure. Increases in health care and education spending 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 expenditure on education and health care. A one standard deviation increase in municipal legislators' salary is associated with an increase of 6.4% in public spending in education and a 5.2% increase in healthcare expenditure.

We also explore whether better politicians increase the populations' disposable income. Higher disposable income can immediately affect the amount of money people have to spend and improve local economic conditions. Columns (7) and (8) of Table 11 explore the effects on payroll and welfare. Our results indicate that one standard deviation increase in local legislators' wages is associated with a 5.4% increase in payroll expenses and a 3.4% increase in welfare expenses.

Finally, in Column (8), we study the effects of politicians' salaries on local government capital investments. These expenses can be for the purchase of equipment, construction work, acquisition of equity interests in companies, acquisition of real estate, and investment loans. These investments can directly improve the city's productivity and economic conditions. We find that a one standard deviation increase in the local legislators' wage is associated with a 3.1% increase in investment expenditure. In short, Our evidence is consistent with local legislators being able to bring more federal resources, being more fiscally responsible, and increasing spending on items that increase voters' well-being and firms' efficiency.

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 could be an alternative channel explaining why better paid legislators are associated to more intense business activity. However, measuring which bills are business-friendly or which public goods generate a stronger economic effect is challenging. For this reason, in this paper we focus on the fiscal policy channel.

4.2 Pathway Analysis

Our results indicate that higher local politicians' wages are associated with stronger economic activity, more educated politicians, less political concentration, fiscal responsibility, and increased expenditure on investments, education, health care, payroll, and welfare. However, our results presented so far do not allow us to conclude whether politician selection or politician effort contributed more to business activity. It also does not provide guidance on which public policy changes are more effective, given the outcome variables' joint determination.

To connect the effects on economic activity and the changes in politician selection and in local policy, we employ the pathway analysis in the context of instrumental variables introduced by Imai, Keele, and Yamamoto (2010) and Heckman and Pinto (2015). In this analysis, we regress the changes in local economic conditions (firm and job creation, and startup investment) on the local legislator wages instrumented by the city's salary cap. We then include the legislature characteristics and the changes in policy one-by-one as controls in the regression. If the inclusion of the control reduces the estimates of politicians' wages on the real economy, this would suggest that this policy change is an important mechanism for the effects of politicians' wages on the real economy. This method was previously used in Maccini and Yang (2009), Andonov, Hochberg, and Rauh (2018), and Butler and Yi (2019).

Table 12 shows the pathway analysis results. In Panel A, the dependent variable is the log growth in the number of new establishments, in Panel B, the log growth in the number of new employees, and Panel C, the log growth in the average investment in new establishments. In columns (1) and (2), we explore the importance of politician selection as a pathway for wages' effects on economic outcomes. Both politicians' education and the legislature's political concentration do not seem to play a crucial role as a pathway. Including these variables do not meaningfully change the estimates of the effect of wages on firm outcomes. This is evidence that additional effort, rather than the selection of more qualified politicians, might be driving the effects in the real economy.

The results in column (3) indicate that increases in the budget surplus are the most

important pathway for the politicians' effects on the real economy. After including the budget surplus in our regressions, the effects of politicians' salaries on firm and job creation becomes statistically insignificant. Increases in budget surplus can affect firm outcomes in two main ways. First, it can reduce the expectations of future taxation. Second, it might also be proxying for the overall quality of the legislature. If the local legislators are better able to manage their financial resources, they may also be better at making other city decisions.

The results in column (4) to (7) show that local government expenditures also play a role, albeit smaller, as a pathway of the effects of wages on firm outcomes. Total spending, and expenditure in Education, Healthcare, and Investment decrease the estimates by approximately 35% for firm creation and approximately 20% for job creation. None of the policy changes seem to explain the relationship between wages and startup investments. Overall, our results show that all the improvements in policy associated with local legislators' salaries positively affect the real economy. However, fiscal responsibility seems to be the most relevant channel for the impact of legislators' wages on firm and job creation.

The pathway analysis has its limitations. Its goal is to disentangle the treatment effects that operate directly into the outcome from the indirect effects that arise from the impact of the treatment on other measured inputs. In our setting, the pathway analysis aims to separate the direct effects of local legislator wages on the local economic activity from the indirect impact that operates through changes in a specific public policy. The pathway analysis relies on *sequential ignorability* (Imai, Keele, and Yamamoto (2010)), which can be breakdown into two assumptions. First, the treatment must be independent of both the counterfactual outputs and counterfactual measured inputs. This assumption is plausibly satisfied in our setting. The variation in legislator wages stemming from the salary caps is plausibly unrelated to the economic conditions and public policy. The second assumption is that measured inputs must be statistically independent of any *potential* outcome given the treatment status and controlling covariates. In our setting, this second assumption can be understood as if each estimate of the effects of public policy on economic activity was produced from a new randomized control trial in which we randomize the change in policy within the treatment

group. This procedure would guarantee that the estimates of the public policy on the economic activity were correctly specified. The second assumption is likely not satisfied in our setting because it would require that the policy's changes be randomly assigned to treatment cities.[17] Thus, the results of our pathway analysis should be carefully interpreted as suggestive evidence of the factors more strongly correlated with economic activity and legislator wages, not as irrefutable evidence.[18]

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 creation and increases in startup investments. Higher salaries attract more educated and more diverse politicians. It also decreases the concentration of party power in the legislature. Local legislators that receive higher salaries manage the municipality's resources more carefully, increasing the municipality's budget surplus while still increasing expenditure on items that improve local economic productivity, such as infrastructure, education, and health care.

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 wages' savings, generating a negative net effect for tax-payers. Governments and the general public should be aware of the potential adverse effects of lowering

[17]There are several reasons for these estimates to be misspecified. We may have indirect effects unobserved by the econometrician. The treatment could also affect the map between inputs and outputs. For instance, better politicians could simplify the tax code, changing how the budget surplus and future expectations on taxation affect firm creation.

[18]In Table IA.5 in the Internet Appendix we interact the pathway variables with the wage variable. The interactions of wages and education and health care expenses are statistically significant in the job creation variables.

politicians' salaries on the private sector and should factor in these externalities while setting their wages.

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Table 1: Salary Cap of Municipal Legislators

This table presents the constitutional salary cap on municipal legislators' wages and maximum legislative spending as a proportion of revenues by population size. A 2000 constitutional amendment defined the caps 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
	(1)	(2)	(3)
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 2: 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.

