

Working Paper Series
(ISSN 1211-3298)

630

**Do Higher Wages
Produce Career Politicians?
Evidence from Two Discontinuity Designs**

Ján Palguta
Filip Pertold

CERGE-EI
Prague, November 2018

ISBN 978-80-7343-437-3 (Univerzita Karlova, Centrum pro ekonomický výzkum a doktorské studium)
ISBN 978-80-7344-485-3 (Národohospodářský ústav AV ČR, v. v. i.)

Do Higher Wages Produce Career Politicians? Evidence from Two Discontinuity Designs*

Ján Palguta

UC3M†

Filip Pertold

CERGE-EI‡

Abstract

Wages paid to politicians affect both the selection of candidates into electoral races and the on-the-job performance incentives of incumbents. We differentiate between selection and incentive effects using two regression discontinuity designs based on: 1) population thresholds shifting politicians' wages and 2) electoral seat thresholds splitting candidates into those who narrowly won or lost. We find that higher wages do not increase the electoral incumbency advantage, suggesting that the incentive effect of higher wages does not impact re-election rates. We further show that higher wages motivate narrowly elected incumbents to run again much less often than past narrowly non-elected candidates.

Key words: re-election, political selection, electoral competition, wages, incumbency advantage, regression discontinuity design, municipal legislatures

JEL classification: D72, M52, J45, H57, H70

* We would like to thank Michal Bauer, Frederico Finan, Julie Chytilová, Štěpán Jurajda, Filip Matějka, Nicolas Mittag, Christian Ochsner, Ctirad Slavík, Gregory Veramendi and Ján Zápál for helpful comments and insightful suggestions. All opinions expressed are those of the authors and have not been endorsed by UC3M or CERGE-EI. Palguta acknowledges financial support from a research fellowship provided by the Community of Madrid. All errors remaining in this text are our own.

†Carlos III University of Madrid (UC3M), Department of Economics. Address: Calle Madrid 126, 28903 Getafe (Madrid), Spain. Email: ipalguta@eco.uc3m.es

‡Center for Economic Research and Graduate Education – Economics Institute (CERGE-EI), a joint workplace of Charles University and the Economics Institute of the Czech Academy of Sciences. Address: Politických vězňů 7, 111 21 Prague, Czech Republic. Email: filip.pertold@cerge-ei.cz

1. Introduction

Are wages an effective tool to improve the quality of political representation? Do they attract better candidates into politics? Or do they instead motivate incumbents to strive harder to be re-elected? These questions tend to be of great interest to many politicians and policy-makers, as attracting high-quality candidates and replacing less competent incumbents is believed to be crucial for policy, governance and public service provision in democracies worldwide (Besley and Coate 1997; Jones and Olken 2005; Besley et al. 2011; Gagliarducci and Nannicini 2013).

In our study, we aim to estimate causal effects of higher wages on selection into politics, electoral competition and re-election. We rely on two types of exogenous thresholds that allow us to distinguish between retention and selection effects of higher pay on re-election. Existing literature has exploited exogenous shifts in politicians' wages at fixed population thresholds to identify causal wage effects on several inter-connected outcomes: candidate selection, electoral competition, incumbents' performance, and re-election. However, it remains unclear how the total wage effect on re-election can be traced back to the wage effects on incumbents' re-election incentives versus initial selection of candidates into electoral races.

Our empirical strategy thus employs also electoral seat thresholds in proportional elections that divide politicians into incumbents who narrowly won seats in legislatures and barely non-elected candidates. Our key identification assumption is that, sufficiently close to the thresholds employed, assignments to higher wages and incumbency are essentially random. In such case, candidates on either side of the seat thresholds should be comparable in terms of observed and unobserved characteristics, and face equal competition from outside entrants in re-election races, while only seated politicians can improve their in-office performance and exploit the office privileges when wages are higher. This allows us to estimate the wage effect on incumbents' electoral advantage while controlling for initial candidate selection and competition from other entrants.

Ferraz and Finan (2011) were among the first studies to try to isolate the impact of wage incentives on politicians' performance and re-election by controlling for politicians' observable characteristics. Gagliarducci and Nannicini (2013) differentiate selection from incentive effects, but solely on politicians' performance, by exploiting the existence of two-term limits that constrain incumbents from repeated candidacy. They use the fact that plausibly only first-term politicians face re-election incentives, while observable and unobservable aspects of selection should be comparable across both first and second terms. Using this strategy, Gagliarducci and Nannicini (2013) conclude that initial selection of competent candidates, rather than stronger re-election incentives, drives higher quality governance when wages increase. Their empirical strategy, however, does not permit disentangling selection and incentive effects of higher wages on re-election outcomes.¹

In our results, we first estimate that higher remuneration attracts new candidates and parties into electoral races and makes more university educated candidates and individuals with white-collar background to run. This suggests that wages indeed matter to individual decisions to become a candidate and ultimately influence the quality of the candidate pool. At the same time, we estimate substantial electoral advantages for incumbent officeholders, which are larger for individuals from white-collar jobs compared to blue-collar workers, and for candidates with university degrees as opposed to candidates without them. This result indicates that candidates with plausibly better outside options on the labor market can increase their re-election chances to a greater extent than the rest of candidates. However, using these estimates only, is not possible to tell if higher re-election rates are driven by the selection of more competent candidates when wages increase or by better performance and greater use of office privileges due to stronger re-election incentives.

¹ Other literature examining the effects of wages on re-election uses structural approach to differentiate between the roles of selection and re-election incentives. This literature delivers mostly positive estimates of wage effects on re-election (Diermeier et al. 2005; Keane and Merlo 2010).

Using our novel empirical strategy, we find that higher wages in fact have a negligible impact on incumbents' re-election when past narrowly non-elected candidates serve as a control group for narrowly-elected incumbents. Furthermore, we show that higher wages motivate narrowly-elected candidates to run for re-election *much less often* than narrowly not-elected candidates choose to try again in the next election. This result indicates that incumbents make decisions about repeating their candidacy based on factors other than wages, and that this is due to their experience in office rather than to their predetermined characteristics. Incumbency *per se* thus changes decision-making about repeated candidacy, causing wages to have an *asymmetric* effect on incumbents and non-elected candidates.

Our evidence, therefore, does not support the literature that predicts higher wage motivates incumbents to exert more effort in office than would be implied by their underlying characteristics (Coates 1999; Besley 2004). Rather, our results agree with citizen-candidate models in the spirit of Osborne and Slivinski (1996) and Besley and Coate (1997), which highlight the role of endogenous selection into politics and predict that higher wages improve selection, particularly by increasing electoral competition and improving the quality of the candidate pool (e.g. Caselli and Morelli 2004; Dal Bó and Finan 2018). In contrast, our results do not coincide with the predictions of other theoretical studies which suggest that higher wages may generate negative political selection (Messner and Polborn 2004; Poutvaara and Takalo 2007; Mattozzi and Merlo 2008; Gagliarducci et al. 2010). In terms of existing empirical evidence, the literature so far has tended to find positive impacts of higher wages on candidate selection, electoral competition and incumbents' performance (Kotakorpi and Poutvaara 2011; Ferraz and Finan 2011; Gagliarducci and Nannicini 2013). Yet, Fisman et al. (2015) show that this may not always be the case, as a wage rise for the Members of European Parliament was associated with generally lower education levels of elected politicians, while rising wages did not impact their effort and legislative activity.

Our findings can be reconciled with economic theory using a simple model of learning in which individuals experiment with electoral candidacy to find out about their political skills rather than entering into politics based on their type that they know up front. Similarly, in occupational choice models in the labor literature, individuals who have never experienced self-employment or certain occupations face considerable uncertainty about their occupation-specific abilities (Jovanovic 1979), and higher wages increase their willingness to experiment (Dillon and Stanton 2017). However, once workers enter an occupation, this uncertainty is resolved to a large extent and anticipated gains become more dispersed. In our case, this would mean that elected candidates learn about the nature of the job and their potential for re-election, and higher wages do not affect their decision to run again anymore. In contrast to most labor literature, the advantage of our setting is that we can study the effects of higher wages on the decisions of individuals to remain in a political job in a quasi-experimental setup, in which we control for exogenous shifts in wages as well as for unobservable factors driving the initial selection into a political occupation.

Finally, alongside the literatures on electoral selection and occupational choice, we add to the literature in political science showing that repeated candidacy is strongly co-determined by electoral incumbency advantages. The existing literature lists a range of reasons for such advantages, including incumbents' increased media exposure (Erikson 1971), opportunities to deliver public services (Fiorina 1989), ability to scare off high-quality challengers (Jacobson 1978), control over relevant resources, and institutional privileges (Mayhew 1974). The estimated advantage varies between 2 and 10%; for example, Lee (2008) estimates that incumbents have an advantage of about 10% of the total vote in the U.S. House of Representatives. For a proportional Swedish system, Liang (2013) found an incumbency advantage of 0.12% of the total vote for each 1 percent of seats. Our study contributes to this literature by showing that higher wages have little effect on incumbents' re-election if one accounts for initial selection of candidates along both observable and unobservable dimensions.

Our evidence is based on data about the universe of more than 560,000 candidates from 6,240 municipalities running in 2002 - 2014 elections in the Czech Republic. The data include personal characteristics of all candidates (including gender, education, age, and previous occupation), their political affiliation, and election results. Importantly, these data contain information about candidates that did not win seats. This allows us to study the process of electoral selection from very early stages. As the Czech Republic is a standard European democracy with proportional elections, we believe our results are transferrable to many democracies with proportional systems.² The rest of the study is organized as follows. In section 2, we describe the institutional background. Section 3 describes the data. Section 4 presents the estimation strategy and discusses identification. Section 5 presents the results. Section 6 concludes.

2. Institutional background

The Czech Republic is a democratic country in Central Europe which has held regular elections since its establishment in 1993, which followed a peaceful split of the former Czechoslovakia. The country has been a standard member of NATO since 1999, and of the European Union since 2004. It has three levels of public administration: central, regional (13 regions + the capital city of Prague) and municipal (6,240 municipalities). At the municipal level, which is in the focus of this study, local governments are composed of a mayor (*starosta*) and a council board (*obecní rada*). These are all appointed by local legislatures (*obecní zastupitelstvo*), which are elected by eligible citizens. Municipalities are in charge of providing a broad range of public services, including management of elementary schools, pre-schools and elderly services, social housing, construction and maintenance of local infrastructure, water supply and waste management. Altogether, municipalities redistribute around 24% of national public expenditures, corresponding to about 10% of GDP (OECD 2015).

² As is, however, common in the related literature, we do not observe the entire pool of potential candidates that have ever entered an electoral race. A unique exception is a study by Dal Bó, Finan, Folke, Persson, and Rickne (2017), who use Swedish administrative data to assess whether politicians are positively selected from the population.

Municipal elections. Individuals are elected to municipal legislatures every four years. Each eligible voter can cast up to as many votes as there are seats in the relevant legislature, but no more than one vote per candidate. The elections are open to any individual candidates, ad-hoc civic movements and national-level parties. Registration for elections is administratively simple and relatively costless. Legislature size is proportional to the municipal population and ranges from 5 to 55 seats.

Elections are proportional with a 5% representation threshold, which is the minimum vote share that any candidate slate needs to receive in order to qualify into the seat-allocation process. The elections are based on an open-list system that uses the d'Hondt method of seat allocation. This means that candidates from qualified slates are ranked according to the following quotients:

$$\text{quot} = V / (s + 1),$$

where V is the number of votes that a slate received, and s is the number of seats that a slate has been allocated so far, initially 0 for all slates. If the legislature size is N , then N candidates with the highest ranks win the allocated seats. Parties do not receive any premium seats if they receive the highest vote share in elections.

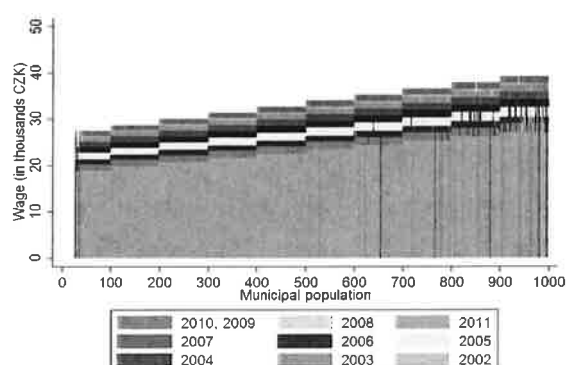
Electoral seat thresholds. Importantly for our empirical strategy, the d'Hondt method of seat allocation creates a set of electoral thresholds, which determine if candidates obtain seats in legislatures. In particular, these thresholds correspond to the vote count that political parties of candidates without seats would need to earn in order to exceed the electoral quotient of the last seated politician. For candidates without seats, the thresholds correspond to the vote count that their party would need to receive in order to rank below the quotient of the first candidate without a seat. These thresholds strictly predict candidates' representation in legislatures.

Statutory wages of municipal politicians. The remuneration of municipal politicians is determined by statutory wage schedules set centrally by the Government of the Czech Republic. Wages vary according to the positions of particular representatives in legislatures, being highest for mayors, followed by deputy mayors and other council

members. Representatives without executive positions on councils earn little remuneration. Table A.1 in Appendix 1 summarizes the wage schedules for mayors, deputy mayors and council members in 2002-2013.