				Quantiles				
	N	Mean	S.D.	p10	p25	p50	p75	p90
Panel A: Legislature Characteristics								
Legislators wages	5,383	1,704.97	1,049.68	744.00	940.00	1,387.00	2,250.00	2,890.60
Assistants per legislator	5,555	0.60	0.93	0.00	0.11	0.33	0.67	1.33
Hours of legislature	5,555	7.68	1.57	8.00	8.00	8.00	8.00	8.00
First term (%)	5,207	49.73	19.75	22.22	33.33	45.45	66.67	77.78
Age	5,553	42.53	9.05	36.88	39.29	42.00	44.70	47.43
Male (%)	5,556	87.58	12.83	71.43	83.33	87.50	100.00	100.00
Buisness owners (%)	5,556	14.82	15.32	0.00	0.00	12.50	25.00	37.50
Completed elementary school (%)	5,556	70.60	22.29	37.50	57.14	71.43	85.71	100.00
Completed high school (%)	5,556	50.50	24.27	16.67	33.33	50.00	66.67	83.33
Went to university (%)	5,556	15.72	17.70	0.00	0.00	12.50	25.00	42.86
Years of education	5,556	11.99	2.20	9.14	10.50	12.00	13.57	14.88
Party Concentration	5,262	0.26	0.10	0.16	0.19	0.23	0.31	0.38
Ideology Index	5,262	4.54	0.56	3.85	4.18	4.55	4.92	5.24
Panel B: Municipal Government Revenue and Spending								
Taxes (MM)	5,556	3.99	76.90	0.07	0.11	0.25	0.69	2.74
Transfers from state government (M)	5,556	6.00	48.65	0.35	0.65	1.22	2.95	8.71
Transfers from federal government (M)	5,556	7.34	23.56	2.22	2.50	3.43	6.13	11.41
Budget surplus (M)	5,556	4.01	24.55	0.59	0.81	1.24	2.39	5.96
Education (M)	5,556	5.86	42.55	0.79	1.10	1.98	4.14	9.06
Healthcare (M)	5,556	5.59	39.45	0.69	0.89	1.46	2.86	7.05
Payroll (M)	5,556	9.58	69.84	1.31	1.72	2.86	5.76	13.29
Investments (M)	5,556	2.45	17.48	0.25	0.38	0.67	1.40	3.43
FPM coefficient	5,560	0.16	0.11	0.08	0.09	0.10	0.19	0.29
Panel C: Demographics								
Population (K)	5,560	31.81	191.32	3.07	5.07	10.43	21.73	49.14
Per capita income	5,565	566.15	265.77	269.88	333.27	537.16	738.89	918.39
Gini Coefficient	5,507	0.55	0.07	0.47	0.51	0.55	0.60	0.64
Urban households (%)	5,506	58.83	23.33	27.00	40.00	59.00	78.00	90.00
Literacy (%)	5,507	81.11	11.19	64.64	72.29	84.48	90.16	93.52
Panel D: Firms and Employment								
Jobs per 1000 Adults	5,507	176.85	158.45	51.29	79.48	133.42	226.35	350.57
Total Number of Jobs (K)	5,564	7.09	75.70	0.22	0.39	0.85	2.54	8.05
Firms per 1000 Adults	5,507	19.11	15.47	1.96	5.06	16.32	30.25	40.22
Total Number of Firms (K)	5,564	0.49	3.86	0.01	0.03	0.09	0.25	0.75
Startup Investment (K)	4,709	464.70	11,288.40	1.88	2.70	4.21	8.21	25.41
Panel E: Firms Balance Sheet (Total)								
Trade Gross Revenue (M)	1,340	2,832.54	28,225.23	19.30	69.89	233.06	929.76	3,185.65
Retail Net Revenue (M)	1,340	2,499.51	24,416.76	17.47	64.95	214.02	882.14	2,918.97
Retail Investment (M)	1,340	43.40	447.42	0.08	0.55	2.67	11.77	46.36
Services Gross Revenue (M)	1,136	1,782.59	21,689.15	4.71	13.02	62.55	266.12	1,303.71
Services Net Revenue (M)	1,136	1,542.13	18,415.97	4.28	12.28	58.94	244.90	1,202.81
Services Total Investments (M)	1,136	150.37	1,761.53	0.00	0.28	3.17	22.43	104.73
Manufacture Gross Revenue (M)	1,589	4,245.01	41,185.97	11.79	46.55	238.43	1,206.68	5,028.79
Industry Net Revenue (M)	1,589	3,427.57	32,720.49	10.42	41.34	206.22	981.29	4,193.79
Industry Investment (M)	1,589	248.91	3,372.81	0.11	1.10	8.19	60.16	260.97

Table 3: First Stage

This table presents the estimates of the first stage of the instrumental variable regressions used in the paper. The dependent variable is the legislators' wage for the 2005-2008 term. 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 the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
1{pop_{2003}>10,000}	0.303***			
	[0.0274]			
1{pop_{2003}>50,000}	0.135			
	[0.0864]			
1{pop_{2003}>100,000}	0.457**			
	[0.183]			
1{pop_{2003}>300,000}	0.534			
	[0.496]			
1{pop_{2003}>500,000}	1.424**			
	[0.614]			
SalaryCap(pop_{2003})		0.360***	0.374***	0.333***
		[0.0395]	[0.0423]	[0.0454]
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	5,326	5,326	5,326	5,326
R-squared	0.723	0.720	0.717	0.724
F-stat	27.69	83.32	78.41	53.74

Table 4: Placebo Test

This table presents the estimates of a placebo test of the first stage of the instrumental variable regressions used in the paper. The dependent variable is the legislators' wages for the 2001-2004 term. In column (1), we instrument Legislator Wages using indicator variables for the hypothetical city's salary cap calculated using the population in 1999. 1{x>V} is an indicator variable that takes the value of one if the city's population in 1999 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 the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
$1\{pop_{1999}>10{,}000\}$	-0.0827			
	[0.165]			
$1\{pop_{1999}>50{,}000\}$	-0.278			
	[0.289]			
$1\{pop_{1999}>100{,}000\}$	0.0399			
	[0.570]			
$1\{pop_{1999}>300{,}000\}$	0.577			
	[0.579]			
$1\{pop_{1999}>500{,}000\}$	0.0661			
	[0.522]			
SalaryCap(pop_{1999})		-0.0138	-0.067	-0.0974
		[0.132]	[0.157]	[0.164]
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	1,181	1,181	1,181	1,181
R-squared	0.01	0.01	0.01	0.01
F-stat	0.44	0.01	0.18	0.35

Table 5: Effects of Legislator's Wages on New Establishments, Jobs, and Startup Investment

This table presents the estimates of instrumental variable regressions of Legislators Wages' effects (in thousands of Brazilian Real) on the firm and job creation and firms' startup investments. Legislator Wages is instrumented using the city's salary cap. In columns (1) and (2), the dependent variables are the log growth in the number of firms and workers during the 2005-2008 political cycle divided by 4. In column (3), the dependent variable is the log growth average startup investment from the 2001-2004 cycle to the 2005-2008 cycle divided by 4. We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. Controls include income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Dependent variables		
	Δ *Log*(Num. of Establishments)	Δ *Log*(Num. of Employees)	Δ *Log*(Avg. Investment in New Establishments)
Legislators Wages (1/1000)	0.035***	0.046***	0.093**
	[0.006]	[0.011]	[0.047]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	2,273

Table 6: The Effects of Local Legislator's Wages on New Establishments, Jobs, and Startup Investment - Income and Education Interactions

This table presents the estimates of instrumental variable regressions of Legislators Wages' effects (in thousands of Brazilian Real) on the firm and job creation, and firms' startup investments interacted with measures of the city's income and education levels. Legislator Wages is instrumented using the city's salary cap. In Panel A, we interact Legislator Wages with an indicator variable that takes the value of one if the city's income is above the median. In Panel B, we interact Legislator Wages with an indicator variable that takes the value of one if the city's education level is above the median. The levels of the indicator variables are included by omitted. In columns (1) and (2), the dependent variables are the log growth in the number of firms and workers during the 2005-2008 political cycle divided by 4. In column (3), the dependent variable is the log growth average startup investment from the 2001-2004 cycle to the 2005-2008 cycle divided by 4. We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. Controls include income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Dependent Variable		
	Δ *Log*(Num. of Establishments)	Δ *Log*(Num. of Employees)	Δ *Log*(Avg. Investment in New Establishments)
Panel A: Income			
Legislators Wages (1/1000)	0.072***	0.098***	0.185**
	[0.012]	[0.020]	[0.085]
Legillator Wages × Above Med. Inc.	-0.063***	-0.097***	-0.138
	[0.012]	[0.021]	[0.100]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	2,273
Panel B: Income Above Median			
Legislators Wages (1/1000)	0.073***	0.107***	0.084
	[0.014]	[0.025]	[0.128]
Legillator Wages × Above Med. Educ.	-0.060***	-0.102***	0.013
	[0.014]	[0.025]	[0.134]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	2,273

Table 7: Effects of Legislator's Wages on New Establishments, Jobs, and Startup Investment - Firm Size Sub-samples

This table presents the estimates of instrumental variable regressions of Legislators Wages' effects (in thousands of Brazilian Real) on the firm and job creation, and firms' startup investments separately for firms with different sizes. Legislator Wages is instrumented using the city's salary cap. In columns (1) and (2), the dependent variables are the log growth in the number of firms and workers during the 2005-2008 political cycle divided by 4. In column (3), the dependent variable is the log growth average startup investment from the 2001-2004 cycle to the 2005-2008 cycle divided by 4. Panel A use the subsample of firms with less than 10 employees. Panels B use the subsample of firms with between 10 and 20 employees. Panels C use the subsample of firms with more than 20 employees. We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. Controls include income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Dependent Variable		
	Δ *Log*(Num. of Establishments)	Δ *Log*(Num. of Employees)	Δ *Log*(Avg. Investment in New Establishments)
Panel A: Firms with less than 10 employees			
Legislators Wages (1/1000)	0.039***	0.044***	0.006
	[0.007]	[0.008]	[0.063]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	2,186
Panel B: Firms with between 10 and 20 employees			
Legislators Wages (1/1000)	0.023**	0.050**	0.101**
	[0.010]	[0.023]	[0.050]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	286
Panel C: Firms with more than 20 employees			
Legislators Wages (1/1000)	0.007	0.075***	-0.004
	[0.007]	[0.017]	[0.059]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	212

Table 8: Effects on Sectors

This table presents the estimates of instrumental variable regressions of Legislators Wages' effects (in thousands of Brazilian Real) on the firm and job creation and firms' startup investments separately by sector. Legislator Wages is instrumented using the city's salary cap. In columns (1) and (2), the dependent variables are the log growth in the number of firms and workers during the 2005-2008 political cycle divided by 4 in the retail (Panel A), service (Panel B), and manufacturing (Panel C) sectors. In column (3), the dependent variable is the log growth average startup investment from the 2001-2004 cycle to the 2005-2008 cycle divided by 4. We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. Controls include income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Dependent Variable		
	Δ *Log*(Num. of Establishments)	Δ *Log*(Num. of Employees)	Δ *Log*(Avg. Investment in New Establishments)
Panel A: Retail			
Legislators Wages (1/1000)	0.037***	0.055***	0.021
	[0.009]	[0.013]	[0.035]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	1,525
Panel B: Services			
Legislators Wages (1/1000)	0.009	0.026*	0.031
	[0.008]	[0.015]	[0.039]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	633
Panel C: Manufacturing			
Legislators Wages (1/1000)	-0.001	-0.018	0.058
	[0.009]	[0.021]	[0.050]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	449

Table 9: The Effects of Local Legislator's Wages on Revenues and Investments

This table presents the estimates of instrumental variable regressions of Legislators Wages' effects (in thousands of Brazilian Real) on revenues and investments aggregated at the city and sector level. Legislator Wages is instrumented using the city's salary cap. In columns (1) and (2), the dependent variable is the log growth average in net revenues from the 2001-2004 cycle to the 2005-2008 cycle divided by 4. In column (3), the dependent variable is the log growth average in investment between 2005 and 2008 and the average between 2001 and 2004 divided by 4. We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. Controls include income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Dependent Variable		
	Δ *Log*(Gross Revenue)	Δ *Log*(Net Revenue)	Δ *Log*(Investment)
Panel A: Retail			
Legislators Wages (1/1000)	0.006	0.004	-0.029
	[0.015]	[0.015]	[0.081]
Controls	Yes	Yes	Yes
Observations	1,005	1,005	1,005
Panel B: Services			
Legislators Wages (1/1000)	-0.014	-0.013	-0.032
	[0.017]	[0.017]	[0.099]
Controls	Yes	Yes	Yes
Observations	872	872	872
Panel C: Manufacturing			
Legislators Wages (1/1000)	0.042*	0.045*	0.090
	[0.024]	[0.024]	[0.080]
Controls	Yes	Yes	Yes
Observations	1,314	1,314	1,314