Wage thresholds. A remarkable property of the statutory wage schedules, which we exploit in our identification strategy, is that until 2018, these schedules involved both a fixed and a flexible amount which depended on the municipal resident population.³ The flexible part of wages did not rise linearly with each resident. Instead, the population statistic used for the determination of wages was always rounded up to the nearest multiple of 100. In this way, the wage schedule involved multiple thresholds (at all multiples of 100 of residents), at which the wages discontinuously jumped upwards.

FIGURE 1
Wage schedule of mayors



Notes: The figure shows the wage schedule of mayors in municipalities with fewer than 1,000 residents.

In percentage terms, the wages rose most quickly at the thresholds in the smallest municipalities with less than 1,000 residents. Each additional resident in these municipalities that meant the municipality exceeded one of the wage thresholds was associated with an approximately 4-5 % wage rise for mayors, as displayed in Figure 1. The wage increase was even higher for deputy mayors (about 6.5%) and council members (about 10%), due to the relatively lower fixed component of their salaries

³ Effective from 1.1.2018, the flexible part of politicians' remuneration has been removed from legislation. The new law specifies 11 categories of population size with fixed wages in each category.

(see Figures A.1 and A.2 in Appendix 1). In larger municipalities with more than 1,000 residents, wage discontinuities were much lower both in absolute and relative terms, making the wage schedule smoother and convex. In our empirical analysis, we thus focus only on small municipalities with fewer than 1,050 residents.⁴

Apart from the wage jumps at population thresholds, it is important for us to discuss three issues related to the remuneration policy: 1. whether any other policies vary at the same thresholds, 2. whether politicians can keep outside earnings, and 3. whether any interim wage reforms disproportionately affected any subset of municipalities.

Other policies varying at population thresholds. Table 1 summarizes policies other than wages that are based on municipal population. In particular, the table shows that there are limits on legislature size that discontinuously increase at certain population thresholds. However, these thresholds coincide with only one of the wage thresholds relevant for municipalities with less than 1,050 inhabitants. We resolve this issue by focusing solely on thresholds that uniquely identify variation in politicians' wages.

TABLE 1

Public policies other than wage-setting based on municipal population

Population	Share of municipalities	Cumulative share of population	Seats in legislature	Council board	Eligible for grants to small towns
≤ 500	54.7%	7.8%	5 – 15		Yes
501–3,000	38.1%	32.6%	7 – 15	If legislature has ≥ 15 seats	No
3,001–10,000	5.1%	48.2%	11 – 25		No
10,000 – 50,000	1.8%	69.7%	15 – 35	Yes	No
50,001–150,000	0.2%	79.9%	25 – 45	Yes	No
>150,000	0.1%	100.0%	35 – 55	Yes	No

Next, Table 1 shows that mandatory establishment of municipal council boards is tied to legislature size and therefore to population. Specifically, legislatures appoint council boards if the legislature has at least 15 seats, otherwise, mayors hold all

⁴ Ferraz and Finan (2011) exploit variation in wages capped at population limits that are far greater in magnitude than those employed in this study (10,000; 50,000; 100,000; 300,000; 500,000 inhabitants). Gagliarducci and Nannicini (2013) also make use of a limit of 5,000 inhabitants, which is several times higher than any of ours. Our estimates agree in many respects with previous evidence of wage effects on electoral competition and political selection, increasing trust in the external validity of our results.

executive powers. The council board members are typically appointed only in large towns (mandatorily in those with more than 10,000 residents). This rule is thus not relevant for our analysis.

Finally, municipalities can access some grants from the central government if their population is smaller than 500 residents. We have, however, already excluded this threshold from our analysis, in our discussion of the mandatory size of legislatures.

Outside earnings of politicians. Next, we discuss whether legislators can earn outside income in addition to their office earnings. In this regard, the law permits politicians to serve in office either as “on leave” or “without leave” from their previous job. In the former category, politicians do not receive any payments from their outside job, although their employer is required to keep their position open until the end of the electoral term. In the latter category, politicians receive regular earnings, but their in-office salary is significantly reduced, to about one third. Importantly for our empirical strategy, this reduction is applied only to the fixed part of a salary, leaving discontinuities in wages generated by flexible part of wages unaffected.

Variation in wages over time. Wages of politicians are typically adjusted for inflation annually by the central government. This, however, means that the real values of wages within each population bracket remain constant. Since adjustments are always applied uniformly to all municipalities, the relative wages between different population brackets remain identical in time.

3. Data

Our analysis relies on data combining information about municipal elections, population statistics and statutory wages paid to politicians.

Election data. Election data includes information about all candidates and parties running in municipal elections in 2002-2014. The data come from the Statistical Office of the Czech Republic and contain details on candidate characteristics, including age, gender, past occupation and party affiliation. We infer information about candidates' education using academic titles noted on candidate lists. The dataset further includes

information about votes and seats that each party and candidate received. We use this information to exactly replicate the seat-allocation process. We also match candidates across electoral terms, using unique identifiers of electoral districts and information about candidates' names, surnames and age. This matching provides information about candidates' incumbency, willingness to re-run and re-election outcome. Overall, our dataset for the 2002-2010 terms contains information about 566,000 candidates running in 6,240 municipalities.⁵ 179,000 candidates eventually won electoral seats.

TABLE 2
Electoral summary statistics and continuity tests at electoral seat thresholds

	Candidates from all municipalities	Candidates from municipalities with less than 1,050 residents within 50 votes spread			
		below seat threshold	above seat threshold	RDD estimate	SE on RDD estimate
	(1)	(2)	(3)	(4)	(5)
White-collar occupations	0.205	0.142	0.154	0.007	[0.011]
- Managers	0.064	0.037	0.045	0.003	[0.006]
- Professionals	0.073	0.035	0.039	0.001	[0.006]
- Other white-collar workers	0.071	0.072	0.071	0.003	[0.008]
Blue-collar-workers	0.247	0.332	0.334	-0.008	[0.016]
Entrepreneurs	0.157	0.155	0.155	-0.000	[0.012]
Not-employed candidates	0.125	0.127	0.117	-0.016	[0.011]
University degree	0.197	0.091	0.104	0.009	[0.009]
- Technical degree	0.110	0.060	0.071	0.005	[0.007]
- Degree in social sciences	0.044	0.018	0.017	-0.002	[0.004]
Age	45.2	43.176	43.619	0.149	[0.390]
Women	0.293	0.282	0.270	-0.006	[0.015]
National party affiliation	0.439	0.178	0.175	0.001	[0.012]
- Christian Democrats	0.098	0.058	0.059	0.005	[0.007]
- Civic Democrats	0.093	0.030	0.030	-0.004	[0.005]
- Communist Party	0.109	0.048	0.046	0.007	[0.007]
- Social Democrats	0.089	0.037	0.034	-0.003	[0.006]
Observations	566,750	10,711	10,711	21,412	

Notes: The RDD estimates in column (4) are reported for linear control function. Standard errors are clustered at the municipality level. ***p<0.01, **p<0.05, *p<0.1

⁵ We do not have information about the willingness to re-run and re-election outcomes for candidates in 2014. We therefore use only data from 2002-2010 in our main analysis.

Table 2 provides summary statistics of the electoral dataset. Column (1) describes candidates from all municipalities running in 2002-2010. Columns (2) and (3) then characterize candidates from municipalities with fewer than 1,050 residents, as only these are close to some of the wage thresholds and are therefore considered in our analysis. Column (2) describes narrowly non-elected candidates within 50 votes bandwidth below the seat threshold, while column (3) considers barely elected candidates within the same bandwidth.⁶ We note that candidates in columns (2) and (3) are *not* representative of the population of candidates in column (1). Our analysis thus considers candidates that come less often from white-collar jobs, less often have a university education, and are less often affiliated with national-level parties. These differences likely reflect the different composition of candidate pools in small municipalities compared to larger towns. We postpone comparison between columns (2) and (3) until section 4, in which we check the internal validity of our design.

TABLE 3
Electoral summary statistics at the municipal level

	All municipalities (1)	Municipalities with $\leq 1,050$ residents		
		2002 (2)	2006 (3)	2010 (4)
Number of candidate slates	4.346	4.192	4.113	4.162
- Civic movements and individual slates	3.293	3.576	3.566	3.682
- National-level parties	1.054	0.616	0.547	0.480
Number of represented slates	3.405	3.096	3.157	3.158
- Civic movements and individual slates	2.467	2.557	2.672	2.739
- National-level parties	0.939	0.539	0.485	0.419
Legislature size	9.590	8.096	8.012	7.945
Voter turnout	0.448	0.473	0.460	0.465

Next, Table 3 summarizes the electoral dataset at the municipal level. It shows that competition in municipal elections is rather low, as only 4.35 candidate slates run on average, while 3.40 slates gain seats in legislatures. The average legislature has 9.59 seats, and the average voter turnout is 44.8%. These statistics are almost constant across small municipalities over the 2002-2010 period.

⁶ Columns (2) and (3) also do not refer to candidates from municipalities near the threshold of 500 residents, as it does not uniquely identify variation in politicians' wages, as discussed in Section 2.

Resident population statistics. We merge the electoral data with information about municipal resident population. The residence statistics come from the Registry of Inhabitants (ROI) which is centrally administered by the Ministry of the Interior of the Czech Republic. These statistics serve, inter alia, to determine the wages of municipal politicians. They are continuously updated, but municipalities use statistics valid on January 1st in each year to determine the wages for the next full year.

Statutory wages paid to politicians. Finally, we impute wages of politicians based on information about municipal resident population and legislation corresponding to a particular election year. We do not allow wages to vary across candidates within municipalities: we set them equal for all candidates at the level of mayor's wage. This imputation should not threaten our empirical design, as the flexible part of a salary varies by population equally across mayors, deputy mayors and council members.

4. Empirical strategy

The main aim of our study is to estimate causal impacts of higher wages paid to politicians on the propensity to re-run and re-election, and to assess the contributions of various drivers of the wage effects: the influence of higher wages on initial selection into electoral races, and their impact on incentivizing more effort by incumbents.

In this section, we first review the methodology for estimating the reduced form effects of higher wages on re-election, political selection, and electoral competition.⁷ Next, we review the strategy for estimating electoral incumbency advantages, as we use it to test incumbents with better outside options on the labor market achieve higher re-election rates. Finally, we present our novel approach that combines the two evaluation strategies above, as when used separately, they do not permit us to distinguish between alternative drivers of wage effects on re-election.

⁷ In Appendix 2, we also report reduced-form estimates of wage effects on municipal budget outcomes. We do not include these results in the main analysis, as the budget outcomes do not have a meaningful counterpart for past narrowly non-elected candidates. For these outcomes, we thus cannot distinguish between selection and incentive effects of higher wages.

4.1. Reduced-form effects of wages on political selection, electoral competition and re-election

The fundamental challenge in obtaining unbiased estimates of the wage effects on electoral outcomes, political selection and electoral competition arises due to potential endogeneity in political wage-setting. Such endogeneity can arise, for example, when politicians with greater skills and better performance can set higher wages for themselves (Di Tella and Fisman 2004). To deal with the endogeneity concerns, the standard RDD strategies, used, for example, by Ferraz and Finan (2011) and Gagliarducci and Nannicini (2013), exploit fixed population thresholds determining politicians' wages. The underlying idea is that, in the proximity of the thresholds, municipalities with populations "just below" the fixed limit can be used as a control group for those "just above". Sufficiently close to the threshold, municipalities on either side of the threshold should have, on average, similar characteristics, although municipalities above the threshold pay higher wages.

More formally, we let P_m denote population size in municipality m . At each threshold P_n separating population brackets n and $n+1$, wages w_m sharply increase from a lower (ℓ_n) to a higher level (h_n): $w_m = \ell_n$ if $P_{n-1} < P_m < P_n$, and $w_m = h_n$ if $P_n < P_m < P_{n+1}$, with $h_n > \ell_n$. The wages are thus a step function of P_m .

To express the idea that the outcomes of interest (e.g., politicians' re-election chances, willingness to run again, their education and occupation at the time of election runs) depend on wages and other stochastic factors, one can use a potential outcomes framework. In particular, we let $y_{im}(w)$ denote the value of the potential outcome for candidate i in municipality m , expressed as a function of wages.⁸ Under the assumption of continuity of conditional regression functions of potential outcomes at the population thresholds (see Hahn et al. 2001), we can identify the causal effect of higher wages by estimating the following equation:

⁸ For the sake of simplicity, our notation in this subsection omits subscripts for electoral terms, even though we use data from several elections. We control for time effects by including a set of time dummies for each term in our specification. We also cluster standard errors at the municipality level.

$$y_{im} = \alpha_0 + \alpha_1 w_m + f(\tilde{P}_m) + \beta' X_{im} + \varepsilon_{im} \quad (1)$$

where \tilde{P}_m is a municipal population normalized to the relevant population threshold⁹, X_{im} are covariates¹⁰ (including threshold fixed effects, region fixed effects, and electoral period fixed effects), ε_{im} is the error term clustered at the municipality level, and $f(\cdot)$ is a flexible k th-order polynomial control function of the following form:¹¹

$$f(\tilde{P}_m) = \sum_{k=1}^K [\gamma_{1k} (\tilde{P}_m)^k + \gamma_{2k} (\tilde{P}_m)^k * w_m] \quad (2)$$

The coefficient α_1 captures the pure LATE effect of higher wages paid to politicians on the outcomes examined.¹²

We estimate Eq. (1) semi-parametrically, i.e. using a sample of municipalities, in which the population falls into a narrow bandwidth around the pooled population threshold. We consider bandwidths chosen automatically as in Calonico, Cattaneo and Titiunik (2014) (henceforth, CCT). Windows around the threshold are symmetrical and constructed such that no individual can appear on both sides of the threshold.