Table 10: Effects on Politician Selection

This table presents the estimates of instrumental variable regressions of Legislators Wages' effects (in thousands of Brazilian Real) on elected legislators' characteristics. Legislator Wages is instrumented using the city's salary cap. In Column (1), the dependent variable is the average legislators' total number of years of schooling. In columns (2) to (4), we study the composition of the legislature. The dependent variables are the percentage of male legislators, the percentage of first-term legislators, and the percentage of legislators with management experience. In columns (5) and (6), we study the political composition of the legislatures. The dependent variables are the Herfindahl-Hirschman index of political party concentration and the average Ideology index from Maciel, Alarcon, and Gimenes (2018). We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. Controls include income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable					
	Years of Educ.	Male	First Term	Business Bkgrd.	Party Conc.	Ideology Index
Legislators Wages (1/1000)	0.391*	-0.029*	0.044	-0.008	-0.042***	-0.087
	[0.231]	[0.017]	[0.037]	[0.020]	[0.014]	[0.083]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,325	5,325	5,112	5,325	5,167	5,167

Table 11: Effects on Public Policy

This table presents the estimates of instrumental variable regressions of Legislators Wages' effects (in thousands of Brazilian Real) on public policy. Legislator Wages is instrumented using the city's salary cap. In columns (1) to (3), we study the effects of wages on the government's budget management. The dependent variables are the log growth in the total budget surplus, discretionary federal transfers, and discretionary state government transfers between 2005 and 2008 and the average between 2001 and 2004 divided by 4. Discretionary transfers are defined as the total transfers minus the city's constitutional participation in federal and state's revenues (*Participação na Receita*). In columns (4) to (8), we study the effects of wages on government expenditure. The dependent variables are the log growth in the total expenditure in education, healthcare, payroll, welfare, and capital investments between 2005 and 2008 and the average between 2001 and 2004 divided by 4. We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. Controls include income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Fiscal Policy			**Government Expenditure**				
	Δ *Log*(Budget Surplus)	Δ *Log*(Disc. Fed. Gov. Transf.)	Δ *Log*(Disc. State Gov. Transf.)	Δ *Log*(Educa-tion)	Δ *Log*(Health-care)	Δ *Log*(Payroll)	Δ *Log*(Welfare)	Δ *Log*(Invest-ment)
Legislators Wages (1/1000)	0.031**	0.024**	-0.011	0.064***	0.052***	0.054***	0.034**	0.031*
	[0.015]	[0.011]	[0.125]	[0.008]	[0.010]	[0.008]	[0.014]	[0.017]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,262	5,310	5,310	5,310	5,310	5,310	5,310	5,310

Table 12: Pathway Analysis - Number of Establishments

This table presents the estimates of instrumental variable regressions of Legislators Wages' effects (in thousands of Brazilian Real) on the firm and job creation and firms' startup investments controlling for public policy changes. Legislator Wages is instrumented using the city's salary cap. In Panel A, the dependent variable is the log growth in the number of firms during the 2005-2008 political cycle divided by 4. In Panel B, the dependent variable is the log growth in the number of workers during the 2005-2008 political cycle divided by 4. In Panel C, the dependent variable is the log growth average startup investment from the 2001-2004 cycle to the 2005-2008 cycle divided by 4. We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. We also control for income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient in all regressions. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Dependent Variable Δ *Log*(Num. of Establishments)								
Legislators Wages (1/1000)	0.030***	0.036***	0.005	0.023***	0.024***	0.029***	0.026***	0.031***
	[0.007]	[0.007]	[0.012]	[0.008]	[0.007]	[0.007]	[0.007]	[0.008]
Years of Education	-0.001*							-0.001
	[0.000]							[0.000]
Political Concentration		-0.006						-0.005
		[0.009]						[0.008]
Δ *Log*(Budget Surplus)			-0.013**					-0.021***
			[0.006]					[0.007]
Δ *Log*(Total Expenditure)				0.084***				0.100***
				[0.016]				[0.032]
Δ *Log*(Education)					0.064***			0.026
					[0.013]			[0.023]
Δ *Log*(Health Care)						0.024**		-0.036**
						[0.011]		[0.016]
Δ *Log*(Investments)							0.009*	0.011*
							[0.005]	[0.007]
Observations	5,320	5,167	5,262	5,310	5,310	5,310	5,310	5,098
Panel B: Dependent Variable Δ *Log*(Num. of Employees)								
Legislators Wages (1/1000)	0.042***	0.048***	0.019	0.037**	0.037***	0.040***	0.040***	0.036***
	[0.013]	[0.013]	[0.025]	[0.015]	[0.014]	[0.013]	[0.014]	[0.014]
Years of Education	0.000							0.000
	[0.001]							[0.001]
Political Concentration		-0.040***						-0.038***
		[0.014]						[0.014]
Δ *Log*(Budget Surplus)			0.022*					-0.002
			[0.013]					[0.013]
Δ *Log*(Total Expenditure)				0.172***				0.083
				[0.038]				[0.060]
Δ *Log*(Education)					0.131***			0.030
					[0.030]			[0.041]
Δ *Log*(Health Care)						0.102***		0.017
						[0.023]		[0.028]
Δ *Log*(Investments)							0.043***	0.024**
							[0.011]	[0.012]
Observations	5,320	5,167	5,262	5,310	5,310	5,310	5,310	5,098
Panel C: Dependent Variable Δ *Log*(Avg. Investment in New Establishments)								
Legislators Wages (1/1000)	0.086	0.089*	0.088*	0.094**	0.097**	0.089	0.094**	0.084
	[0.062]	[0.051]	[0.047]	[0.046]	[0.047]	[0.055]	[0.044]	[0.053]
Years of Education	0.006							0.007
	[0.005]							[0.004]
Political Concentration		0.076						0.127
		[0.112]						[0.111]
Δ *Log*(Budget Surplus)			0.056					0.042
			[0.073]					[0.085]
Δ *Log*(Total Expenditure)				0.031				0.504
				[0.171]				[0.344]
Δ *Log*(Education)					-0.143			-0.714***
					[0.151]			[0.268]
Δ *Log*(Health Care)						0.108		0.087
						[0.116]		[0.168]
Δ *Log*(Investments)							0.064	0.088
							[0.061]	[0.079]
Observations	2,271	2,196	2,252	2,271	2,271	2,271	2,271	2,173

Figure 1: 2005 Municipal Legislators Salaries by Population

This figure plots legislators' wages on the y-axis and the municipality population on 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.

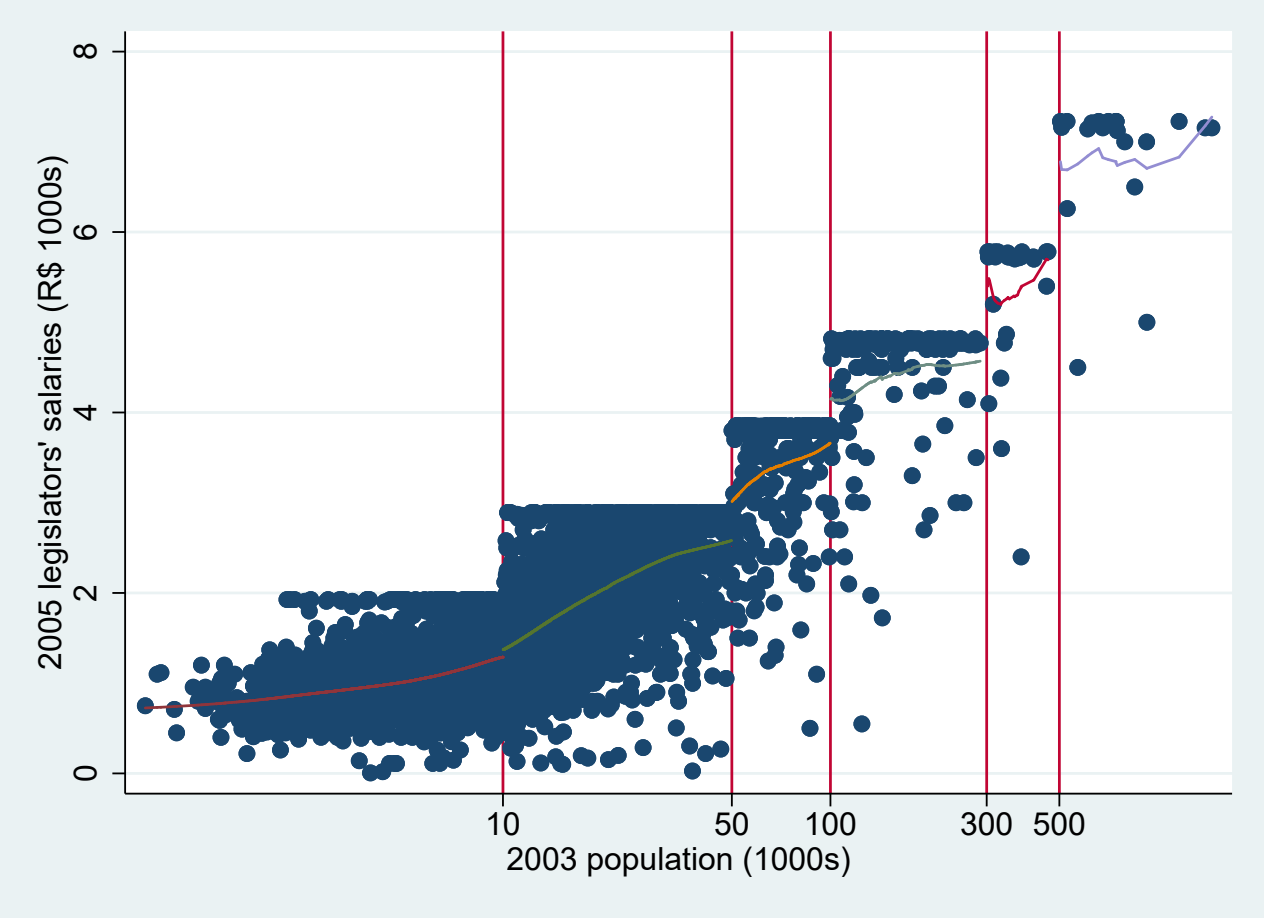


Figure 2: Municipal Legislators Salary Distribution

This figure plots the Legislators' Wages' distribution in 2001 (white bars) and 2005 (green bars).