Validity checks. The continuity assumption in our setting requires that no policies other than wages are based on the same thresholds and that politicians cannot manipulate population statistics close to the thresholds. We have already checked the former condition in Section 2. We check the latter condition in Panel A in Figure 2 by visually inspecting continuity of the density function of municipal populations at the population threshold that pools all individual thresholds together. The figure does not suggest any sorting around the threshold. A more formal test is conducted by using a McCrary test (2008) in Panel B, which runs kernel local polynomial regressions of the assignment variable separately on both sides of the threshold, with the null

⁹ We define $\tilde{P}_m = (P_m - P_n)$, i.e. we pool the population thresholds together by finding for each municipality m the closest population threshold P_n and re-center this threshold to zero.

¹⁰ Covariates are not necessary for identification, but we include them in some specifications, as they improve the precision of estimation without introducing bias to the main coefficients.

¹¹ Some specifications are estimated at the municipality level, thus leaving out subscript i . This relates mostly to estimations of wage effects on electoral competition, in which the main outcome variables are the number of candidates and candidate parties of different types per municipality.

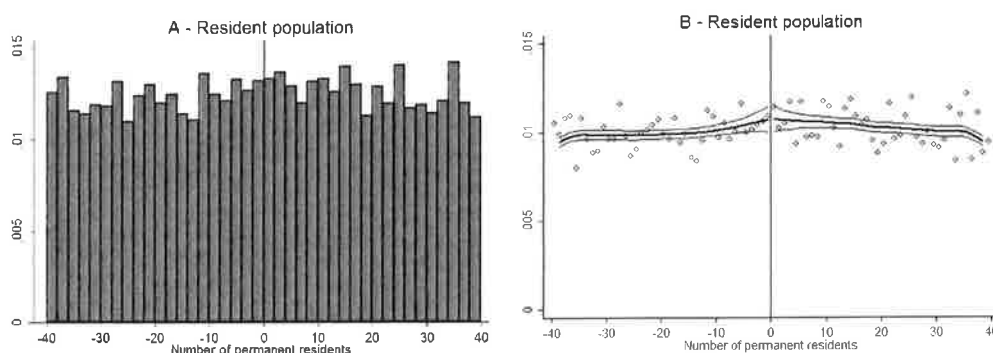
¹² The estimand of interest at the pooled population threshold \bar{P} can be also expressed as:

$$E[y_{im}(\mathcal{A}_n) - y_{im}(\mathcal{L}_n) | P_m = \bar{P}] = \lim_{p \downarrow \bar{P}} E[y_{im} | P_m = \bar{P}] - \lim_{p \uparrow \bar{P}} E[y_{im} | P_m = \bar{P}]$$

hypothesis of no discontinuity at the threshold. Based on the estimated log difference in the height of the density function equal to 0.005 at the threshold, and a standard error of 0.057, we fail to reject the absence of any discontinuity. These results suggest strong internal validity of the RDD strategy.

FIGURE 2

Density distribution of municipal population



Notes: Panel A shows a raw histogram of municipal populations. Panel B implements the McCrary density discontinuity test. In particular, the scatterplot is a histogram of municipal populations and the solid lines below are local linear smoothers fitted to the empirical distribution, estimated using automatic bandwidth and bin-size selection procedures.

4.2. Electoral incumbency advantage

In the next step, we review the strategy for estimating the incumbency advantages at electoral seat thresholds in the setting of close proportional elections. We rely on seat thresholds, as they split candidates into narrowly-elected incumbents and narrowly non-elected candidates, while all other candidates' predetermined characteristics should be independent of the resulting incumbency status (Lee 2008).

Formally, we again use a potential outcomes framework to express the idea that the outcomes of interest y_{it} (i.e., re-election, willingness to run again) are a function of the incumbency status I_{t-1} and other stochastic factors. Under the assumption of the continuity of potential outcomes at the seat thresholds (see Hahn et al. 2001), we can identify a causal effect of incumbency by estimating the following equation within a narrow bandwidth selected by the CCT procedure around the seat thresholds:

$$y_{it} = \lambda_0 + \lambda_1 I_{it-1} + g(\tilde{v}_{it-1}) + \beta' X_{it} + e_{it} \quad (3)$$

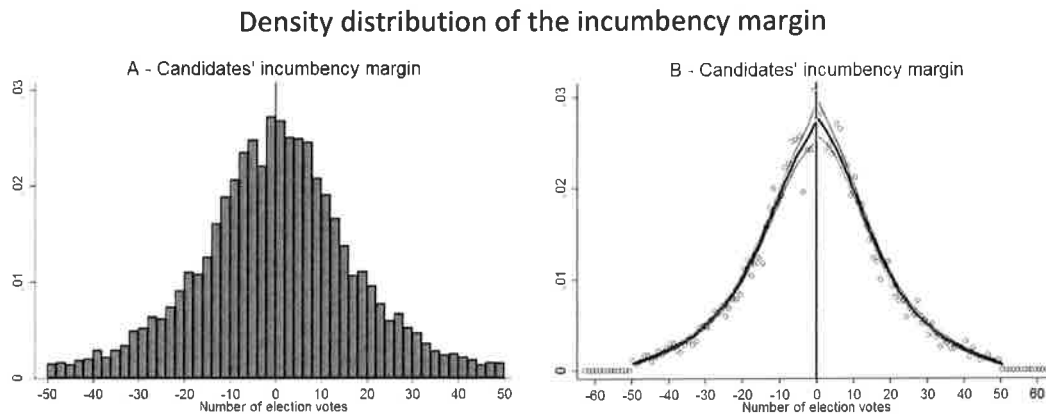
where \tilde{v}_{it-1} represents candidates' incumbency margin (i.e. the difference between candidates' votes and the seat threshold), X_{it} are covariates (including fixed effects for electoral terms and administrative districts), e_{it} is the error term clustered at the municipality level, and $g(\cdot)$ is a k th-order polynomial control function, estimated separately on either side of the seat thresholds. The coefficient λ_1 in Eq. (3) is the estimated difference in re-election chances and willingness to run again between incumbent and past narrowly non-elected candidates.

Validity checks. For identification, the continuity assumption requires that no factors other than the assignment of electoral seats change at the seat thresholds, which is highly implausible in our setting, as the thresholds are calculated solely for the purpose of determining allocation of seats. Table 2 still implements a set of indirect placebo tests of the continuity assumption. Specifically, column (4) in Panel A reports estimates of coefficients λ_1 from Eq. (3) based on linear control function for specifications, in which numerous observable characteristics of candidates serve consecutively as outcomes.¹³ Column (5) reports the corresponding standard errors clustered at the municipality level. The estimates should not be significant if narrowly-elected incumbents do not differ in terms of the inspected characteristics from narrowly non-elected candidates. Indeed, the table does not find any significant estimates related to candidates' education, age, gender, occupation or political affiliation. The table therefore confirms the internal validity of the RDD strategies for estimating the incumbency advantages (Lee 2008, Eggers et al. 2015).

We also check the condition of 'no manipulation of votes' at the seat thresholds in Figure 3. Panel A shows the raw histogram of incumbency margin with no discernible discontinuity at the seat threshold. A McCrary test (2008) implemented in Panel B yields an estimated log difference in the height of the density function of the incumbency margin at the seat threshold equal to 0.017, and a standard error of 0.056, confirming the absence of any discontinuities in the inspected distribution.

¹³ See Table A.2 in Appendix 1 for estimates based on a quadratic polynomial.

FIGURE 3



Notes: Panel A shows a histogram of candidates' incumbency margins, calculated as the difference between the candidates' votes and the seat threshold. Panel B implements the McCrary test. In particular, the scatterplot is a histogram of candidates' incumbency margins, and the solid lines are local linear smoothers fitted to the empirical distribution, estimated using automatic bandwidth and bin-size selection procedures. Both panels show observations for candidates within a 50 vote bandwidth around the electoral seat thresholds.

4.3 Isolating the incentive effect of higher wages on re-election

Finally, we describe our strategy for isolating the pure incentive effect of higher wages on re-election from the wage effects on selection of candidates into electoral races.

The strategy is based on combination of the two RDD strategies above: the RD design based on population thresholds and the RD design based on electoral seat thresholds.

While the former strategy allows us to control for endogenous wage-setting for politicians, the latter allows us to account for observable and unobservable aspects of candidate selection into electoral competitions. As non-elected candidates cannot exploit office privileges or improve in-office performance prior to elections in response to higher wages, we argue that the combination of the two strategies isolates the pure incentive effect of higher wages on re-election.¹⁴

¹⁴ The underlying idea of our approach resembles the intuition of evaluation designs that compare different discontinuities across space, such as in Dickert-Conlin and Elder (2010) or across different groups of politicians, such as in Gagliarducci and Nannicini (2013). In the latter case, which is more relevant for our study, the authors also estimate the effects of higher wages on politicians' performance by exploiting variation around population thresholds in RDD fashion. In the next step, they compare the outcomes across politicians serving a first or second term, as the two-term limit is assumed to provide re-election incentives only to politicians in the first term. As both observable and

In practice, we estimate the following specification:

$$y_{imt} = \delta_0 + \delta_1 I_{it-1} + \delta_2 w_{mt} + \delta_3 w_{mt} * I_{it-1} + h(\tilde{v}_{it-1}, \tilde{P}_{mt}) + \beta' X_{imt} + \eta_{imt} \quad (4)$$

where y_{imt} is the outcome of interest (i.e. re-election, willingness to run again) for candidate i in municipality m and term t , I_{it-1} an indicator is equal to 1 if candidate i holds a seat in legislature in time $t-1$, and 0 otherwise, w_{mt} are wages paid to politicians in time t , X_{imt} are pre-determined covariates (including electoral term fixed effects and administrative region fixed effects), and η_{imt} is the error term clustered at the municipality level. The assignment variables \tilde{v}_{it-1} and \tilde{P}_{mt} are defined as above. The flexible k th order polynomial control function includes all interactions between the two assignment variables and the two treatments.¹⁵

There are three coefficients of interest in Eq. (4). Coefficient δ_1 captures the impact of incumbency on the inspected outcomes, reflecting all aspects of selection and incumbents' performance that are independent of wages. Coefficient δ_2 captures the impact of wages on the inspected outcomes regardless of whether politicians are incumbents or past narrowly non-elected candidates. Finally, coefficient δ_3 is the additional effect of wages experienced solely by incumbents and not by past narrowly non-elected candidates. δ_3 can thus be interpreted as a pure incentive effect of higher wages, as candidates on either side of the seat threshold should be comparable in terms of observed and unobserved characteristics and simultaneously face the same competition from outside entrants, while only incumbents had the opportunity to deliver better in-office performance due to higher wages prior to the re-election race.¹⁶

unobservable aspects of selection should be comparable at the population thresholds across politicians serving in different terms, the comparison of the wage effects for the two groups in a difference-in-differences fashion isolates the incentive effects of higher wages on in-office performance.

¹⁵ The control function takes the following form: $h(\tilde{v}_{it-1}, \tilde{P}_{mt}) = \sum_{k=1}^K [\gamma_{1k}(\tilde{v}_{it-1})^k + \gamma_{2k}(\tilde{P}_{mt})^k + \gamma_{3k}(\tilde{v}_{it-1} * I_{it-1})^k + \gamma_{4k}(\tilde{v}_{it-1} * w_{mt})^k + \gamma_{5k}(\tilde{v}_{it-1} * \tilde{P}_{mt})^k + \gamma_{6k}(\tilde{P}_{mt} * w_{mt})^k + \gamma_{7k}(\tilde{P}_{mt} * I_{it-1})^k + \gamma_{8k}(\tilde{v}_{it-1} * \tilde{P}_{mt} * I_{it-1})^k + \gamma_{9k}(\tilde{v}_{it-1} * \tilde{P}_{mt} * w_{mt})^k + \gamma_{10k}(\tilde{P}_{mt} * w_{mt} * I_{it-1})^k + \gamma_{11k}(\tilde{v}_{it-1} * w_{mt} * I_{it-1})^k + \gamma_{12k}(\tilde{P}_{mt} * \tilde{v}_{it-1} * w_{mt} * I_{it-1})^k]$

¹⁶ Our strategy does not preclude that there are effects of higher wages on campaigning effort that can be exerted both by incumbents and past non-elected candidates. Due to this possibility, coefficient δ_3

We estimate Eq. (4) using a sample of individuals that fall simultaneously within the narrow bandwidth around the population thresholds and a narrow bandwidth around the seat threshold.¹⁷ Finally, we note that validity of the continuity assumptions examined in Figures 2 and 3 also extends to estimation of Eq. (4). Overall, the figures thus support strong internal validity of the proposed identification strategy.