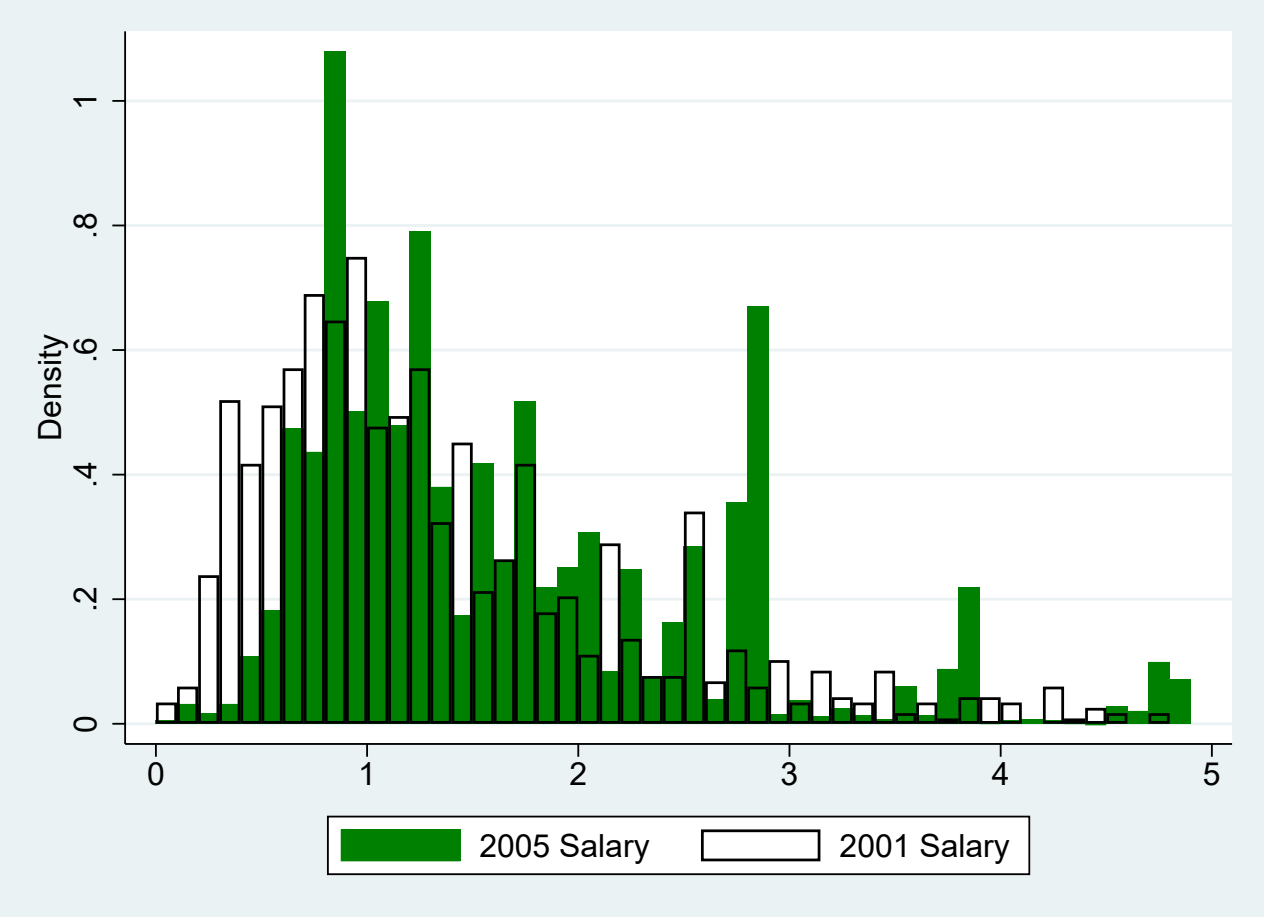
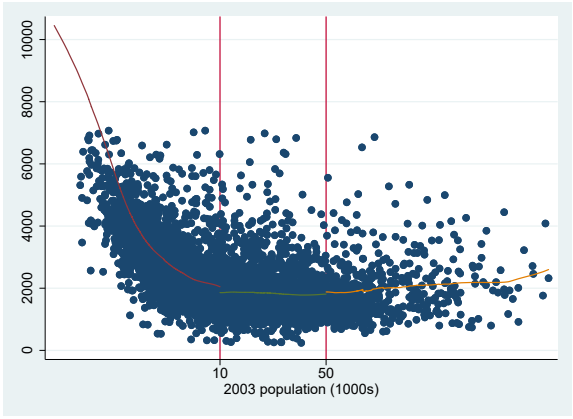


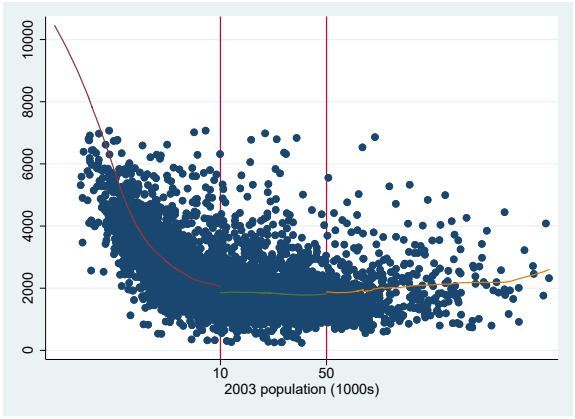
Figure 3: Baseline Municipal Characteristics by Population

This figure plots several municipalities characteristics measured in 2003 (y-axis) and the municipality population (x-axis, log scale). The y-axis variables are municipal spending, municipal investment, municipal surplus, number of jobs, number of formal firms, and income per capita. Vertical lines correspond to the population cutoffs of the 2000 constitutional amendment. Curves were fitted in each interval using locally weighted scatterplot smoothing.