5. Results

We start the exposition of results by presenting the estimated wage effects on political selection and electoral competition. In the next step, we estimate the size of electoral incumbency advantages across different types of candidates to evaluate if candidate characteristics correlate with re-election rates. Next, we estimate reduced form effects of higher wages on re-election and willingness to run again that likely combine the impacts of selection, electoral competition and performance. Finally, we implement our novel strategy to isolate the incentive effect of higher wages on re-election from the wage effects on initial selection into electoral races.

5.1. Effects of higher wages on political selection and electoral competition

Political selection. Table 4 presents RDD estimates of the impact of higher wages on political selection. The table reports estimates of coefficient α_1 from Eq. (1) when candidate characteristics (past occupation, education, age and gender) serve as dependent variables. Panels A, B and C show estimates for the whole candidate pool, elected and non-elected candidates, respectively. The estimates are obtained using a linear control function (see Table A.4 in Appendix 1 for results based on a quadratic polynomial). The empirical specification also includes fixed effects for electoral terms, population thresholds and administrative regions.¹⁸

has to be interpreted as a net bonus (or penalty) to re-election chances that incumbents gain over past non-elected politicians when wages increase.

¹⁷ We do not use automatic bandwidth selection procedures as in Calonico et al. (2014) for estimating Eq. (4), as we have two separate assignment variables. Importantly, we show that our results are robust to alternative combinations of the bandwidth choices.

¹⁸ Table A.3 in Appendix 1 shows the numbers of observations within fixed bandwidths around each of the population thresholds considered.

Table 4 indicates that wages paid to politicians improve political selection on several margins. We observe a significant rise in the share of white-collar workers in the whole candidate pool, and also among elected and non-elected candidates (column 1). Columns (2) and (3) respectively show significantly less frequent representation of blue-collar workers and entrepreneurs. Column (5) reveals that higher wages attract more university-educated candidates, particularly those with degrees in social sciences. According to column (7), elected politicians are also older when wages increase.

TABLE 4
Wage effects on political selection

	White-collar occupation	Blue-collar workers	Entrepreneurs	Not-employed	University degree in social sciences	Technical university degree	Log (Age)	Women
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All candidates								
Log (wage)	0.715*** [0.217]	-0.458 [0.295]	-0.361 [0.219]	0.047 [0.197]	0.157** [0.073]	0.041 [0.171]	0.033 [0.190]	0.243 [0.250]
Obs.	56,087	65,113	65,113	74,185	69,629	65,113	74,185	74,185
Panel B: Elected candidates								
Log (wage)	0.663** [0.298]	-0.816** [0.329]	-0.472* [0.256]	0.191 [0.246]	0.184* [0.110]	0.006 [0.241]	0.391* [0.200]	0.068 [0.313]
Obs.	27,474	38,060	35,954	29,561	29,561	27,474	33,788	33,788
Panel C: Non-elected candidates								
Log (wage)	0.818*** [0.262]	-0.116 [0.411]	-0.170 [0.309]	-0.085 [0.304]	0.155* [0.082]	0.113 [0.181]	-0.264 [0.279]	0.418 [0.411]
Obs.	31,078	33,449	33,449	35,827	40,388	40,388	40,388	28,601
Region FE	X	X	X	X	X	X	X	X
Threshold FE	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Bandwidth	CCT	CCT	CCT	CCT	CCT	CCT	CCT	CCT
Polynomial	linear	linear	Linear	linear	linear	Linear	linear	linear

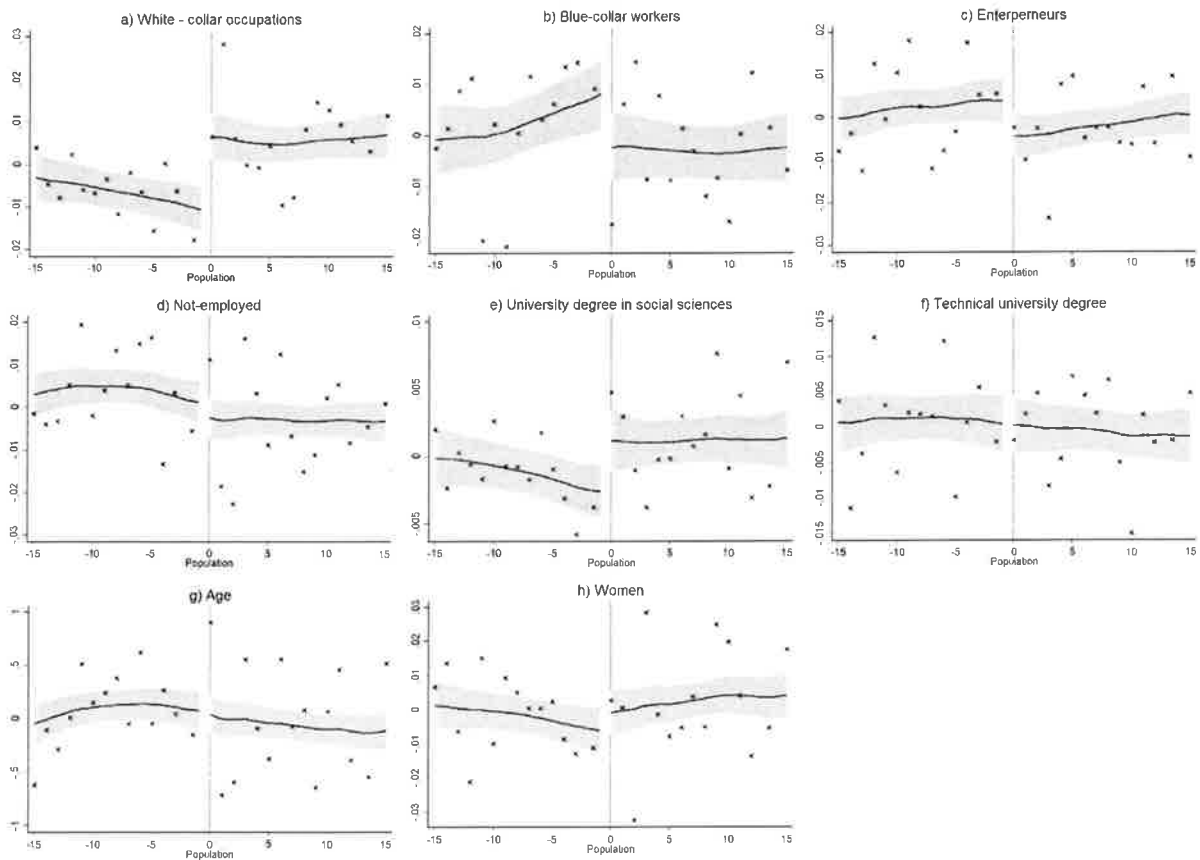
Notes: All entries report a coefficient for log wages from Eq. (1). Bandwidths are chosen using the automatic bandwidth selection procedure by Calonico et al. (2014). Robust standard errors clustered at the municipality level are presented in parenthesis, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 4 and A.4 and A.6 in Appendix 1 visualize the estimates in Table 4 for the whole candidate pool, elected, and non-elected politicians, respectively. To remove possible effects of population brackets, electoral terms and regional characteristics, we first take each inspected outcome and regress it on a set of fixed effects used in Table 4.

Each small cross in the figures then depicts the average value of the estimated residuals in equally-sized bins within a bandwidth of ± 15 residents around the pooled population threshold, which is demarcated by a vertical line and re-centered to zero. The solid lines are local polynomial smoothers estimated separately to the left and right of the pooled threshold. The grey-shaded areas are 95% confidence intervals.¹⁹

FIGURE 4

Wage effects on the composition of the candidate pool



Notes: The figure displays characteristics of the candidate pool against the municipal population in the proximity of the pooled wage threshold. Specifically, we take each characteristic of interest and regress it on fixed effects for electoral terms, population brackets and administrative regions. Each small cross in the figure then represents the average value of the estimated residuals in equally-sized population bins. The solid lines are the outcomes smoothed by local polynomial smoothers separately to the left and right of the pooled population threshold, demarcated by the vertical line re-centered to zero. The grey-shaded areas are 95% confidence intervals.

¹⁹ Figures A.3, A.5 and A.7 in Appendix 1 provide results of the graphical analysis, in which candidate characteristics are not conditioned on the fixed effects. The results are qualitatively identical.

Figure 4 validates the finding that higher wages attract more white-collar workers and university-educated candidates into the whole candidate pool, while suppressing the candidacies of blue-collar workers and entrepreneurs. As displayed by marked discontinuities in Figure A.4, the effects of higher wages are also strongly manifested among elected politicians. Finally, Figure A.6 confirms the wage effect on political selection among candidates that eventually cannot deliver any in-office performance, as they do not win seats. Overall, our analysis thus indicates that higher wages improve electoral selection by raising the quality of the candidate pool.

Electoral competition. We next investigate if higher wages incite stronger electoral competition. Specifically, Table 5 asks if selection into elections may have improved due to new parties entering fresh candidates into the contests, or if it is instead due to experienced parties making more positive selection among their past candidates. Technically, the table reports estimates of coefficient α_1 from Eq. (1) when alternative measures of electoral competition are used as dependent variables.

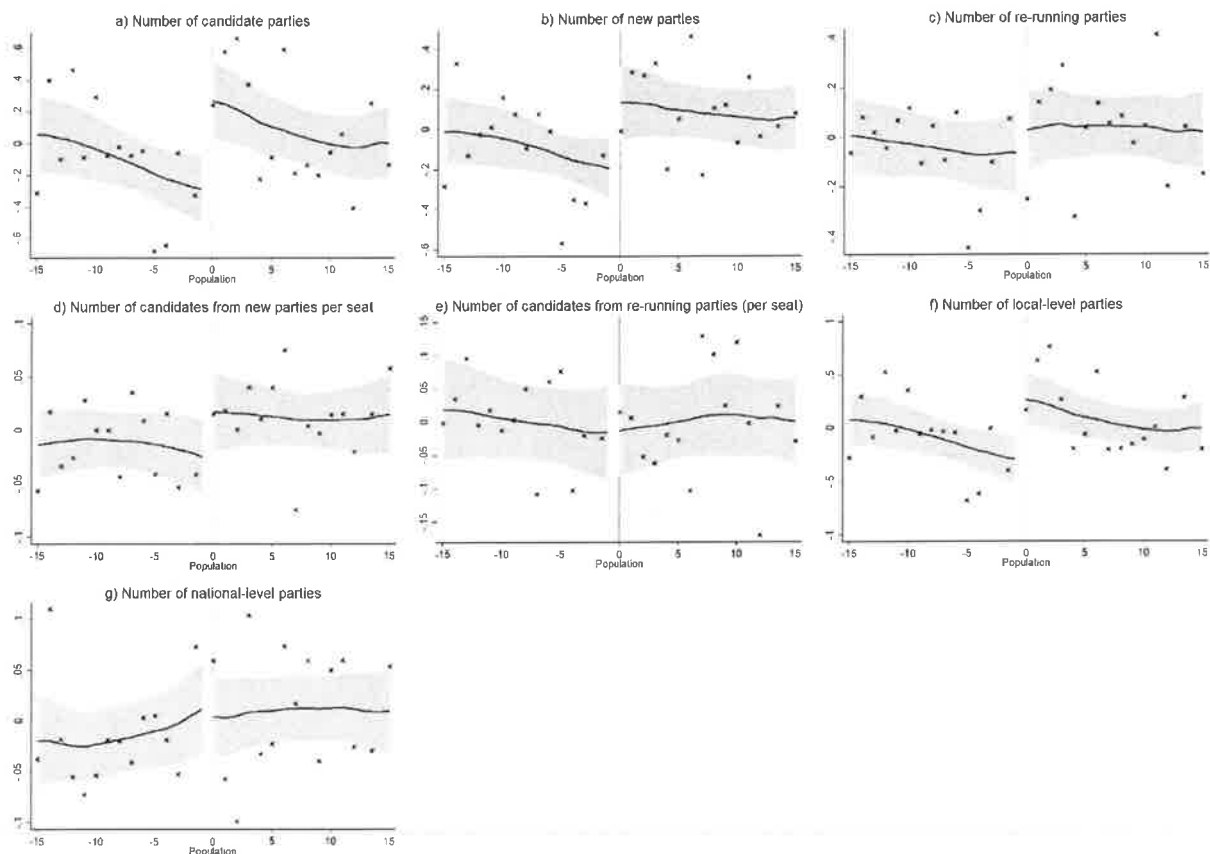
TABLE 5
Wage effects on electoral competition

The number of:	candidate parties	new parties	re-running parties	candidates from new parties (per seat)	candidates from re-running parties (per seat)	local-level parties	national-level parties
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log (wage)	22.108*** [6.918]	11.988** [6.034]	-2.287 [6.027]	2.057* [1.229]	-0.252 [2.668]	23.243*** [7.193]	-1.439 [1.416]
Polynomial	linear	linear	linear	linear	linear	linear	Linear
Obs.	4,739	1,884	1,884	2,065	1,884	4,739	3,952
Log (wage)	25.620*** [8.532]	12.081* [6.170]	-5.670 [7.194]	2.564* [1.419]	-0.936 [3.094]	27.022*** [8.792]	-1.767 [1.623]
Polynomial	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic
Obs.	6,049	3,832	2,778	2,949	2,949	6,049	6,049
Region FE	X	X	X	X	X	X	X
Threshold FE	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X
Bandwidth	CCT	CCT	CCT	CCT	CCT	CCT	CCT

Notes: All entries report the coefficient for log wages from Eq. (1). The coefficients divided by 100 are average changes in the dependent variable associated with a 1% increase in wages. Bandwidths are chosen using the automatic bandwidth selection procedure by Calonico et al. (2014). Robust standard errors clustered by municipality are presented in parenthesis, ***p<0.01, **p<0.05, *p<0.1.

Column (1) in Table 5 shows that higher wages generally attract more parties into elections. According to columns (2) and (3), this is due to new parties entering competitions rather than parties with previous experience being more likely to run again. Column (6) indicates that wages lead to entry of more candidates of local civic movements which typically operate in one municipality only. On the contrary, column (7) finds no wage effect on the number of national-level candidate parties. Regarding the number of candidates, columns (4) and (5) confirm that higher wages are associated with more candidates from new parties running for office (per seat), while there is no increase in the number of candidates from parties that have run in elections in the past.

FIGURE 5
Wage effects on electoral competition



Notes: The figure displays measures of electoral competition against municipal populations using the same methodology as Figure 4 above. The grey-shaded areas are 95% confidence intervals.

Figure 5 visualizes the estimates of wage effects on electoral competition. The figure uses the exact methodology of Figure 4, i.e., it plots the inspected outcomes against municipal populations around the pooled population threshold conditionally on a set of fixed effects used in estimation. The figure shows marked discontinuities in the overall number of parties (panel a), especially new parties (panel b) and local-level civic movements (panel f), thus confirming the results above.¹⁹

5.2 Electoral incumbency advantage

The results presented so far indicate that higher wages improve selection into politics, and increase electoral competition, which can have important implications for politicians' re-election rates. At the same time, however, incumbent candidates can use their control over relevant resources, institutional privileges, media exposure and opportunities to deliver public goods to build sizeable electoral advantages in re-election contests (e.g., Lee 2008, Liang 2013). It is therefore an open question whether officeholders can use their incumbency status to protect themselves from the effects of greater electoral competition when wages increase.

Table 6 implements the RDD strategy based on seat thresholds in close elections to compare the willingness to re-run and re-election rates for narrowly-elected incumbents and past narrowly non-elected candidates. So far, the estimates are independent of wages, but their important underlying property is that candidates in the treatment and control groups should be comparable in terms of observable and unobservable characteristics (as previously tested in Table 2). We will use this fact later to motivate the combination of this RDD method with the RDD strategy based on wage thresholds to isolate the pure incentive effect of higher wages on re-election. Technically, Table 6 reports coefficients λ_1 from Eq. (3) when the willingness to re-run and re-election rates serve as dependent variables in Panels A and B, respectively. The table considers linear specification of the control function (see Table A.5 in Appendix 1 for estimation based on a quadratic polynomial).

¹⁹ Figure A.8 in Appendix 1 provides results of graphical analysis unconditional on fixed effects.

TABLE 6

Electoral incumbency effects

Subsample:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All candidates	Candidates from white-collar occupations	Candidates from other than white-collar occupations	Candidates with university degrees	Candidates without university degrees	Candidates older than 45	Candidates younger than 45
Panel A – Dependent variable: Willingness to re-run							
Incumbent	0.183*** [0.020]	0.170*** [0.050]	0.185*** [0.021]	0.240*** [0.068]	0.177*** [0.022]	0.232*** [0.027]	0.138*** [0.027]
Obs.	14,112	2,118	12,747	1,160	11,995	7,330	7,377
Panel B - Dependent variable: Re-election							
Incumbent	0.179*** [0.017]	0.222*** [0.047]	0.170*** [0.019]	0.224*** [0.061]	0.174*** [0.019]	0.217*** [0.023]	0.146*** [0.028]
Obs.	15,040	2,121	12,912	1,337	13,390	7,229	6,709
Region FE	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X
Bandwidth	CCT	CCT	CCT	CCT	CCT	CCT	CCT
Polynomial	linear	linear	linear	linear	linear	linear	Linear

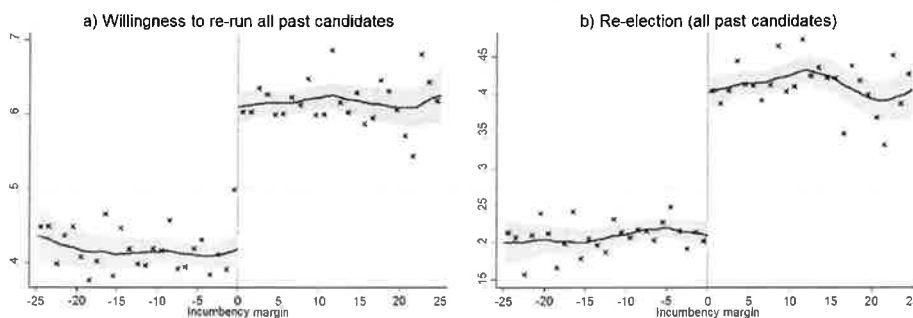
Notes: The table reports coefficients for the binary indicator of political incumbency from Eq. (3) for different subsamples of candidates. Robust standard errors clustered by municipality are presented in parenthesis, ***p<0.01, **p<0.05, *p<0.1.

Column (1) in Panel A shows that incumbents are 18.3 % more willing to repeatedly run for office compared to barely non-elected candidates. This gives incumbents 17.9 % higher re-election chances (Panel B). Both estimates are significant at the 1 % level. Columns (2) – (7) then inspect heterogeneity in incumbency advantage across candidates with respect to their occupational backgrounds, education and age. Specifically, columns (2) and (3) indicate that white-collar incumbents enjoy higher electoral advantages than non-white-collar incumbents. Also, university educated incumbents (column 4) are more likely to run again and to win re-election (relatively to narrowly non-elected candidates) compared to incumbents without university degrees (column 5). Finally, columns (6) and (7) suggest that older (and plausibly more experienced) incumbents are more likely to run again and to be re-elected (relative to barely non-elected candidates) than younger incumbents. Overall, Table 6 supports the hypothesis that incumbents with better outside options on the labor market truly enjoy greater incumbency advantages, thus allowing for a positive effect of higher wages on re-election rates.

Graphical evidence corresponding to column (1) of Table 6 is provided in Figure 7. Panel A shows markedly higher willingness of incumbents to re-run compared to past non-elected candidates. Panel B confirms large electoral advantages for incumbents.

FIGURE 7

Electoral incumbency effects



Notes: The figure displays re-election outcomes against the difference between actual vote counts and seat thresholds. The grey-shaded areas are 95% confidence intervals

5.3 Wages effects on re-election and willingness to run

The previous section provides evidence of sizeable advantages of incumbent candidates in terms of willingness to re-run and on re-election rates. Earlier, we showed positive wage effects on electoral competition and political selection. In this section, we naturally proceed to the question of how wages affect re-election chances and the willingness to run again across the groups of incumbent and past non-elected candidates. We first estimate the wage effects in a reduced form set-up in which we do not distinguish between the mechanisms of selection and on-the-job incentives. Later, we proceed to estimation of wage effects on re-election while accounting for political selection and electoral competition.

TABLE 7

Wage effects on the willingness to re-run and re-election

Panel A	Willingness to re-run (all candidates)		Willingness to re-run (incumbents)		Willingness to re-run (past non-elected candidates)	
	(1)	(2)	(3)	(4)	(5)	(6)
Log (wage)	0.416 [0.361]	0.511 [0.432]	0.162 [0.440]	0.037 [0.452]	1.159** [0.518]	1.317* [0.725]
Obs.	69,629	95,544	25,301	46,457	33,449	35,827
Panel B	Re-election (all candidates)		Re-election (incumbents)		Re-election (past non-elected candidates)	
	(1)	(2)	(3)	(4)	(5)	(6)
Log (wage)	-0.162 [0.205]	0.074 [0.259]	0.519 [0.460]	0.348 [0.450]	-0.191 [0.222]	-0.187 [0.281]
Obs.	74,185	90,888	20,896	44,238	26,596	35,827
District FE	X	X	X	X	X	X
Threshold FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X
Bandwidth	CCT	CCT	CCT	CCT	CCT	CCT
Polynomial	linear	quadratic	linear	quadratic	linear	quadratic

Notes: All entries report the coefficient for log wages from Eq. (1). Robust standard errors clustered by municipality are presented in parenthesis, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

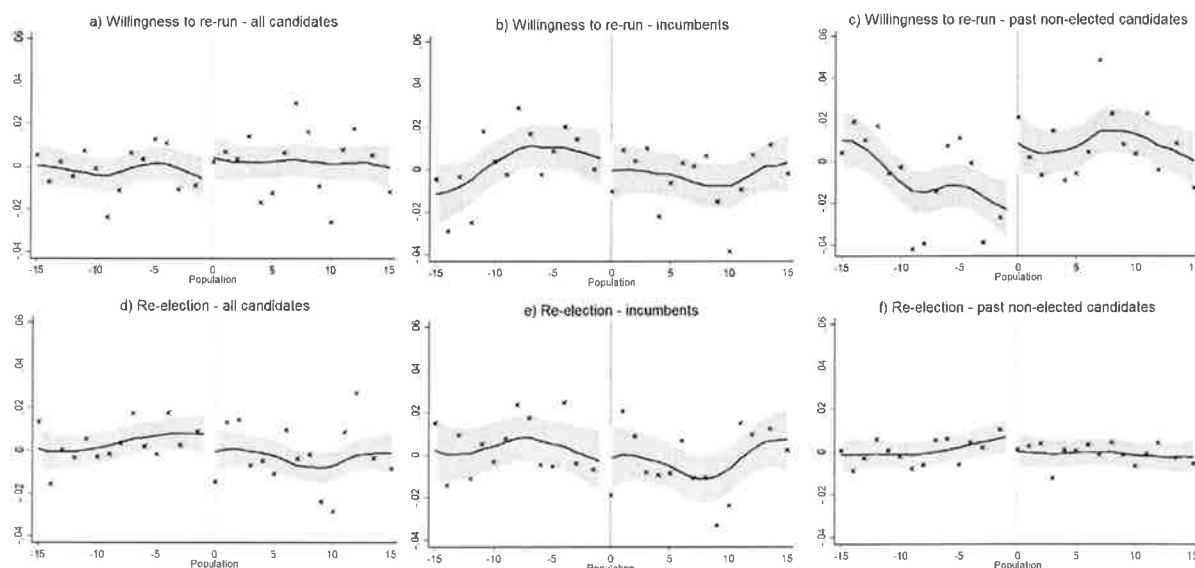
Reduced form estimates. Panel A in Table 7 reports estimates of the reduced form effects of higher wages on candidates' willingness to run again. Technically, we obtain the estimates by running Eq. (1), in which repeated candidacy serves as outcome variable. Columns (1) and (2) in Table 7 provide estimates for the sample of all past

candidates, using linear and quadratic forms of the control function, respectively. Columns (3) and (4) then consider incumbent candidates, while columns (5) and (6) use data on past non-elected candidates. The estimates are visualized in Figure 8.

Panel A reveals that wages have no significant effect on the decision of incumbents to run for re-election, although past non-elected candidates are 1.2 percentage points more likely to run again for each 1 % increase in wages. The effects are significant at least at the 10% level. Estimation that would not distinguish between the two types of candidates would conceal this heterogeneity.

FIGURE 8

Wage effects on the willingness to re-run and re-election



Notes: Willingness to run again and re-election outcomes against municipal resident populations. The grey-shaded areas are 95% confidence intervals.

Figure 8 confirms these results by showing a clear discontinuity in the willingness to run again at the pooled population threshold for candidates who previously did not win seats (Panel C). There are no jumps in the full sample (Panel A) nor among incumbent candidates (Panel B). Although the figure visualizes estimates conditionally on fixed effects for electoral terms, population thresholds and administrative districts, they are robust for omitting these covariates from estimation (see Figure A.10).

Panel B in Table 7 then shows the reduced-form effects of higher wages on re-election. We do not find significant estimates in the whole sample (columns 1 and 2), or in the samples of incumbent (columns 3 and 4) and past non-elected candidates (columns 5 and 6). The corresponding graphical evidence in panels D, E and F of Figure 8 confirms the lack of significant wage effects on re-election for all three groups.

Isolating the incentive effect of higher wages on re-election. Although insignificant, the estimates of wage effects on re-election seem to be larger in magnitude for incumbent candidates compared to past non-elected candidates. This evidence thus allows for the possibility that incumbents can boost their re-election chances by delivering better in-office performance when wages increase. Such effects could then theoretically offset the forces of higher wages on greater electoral competition and positive electoral selection.

TABLE 8
Wage effects on the willingness to re-run and re-election

	Re-election (all past candidates)		Willingness to re-run (all past candidates)	
	(1)	(2)	(3)	(4)
Incumbent	0.200*** [0.020]	0.197*** [0.028]	0.233*** [0.021]	0.218*** [0.029]
Log(Wage)	0.415 [0.376]	0.516 [0.385]	0.874** [0.411]	0.836** [0.422]
Log(Wage)*Incumbent	-0.179 [0.122]	-0.219 [0.179]	-0.461*** [0.126]	-0.420** [0.182]
District fixed effects	X	X	X	X
Year fixed effects	X	X	X	X
Threshold fixed effects	X	X	X	X
Wage bandwidth (residents)	+/- 30	+/- 30	+/- 30	+/- 30
Incumbency bandwidth (votes)	+/- 100	+/- 100	+/- 100	+/- 100
Control function	linear	quadratic	linear	quadratic
Obs.	13,410	13,410	13,410	13,410
R2	0.061	0.061	0.055	0.055

Notes: The table reports estimates of Eq. (4). Robust standard errors clustered by municipality are presented in parenthesis, ***p<0.01, **p<0.05, *p<0.1.