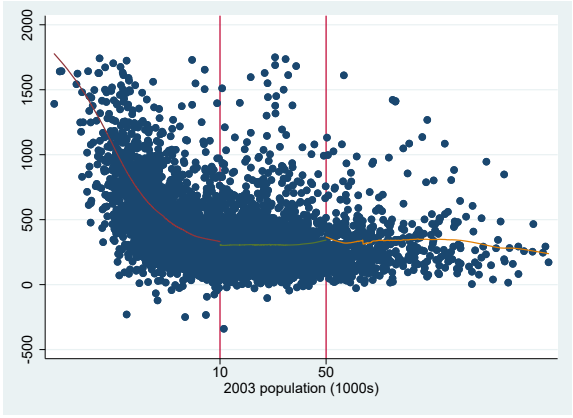
(a) *Annual Spending per Capita*



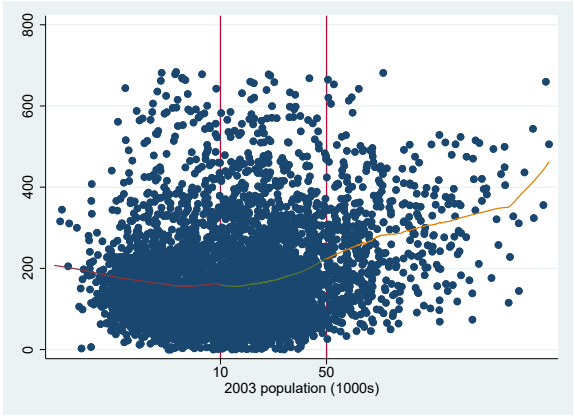
(b) *Municipal Investment per Capita*



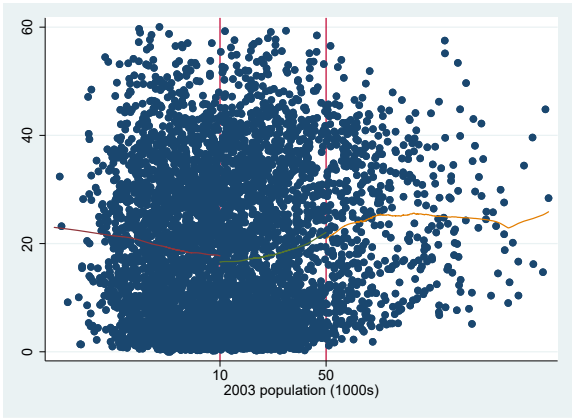
(c) *Municipal Surplus per Capita*



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



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



(f) *Annual Income per Capita*

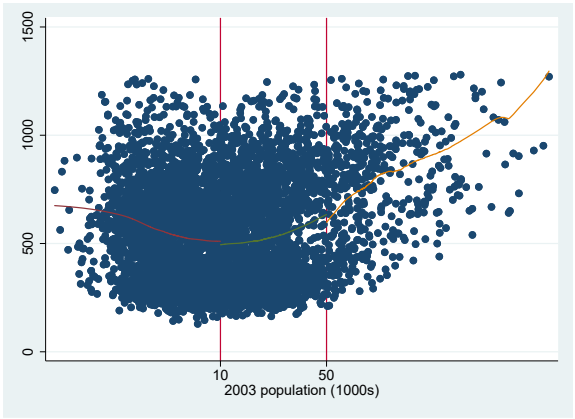
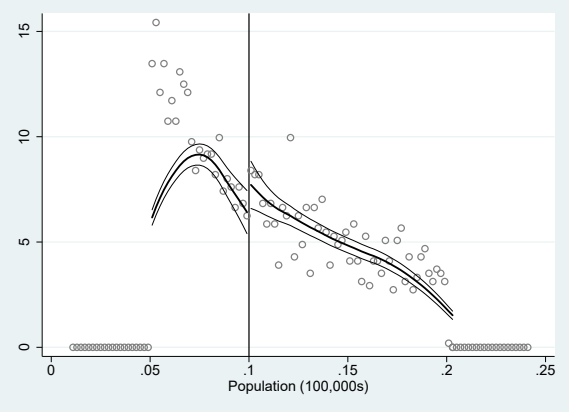


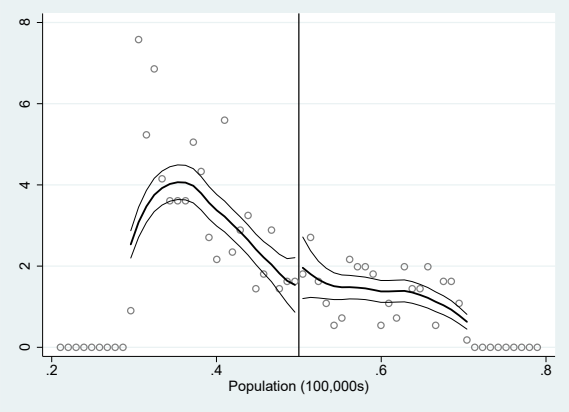
Figure 4: Population Distribution around Thresholds

This figure plots the population density discontinuity test developed by McCrary (2008). Municipalities' population measured in 2003 around the 2000 constitutional amendment cutoffs. Vertical lines correspond to the population cutoffs. Each figure presents one of the cutoffs.

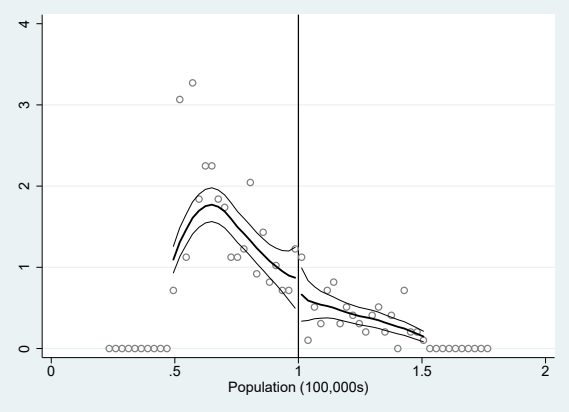
(a) *10,000 inhabitants cutoff*



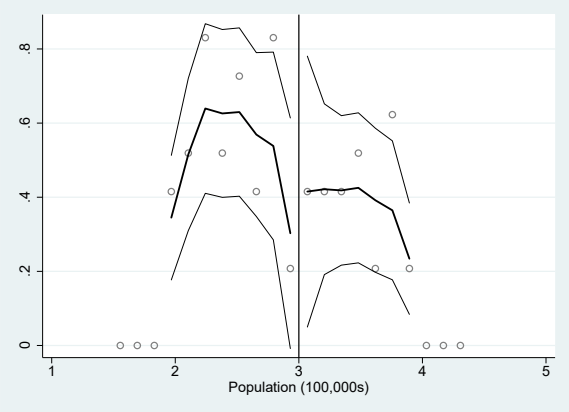
(b) *50,000 inhabitants cutoff*



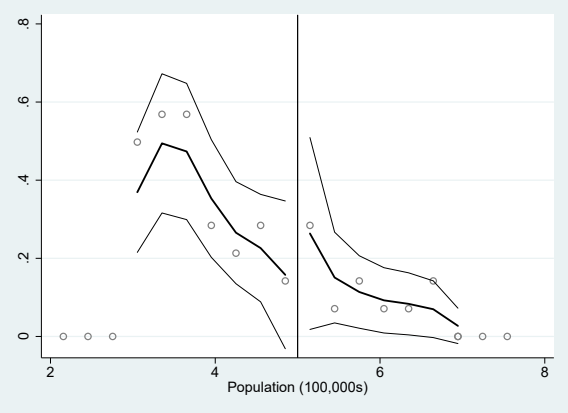
(c) *100,000 inhabitants cutoff*



(d) *300,000 inhabitants cutoff*



(e) *500,000 inhabitants cutoff*



Internet Appendix to: "The Real Effects of Politicians' Incentives"

December 20, 2020

Table IA.1: FPM Population Brackets

This table presents the population brackets and coefficients of the municipal participation fund (FPM - *Fundo de Participacao dos Municipios*)

Population	FPM Coefficent	Population	FPM Coefficient
0 to 10,188	0.6	61,129 to 71,316	2.4
10,189 to 13,584	0.8	71,317 to 81,504	2.6
13,585 to 16,980	1	81,505 to 91,692	2.8
16,981 to 23,772	1.2	91,693 to 101,880	3
23,773 to 30,564	1.4	101,881 to 115, 464	3.2
30,565 to 37,356	1.6	115,465 to 129,048	3.4
37,357 to 44,148	1.8	129,049 to 142,632	3.6
44,149 to 50,940	2	142,633 to 156,216	3.8
50,941 to 61,128	2.2	Above 159,216	4