To isolate the effect of re-election incentives from wage effects on electoral selection, Table 8 implements our novel empirical strategy embodied in Eq. (4) which compares

the wage effects on re-election for narrowly-elected incumbents and narrowly non-elected candidates. At the time of the initial elections, these groups should be comparable in terms of observable and unobservable characteristics.

The estimated interaction effect in columns (1) and (2) suggests that higher wages truly have no effect on incumbents' re-election chances once we account for initial selection of candidates into elections. The estimates are robust across linear and quadratic specifications of the polynomial control function. Table A.6 in Appendix 1 confirms that our estimates are robust to alternative combinations of bandwidth choices around the electoral and population thresholds, respectively.

Furthermore, columns (3) and (4) in Table 8 find that past non-elected candidates are far more sensitive to higher wages in their decision to re-run compared to incumbents. The estimates are again robust to alternative bandwidth choices and shapes of the polynomial control function, as demonstrated in Table A.7 in Appendix 1. Our evidence thus strongly suggests that incumbents make decisions about repeated candidacy based on factors other than wages, and this is due to their experience in office rather than to their predetermined characteristics.

6. Conclusion

In this paper, we study the causal effect of wages on politicians' willingness to re-run and re-election chances. We employ two sets of exogenous thresholds – fixed population thresholds which discontinuously predict politicians' wages, and electoral seat thresholds that split candidates into narrowly elected incumbents and narrowly non-elected candidates.

Using our identification strategy, we show that higher wages have a negligible effect on incumbents' re-election chances and, at the same time, on incumbents' decision to run for re-election. On the other hand, we find that wages have a causal impact on

electoral competition, as they attract new candidates into electoral races and make past losing candidates more willing to run again.

Are wages, therefore, an effective tool to improve the quality of political representation? On the positive side, we show that higher wages do not increase the incumbency advantage and, in line with the previous literature, that they increase electoral competition. This is positive, especially for countries that aim to replace less competent incumbents and which consider a wage increase as a tool to improve the quality of politicians. On the other hand, our evidence suggests that higher wages may not effectively persuade incumbents to exert more effort in office when seeking re-election. This is a negative conclusion for countries which are supply-constrained of new candidates for various political or institutional reasons.

Using our data and empirical design, we are not able to isolate the effects of wage incentives from selection regarding outcomes that reflect politicians' performance, for example, in terms of municipal budget outcomes. It should, however, be highlighted that such outcomes do not have meaningful counterparts for past narrowly non-elected candidates, which in our case serve as a control group. From that reason, re-election probability and the decision to re-run seem to be the most suitable outcomes for the question of whether higher wages provide comparative electoral advantages to politicians who hold elected office.

Bibliography

Besley, Timothy (2004). "Paying Politicians: Theory and Evidence." *Journal of the European Economic Association*, 2, 193–215.

Besley, Timothy, and Stephen Coate (1997). "An Economic Model of Representative Democracy." *Quarterly Journal of Economics*, 112, 85–114.

Besley, Timothy, Jose Montalvo, and Marta Reynal-Querol (2011). "Do Educated Leaders Matter?" *Economic Journal*, 121, F205–F227.

Calonico, Sebastian, Matias Cattaneo, and Rocio Titiunik (2014). "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs." *Econometrica*, 82, 2295–2326.

Caselli, Francesco, and Massimo Morelli (2004). "Bad Politicians." *Journal of Public Economics*, 88, 759–782.

Coates, Dennis (1999). "Efficiency Wages for Politicians: Do Better Paid Officials Produce Better Outcomes?" *University of Maryland*, available at:

<http://research.umbc.edu/%7Ecoates/work/salaryre.pdf>

Chattopadhyay, Raghendra, and Esther Dufflo (2004). "Women as Policy Makers: Evidence from a India-Wide Randomized Policy Experiment." *Econometrica*, 72, 1409–1443.

Dal Bó, Ernesto and Frederico Finan (2018). "Progress and Perspectives in the Study of Political Selection." *NBER Working Paper #24783*, available at: <http://www.nber.org/papers/w24783>

Dal Bó, Ernesto, Frederico Finan, Olle Folke, Torsten Persson, and Johanna Rickne (2017). "Who becomes a politician?" *Quarterly Journal of Economics*, 132, 1877-1914.

Di Tella, Rafael and Raymond Fisman (2004). "Are Politicians Really Paid Like Bureaucrats?" *Journal of Law and Economics*, 47, 477–514.

Dickert-Conlin, Stacy and Todd Elder (2010). "Suburban Legend: School Cutoff Dates and the Timing of Births." *Economics of Education Review*, 29, 826–841.

Diermeier, Daniel, Michael Keane, and Antonio Merlo (2005). "A Political Economy Model of Congressional Careers." *American Economic Review*, 95, 347–373.

Dillon, Eleanor and Christopher Stanton (2017). "Self-employment Dynamics and the Returns to Entrepreneurship." *NBER Working Paper #23168*, available at: <http://www.nber.org/papers/w23168>

Eggers, Andrew, Anthony Fowler, Jens Hainmueller, Andrew Hall, and James Snyder (2015). "On the Validity of the regression Discontinuity Design for Estimating Electoral Effects: New Evidence from Over 40,000 Close Races." *American Journal of Political Science*, 59, 259-274.

Erikson, Robert (1971). "The Advantage of Incumbency in Congressional Elections." *Polity*, 3, 395-405.

Ferraz, Claudio and Frederico Finan (2009). "Motivating Politicians: The Impacts of Monetary Incentives on Quality and Performance." *NBER Working Paper #14906*, available at: <http://www.nber.org/papers/w14906>

Ferreira, Fernando and Joseph Gyourko (2009). "Do Political Parties Matter? Evidence from U.S. Cities." *Quarterly Journal of Economics*, 124, 399-422.

Fiorina, Morris (1989). *Congress: Keystone of the Washington Establishment*. New Haven, CT: Yale University Press.

Fisman, Raymond, Nikolaj Harmon, Emir Kamenica, and Inger Munk (2015). "Labor Supply of Politicians." *Journal of the European Economic Association*, 13, 871-905.

Folke, Olle (2014). "Shades of Brown and Green: Party Effects in Proportional Election Systems." *Journal of the European Economic Association*, 12, 1361-1395.

Gagliarducci, Stefano and Tommaso Nannicini (2013). "Do Better Paid Politicians Perform Better? Disentangling Incentives from Selection." *Journal of the European Economic Association*, 11, 369-398.

Gagliarducci, Stefano, Tommaso Nannicini, and Paolo Naticchioni (2010). "Moonlighting Politicians." *Journal of Public Economics*, 94, 688-699.

Hahn, Jinyong, Petra Todd, and Wilbert Van der Klaauw (2001). "Identification and Estimation of Treatment Effects with Regression Discontinuity Design." *Econometrica*, 69, 201-209.

Jacobson, Gary (1978). *Money in Congressional Elections*. New Haven, CT: Yale University Press.

Jones, Benjamin, and Benjamin Olken (2005), "Do Leaders Matter? National Leadership and Growth since World War II." *Quarterly Journal of Economics*, 120, 835-864.

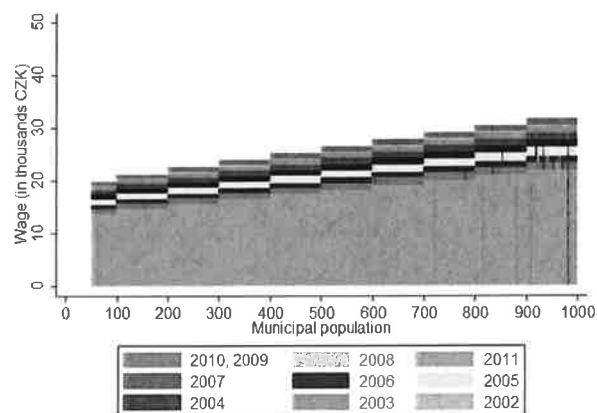
Jovanovic, Boyan (1979) "Job Matching and The Theory of Turnover." *Journal of Political Economy*, 87, 972-990.

- Keane, Michael and Antonio Merlo (2010). "Money, Political Ambition, and the Career Decisions of Politicians." *American Economic Journal: Microeconomics*, 2, 186–215.
- Kotakorpi, Kaisa and Panu Poutvaara (2011). "Pay for Politicians and Candidate Selection: An Empirical Analysis." *Journal of Public Economics*, 95, 877–885.
- Lee, David S. 2008. "Randomized Experiments from Non-random Selection in U.S. House Elections." *Journal of Econometrics*, 142, 675–97.
- Lee, David, Enrico Moretti and Matthew Butler (2004). "Do Voters Affect or Elect Policies? Evidence from the U.S. House." *Quarterly Journal of Economics*, 119, 807–859.
- Liang, Che-Yuan (2013). "Is There an Incumbency Advantage or Cost of Ruling in Proportional Election Systems?" *Public Choice*, 154, 259–284.
- Mattozzi, Andrea and Antonio Merlo (2008). "Political Careers or Career Politicians." *Journal of Public Economics*, 92, 597–608.
- Mayhew, David (1974). *Congress: The Electoral Connection*. New Haven, CT: Yale University Press.
- McCrary, Justin (2008). "Manipulation of the Running Variable in the Regression Discontinuity Design: A Density Test." *Journal of Econometrics*, 142, 698–714.
- Messner, Matthias and Matthias Polborn (2004). "Paying Politicians." *Journal of Public Economics*, 88, 2423–2445.
- OECD (2017). *Government at a Glance 2017*. Paris, France: OECD Publishing.
- Osborne, Martin and Al Slivinski (1996). "A Model of Political Competition with Citizen-Candidates." *Quarterly Journal of Economics*, 88, 2423–2445.
- Pande, Rohini (2003). "Can Mandated Political Representation Increase Policy Influence for Disadvantaged Minorities? Theory and Evidence from India." *American Economic Review*, 93, 1132–1151.
- Poutvaara, Panu and Tuomas Takalo (2007). "Candidate Quality." *International Tax and Public Finance*, 14, 7-27.

Appendix 1 – Supplementary figures and tables

FIGURE A.1

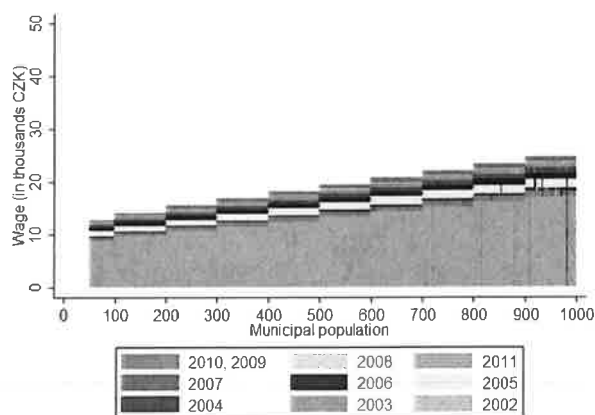
Wage schedule for deputy mayors



Notes: The figure shows the wage schedule for deputy mayors in municipalities with fewer than 1,000 residents.

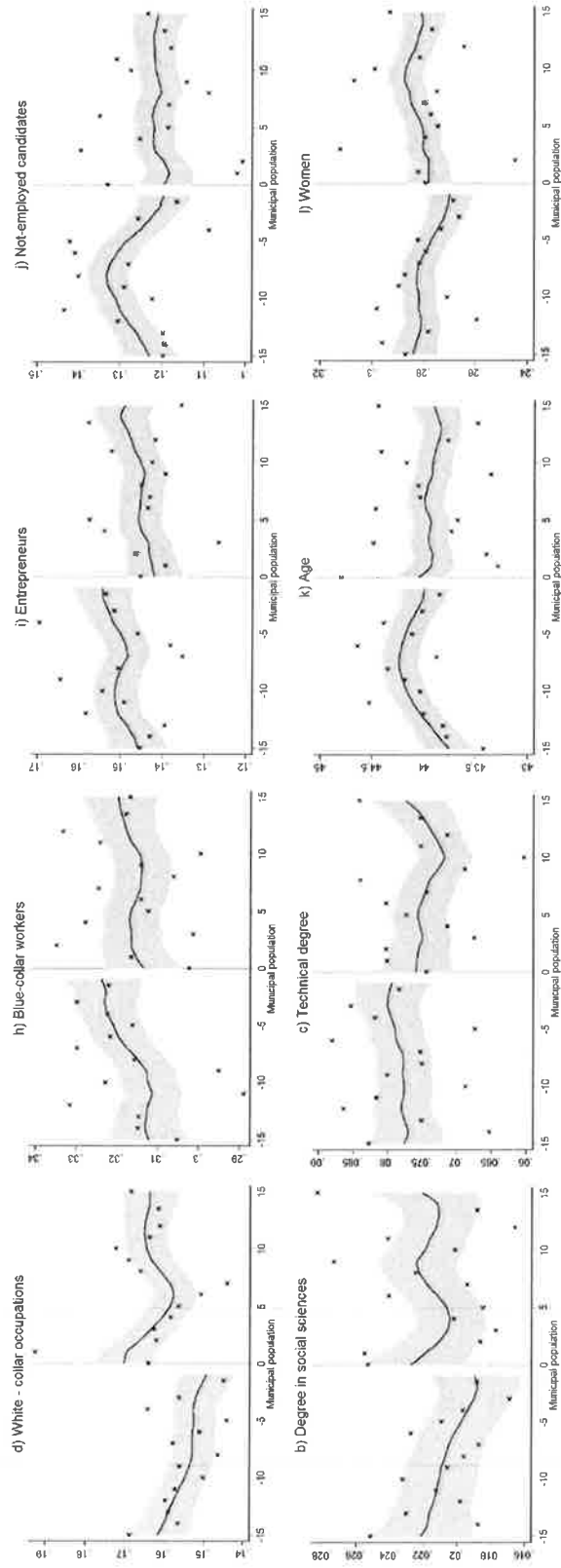
FIGURE A.2

Wage schedule for council members



Notes: The figure shows the wage schedule for council members in municipalities with fewer than 1,000 residents.

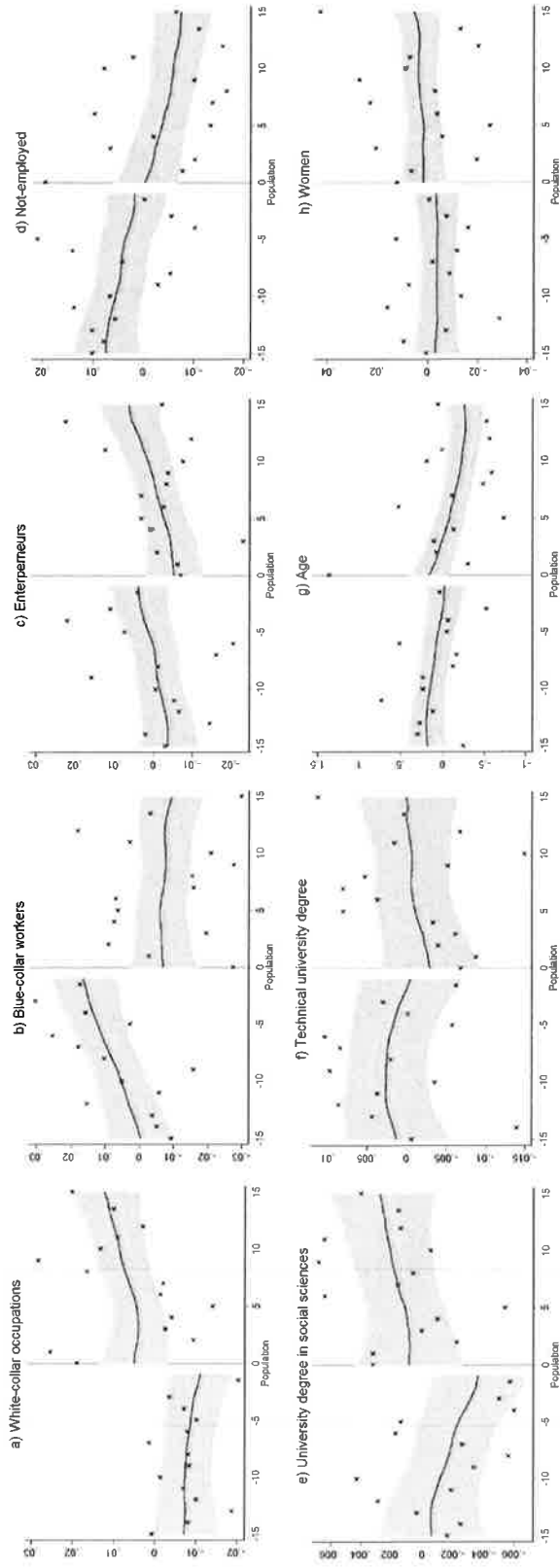
FIGURE A.3
 Wage effects on the composition of the candidate pool – unadjusted for fixed effects



Notes: The figure displays characteristics of candidates in the full candidate pool against municipal populations. Each small cross in the figures represents the average value of the outcome in equally-sized population bins. The solid lines are the outcome variables smoothed by local polynomial smoothers separately to the left and right of the pooled population threshold, demarcated by the vertical line re-centered to zero. The grey-shaded areas are 95% confidence intervals.

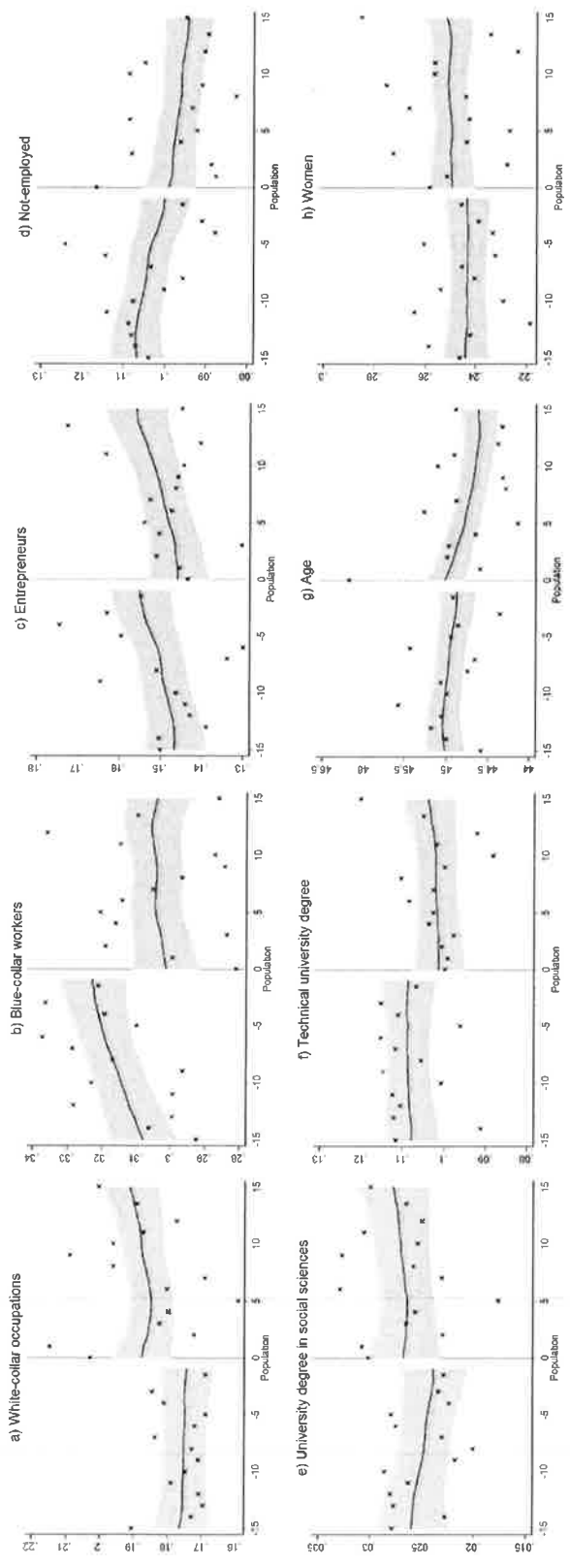
FIGURE A.4

Wage effects on the composition of legislatures – adjusted for fixed effects



Notes: The figure displays characteristics of elected politicians against municipal populations in the proximity of the pooled wage thresholds. The grey-shaded areas are 95% confidence intervals.

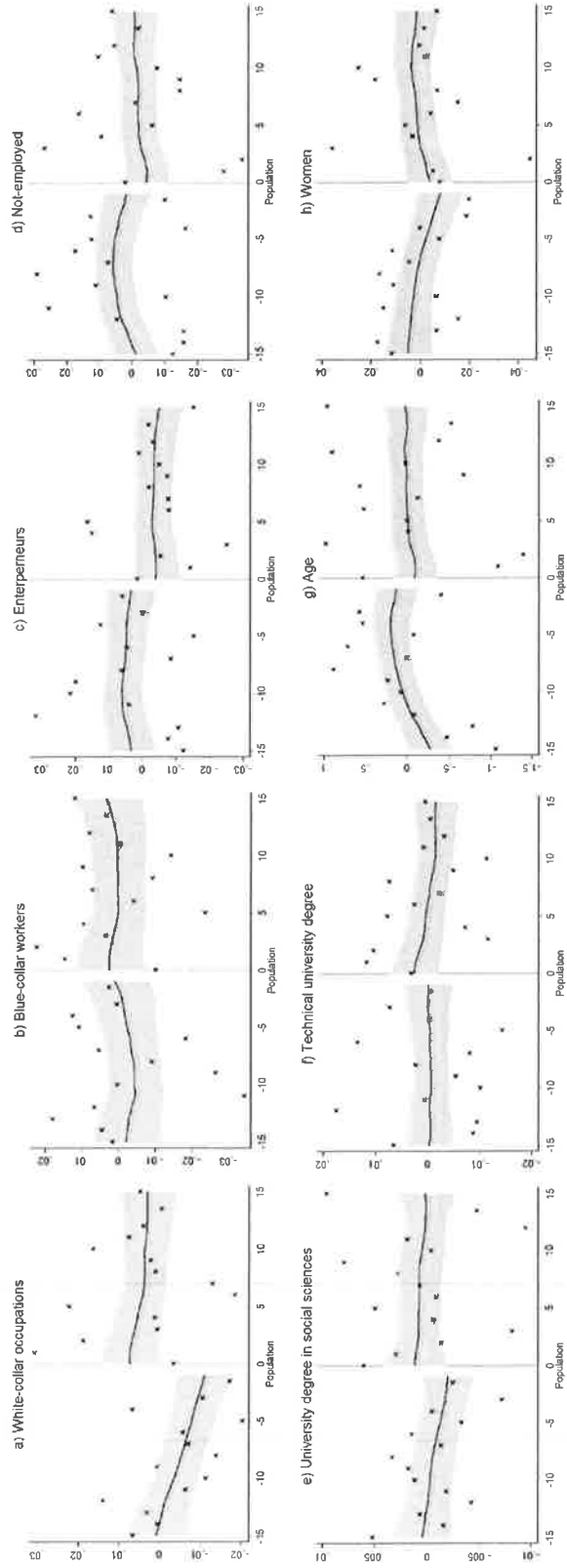
FIGURE A.5
Wage effects on the composition of legislatures – unadjusted for fixed effects



Notes: The figure displays measures of political selection against municipal populations. Each small cross represents the average value of the outcome in equally-sized population bins. The solid lines are the outcome variables smoothed by local polynomial smoothers separately to the left and right of the pooled population threshold, demarcated by the vertical line re-centered to zero. The grey-shaded areas are 95% confidence intervals.

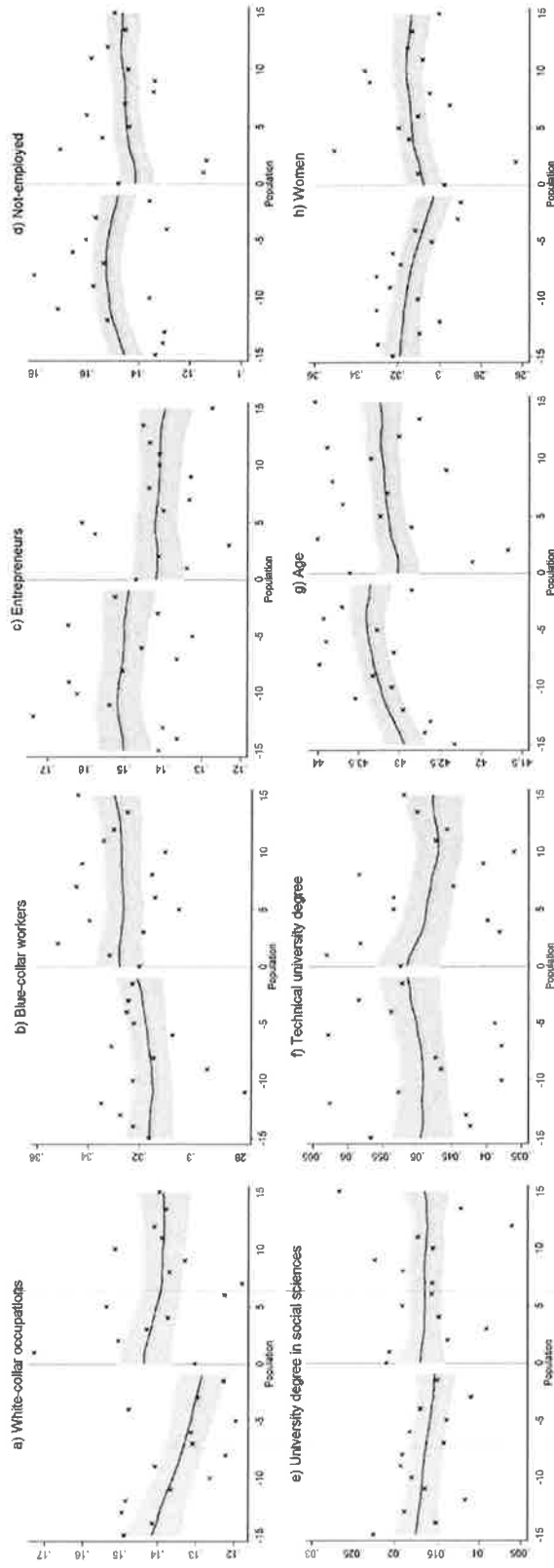
FIGURE A.6

Wage effects on the pool of non-elected candidates – adjusted for fixed effects



Notes: The figure displays characteristics of non-elected politicians against municipal populations in the proximity of the pooled wage thresholds. The grey-shaded areas are 95% confidence intervals.