Table IA.2: OLS Evidence

This table presents the estimates of ordinary least squares regressions of Legislators Wages' effects (in thousands of Brazilian Real) on the firm and job creation and firms' startup investments. In columns (1) and (2), the dependent variables are the log growth in the number of firms and workers during the 2005-2008 political cycle divided by 4. In column (3), the dependent variable is the log growth average startup investment from the 2001-2004 cycle to the 2005-2008 cycle divided by 4. We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. Controls include income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: OLS Evidence

	(1)	(2)	(3)
	Δ *Log*(Num. of Establishments)	Δ *Log*(Num. of Employees)	Δ *Log*(Avg. Investment in New Establishments)
Legislators Wages (1/1000)	-0.001	0.001	0.016
	[0.001]	[0.002]	[0.012]
Controls	Yes	Yes	Yes
Observations	5326	5326	2273
R-squared	0.131	0.027	0.005

Table IA.3: Alternative Functional Forms

This table presents estimates of instrumental variable regressions similar to those in Table 5 using alternative functional form assumption on population. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Dependent Variable		
	Δ *Log*(Num. of Establishments)	Δ *Log*(Num. of Employees)	Δ *Log*(Avg. Investment in New Establishments)
Panel A: Linear Spline			
Legislators Wages (1/1000)	0.026***	0.040***	0.060
	[0.007]	[0.013]	[0.057]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	2,273
Panel B: quadratic spline, 1st cutoff			
Legislators Wages (1/1000)	0.029***	0.042***	0.090
	[0.007]	[0.013]	[0.055]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	2,273
Panel C: quadratic spline, 1st and 1nd cutoff			
Legislators Wages (1/1000)	0.040***	0.050***	0.095**
	[0.006]	[0.011]	[0.045]
Controls	Yes	Yes	Yes
Observations	5,326	5,326	2,273

Table IA.4: Effects of Legislator's Wages on Jobs, New Establishments, and Startup Investment - Controlling for Court Congestion

This table presents the estimates of instrumental variable regressions of Legislators Wages' effects (in thousands of Brazilian Real) on the firm and creation and firms' startup investments. Legislator Wages is instrumented using the city's salary cap. In columns (1) and (2), the dependent variables are the log growth in the number of firms and workers during the 2005-2008 political cycle divided by 4. In column (3), the dependent variable is the log growth average startup investment from the 2001-2004 cycle to the 2005-2008 cycle divided by 4. We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. Controls include income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, the FPM coefficient, and Court Congestion (the logarithm of the number of pending cases divided by the number of judges in the city's court). Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
	Dependent variables		
	Δ *Log*(Num. of Establishments)	Δ *Log*(Num. of Employees)	Δ *Log*(Avg. Investment in New Establishments)
Legislators Wages (1/1000)	0.014**	0.021**	0.057
	[0.006]	[0.009]	[0.047]
Controls	Yes	Yes	Yes
Observations	1,342	1,342	931

Table IA.5: Effects of Legislator's Wages interacted with Legislature Characteristics and Changes in Public Policy

This table presents the estimates of instrumental variable regressions of Legislators Wages' effects (in thousands of Brazilian Real) on the firm and job creation and firms' startup investments interacted with controls for legislature characteristics and public policy changes. Legislator Wages is instrumented using the city's salary cap. The interacted variables (High Interact.) are indicator variables that take the value of one if the interacting variable is in the top quartile of the distribution. In Panel A, the dependent variable is the log growth in the number of firms during the 2005-2008 political cycle divided by 4. In Panel B, the dependent variable is the log growth in the number of workers during the 2005-2008 political cycle divided by 4. In Panel C, the dependent variable is the log growth average startup investment from the 2001-2004 cycle to the 2005-2008 cycle divided by 4. We control for the population cutoffs using 3rd-order polynomial with quadratic on the first 2 cutoffs in all regressions. We also control for income, percentage of the urban population, Gini coefficient, percentage of households with energy, rate of literate, average wages, hours of functioning legislature, the number of assistants per legislator, and the FPM coefficient in all regressions. Robust standard errors are reported in brackets. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Interacting Variable						
	Political Conc.	Years of Educ.	Budget Surp.	Total Exp.	Educ. Exp.	Health. Exp.	Invest. Exp.
Panel A: Dep. Var. Δ *Log*(Num. of Establishments)							
Legislators Wages	0.033***	0.040***	0.014	0.016**	0.012	0.019**	0.036***
	[0.007]	[0.007]	[0.014]	[0.008]	[0.012]	[0.008]	[0.007]
Legis. Wages × High Interact.	-0.003	-0.037**	0.008	0.006	0.011	0.018	0.017
	[0.035]	[0.018]	[0.023]	[0.020]	[0.019]	[0.019]	[0.020]
High Interact.	0.063*	-0.009	-0.002	0.039	0.016	0.056*	0.035
	[0.035]	[0.030]	[0.028]	[0.037]	[0.029]	[0.031]	[0.032]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,167	5,320	5,262	5,310	5,310	5,310	5,310
Panel B: Dep. Var. Δ *Log*(Num. of Employees)							
Legislators Wages	0.043***	0.052***	0.028	0.011	0.002	0.014	0.038***
	[0.014]	[0.012]	[0.028]	[0.015]	[0.022]	[0.015]	[0.011]
Legis. Wages × High Interact.	0.030	-0.026	0.004	0.067	0.084**	0.098**	0.027
	[0.063]	[0.037]	[0.047]	[0.042]	[0.041]	[0.043]	[0.044]
High Interact.	-0.002	0.034	0.022	0.133*	0.146**	0.211***	0.117*
	[0.060]	[0.054]	[0.051]	[0.076]	[0.060]	[0.066]	[0.063]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,167	5,320	5,262	5,310	5,310	5,310	5,310
Panel C: Dep. Var. Δ *Log*(Avg. Investment in New Establishments)							
Legislators Wages	0.068	0.084*	0.056	0.118**	0.079	0.079	0.102*
	[0.125]	[0.049]	[0.050]	[0.052]	[0.051]	[0.057]	[0.053]
Legis. Wages × High Interact.	0.112	0.131	0.200	-0.227	-0.061	-0.026	-0.082
	[0.332]	[0.145]	[0.158]	[0.142]	[0.117]	[0.120]	[0.132]
High Interact.	0.357	0.602	-0.406	0.182	0.119	0.185	0.224
	[0.596]	[0.403]	[0.415]	[0.337]	[0.308]	[0.360]	[0.371]
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,196	2,271	2,252	2,271	2,271	2,271	2,271