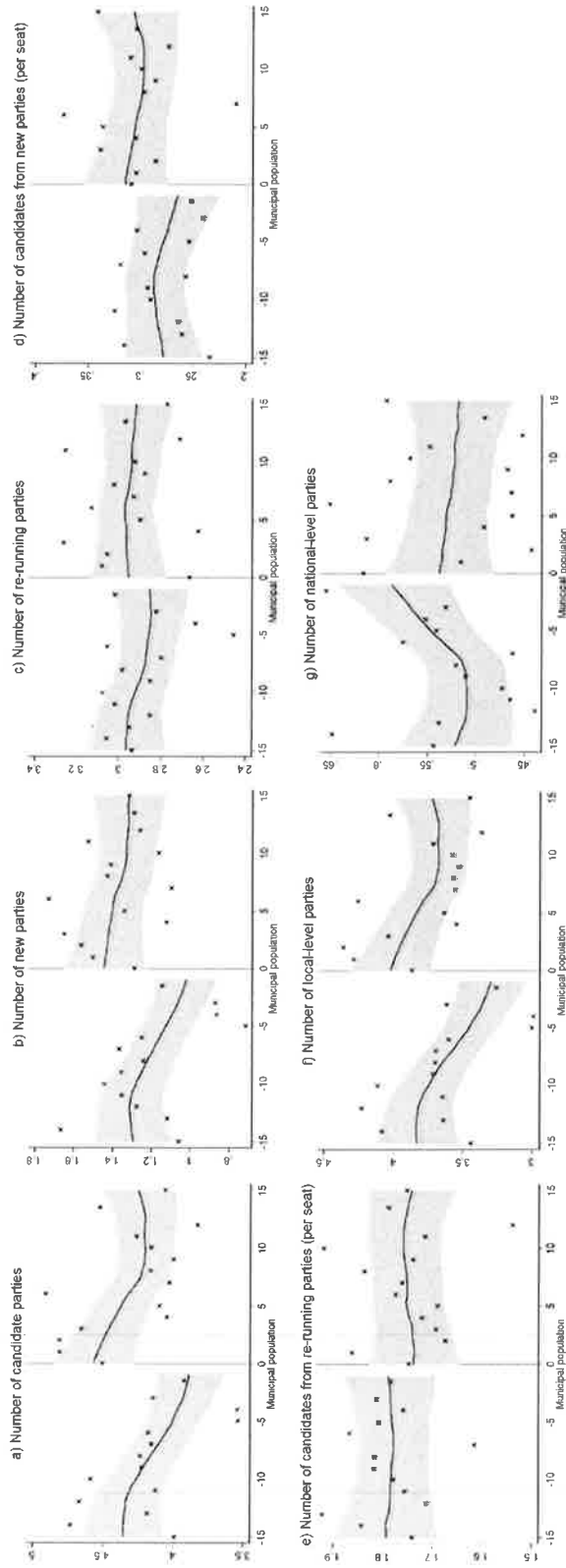
FIGURE A.7
 Wage effects on the pool of non-elected candidates – unadjusted for fixed effects



Notes: The figure displays measures of political selection against municipal populations. Each small cross represents the average value of the outcome in equally-sized population bins. The solid lines are the outcome variables smoothed by local polynomial smoothers separately to the left and right of the pooled population threshold, demarcated by the vertical line re-centered to zero. The grey-shaded areas are 95% confidence intervals.

FIGURE A.8

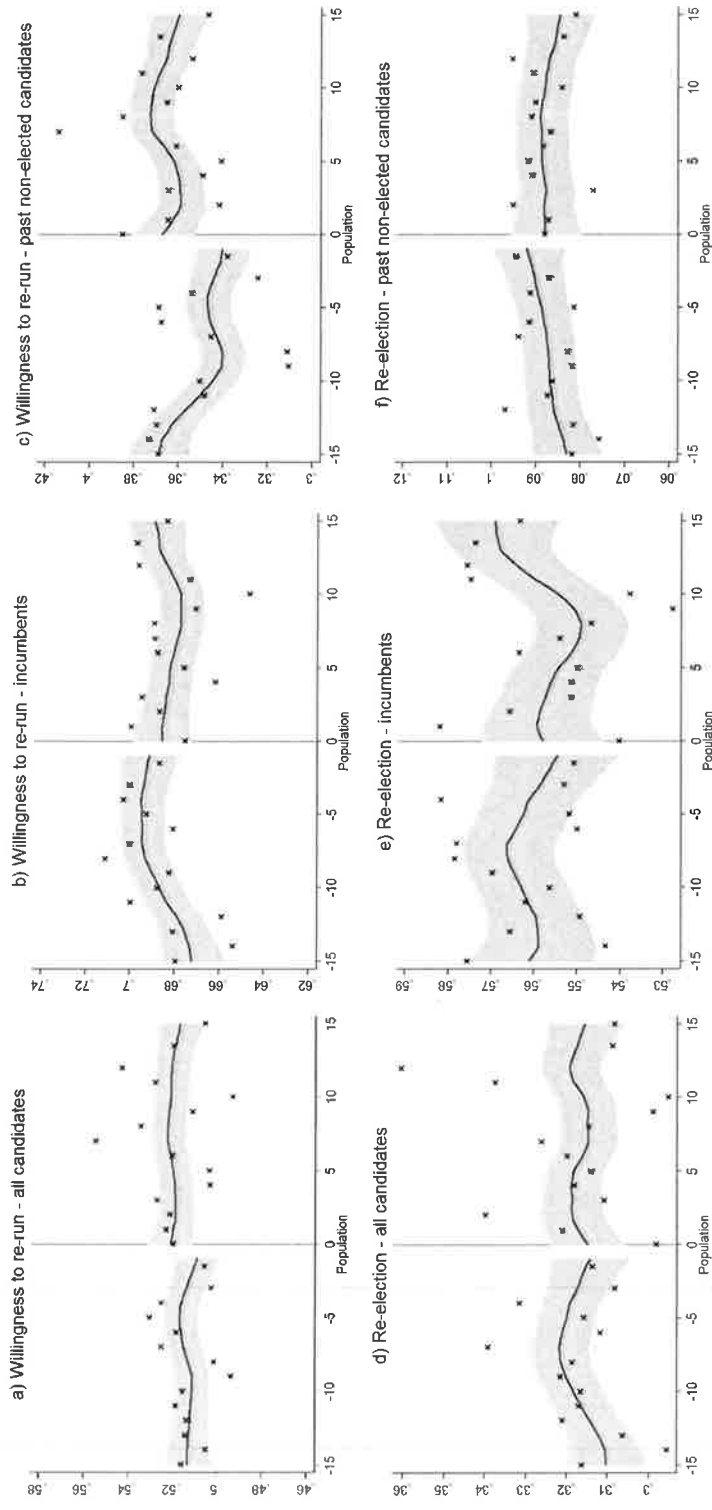
Wage effects on electoral competition – unadjusted for fixed effects



Notes: The figure displays measures of electoral competition against municipal populations. Each small cross represents the average value of the outcome in equally-sized population bins. The solid lines are outcome variables smoothed by polynomial smoothers estimated separately to the left and right of the pooled population threshold, demarcated by the vertical line at zero. The grey-shaded areas are 95% confidence intervals.

FIGURE A.9

Wage effects on the willingness to re-run and re-election – unadjusted for fixed effects



Notes: The figure displays candidates' willingness to re-run and re-election outcomes against municipal populations. Each small cross represents the average value of the outcome in equally-sized population bins. The solid lines are outcome variables smoothed by polynomial smoothers estimated separately to the left and right of the pooled population threshold, demarcated by the vertical line at zero. The grey-shaded areas are 95% confidence intervals.

TABLE A.1
Wage schedules for mayors, deputy mayors and regular council members

Time period (mm.yyyy):	Fixed part of salary			Cumulative bonuses for each 100 residents (CZK)						
	Mayor	Deputy mayor	Council member	Below 1000 residents	1000 – 2 999 residents	3000 – 9 999 residents	10 000 – 19 999 residents	20 000 – 49 999 residents	50 000 – 99 999 residents	Above 100 000 residents
03.2002 – 01.2003	18 920	13 720	8 860	900	135	50	34.6	15.6	5.6	4.8
02.2003 – 05.2004	20 250	14 680	9 480	963	144	53.5	37	16.7	6	5.1
06.2004 – 12.2004	21 260	15 410	9 950	1 011	151.2	56.2	38.85	17.54	6.3	5.36
01.2005 – 02.2006	22 770	16 500	10 660	1 083	161.9	60.18	41.6	18.78	6.75	5.74
03.2006 – 12.2006	23 910	17 330	11 200	1 137	169.99	63.19	43.68	19.72	7.09	6.03
01.2007 – 02.2008	25 110	18 200	11 760	1 194	178.5	66.4	45.9	20.7	7.4	6.3
03.2008 – 01.2009	26 370	19 110	12 350	1 254	187.4	69.7	48.2	21.7	7.8	6.6
02.2009 – 12.2010	27 425	19 874	12 844	1 304	194.9	72.5	50.1	22.6	8.1	6.9
01.2011 – 12.2013	26 054	18 880	12 202	1 239	185.2	68.9	47.6	21.5	7.7	6.6

Notes: Wages in the three largest cities of Prague, Brno, and Ostrava, are set according to a specific schedule. These cities are not used in the empirical analysis.

TABLE A.2**Continuity tests at electoral seat thresholds – quadratic control function**

	RDD estimate	SE on RDD estimate
White-collar occupations	0.023	[0.015]
- Managers	0.001	[0.008]
- Professionals	0.004	[0.008]
- Other white-collar workers	0.016	[0.011]
Blue-collar-workers	-0.005	[0.020]
Entrepreneurs	-0.010	[0.015]
Not-employed candidates	-0.019	[0.014]
University degree	0.010	[0.012]
- Technical degree	0.005	[0.009]
- Degree in social sciences	-0.004	[0.005]
Age	0.152	[0.498]
Women	0.013	[0.019]
National party affiliation	0.006	[0.015]
- Christian Democrats	0.002	[0.009]
- Civic Democrats	0.001	[0.006]
- Communist Party	0.008	[0.009]
- Social Democrats	-0.003	[0.007]
Observations	21,412	

Notes: RDD estimates are reported for a quadratic control function and bandwidth of 50 votes around the seat thresholds. Standard errors are clustered at municipality level. ***p<0.01, **p<0.05, *p<0.1

TABLE A.3**Number of candidates and municipalities close to population thresholds**

	2002 elections		2006 elections		2010 elections	
	# of municipalities	# of candidates	# of municipalities	# of candidates	# of municipalities	# of candidates
Population threshold	Bandwidth of +/-15 residents					
100	108	3,269	112	3,046	101	2,804
200	107	3,854	108	3,919	121	3,908
300	70	2,724	78	3,097	81	3,178
400	69	2,384	52	2,539	57	3,157
600	33	2,548	51	2,813	51	2,658
700	24	2,307	30	2,217	31	2,449
800	24	2,087	20	1,923	28	2,236
900	19	1,801	21	1,894	19	2,348
1,000	24	1,632	10	1,380	20	1,457
Total	478	22,606	482	22,828	509	24,195
Population threshold	Bandwidth of +/-30 residents					
100	204	5,937	219	5,825	201	5,391
200	196	7,257	202	7,286	218	6,959
300	153	5,746	139	5,993	156	6,392
400	139	4,632	106	5,281	128	6,335
600	63	4,872	98	5,731	112	5,747
700	45	3,916	60	4,512	67	5,083
800	37	3,898	43	3,597	52	4,223
900	38	3,184	46	3,680	41	4,259
1,000	44	2,620	31	3,164	31	2,984
Total	919	42,062	944	45,069	1,006	47,373

Notes: The figures refer to 2002-2010 electoral terms and omit the population threshold of 500 inhabitants, as it does not uniquely identify raises in politicians' wages.

TABLE A.4

Wage effects on political selection – quadratic control function

	White-collar occupation	Blue-collar workers	Entrepreneurs	Not-employed	University degree in social sciences	Technical university degree	Log (Age)	Women
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All candidates								
Log (wage)	0.828*** [0.245]	-0.536 [0.425]	-0.349 [0.305]	0.241 [0.287]	0.213** [0.096]	0.089 [0.236]	0.311 [0.258]	0.339 [0.347]
Obs.	86,510	69,629	69,629	69,629	78,462	74,185	74,185	74,185
Panel B: Elected candidates								
Log (wage)	0.716** [0.327]	-0.891** [0.454]	-0.568* [0.320]	0.271 [0.282]	0.212 [0.155]	0.045 [0.286]	0.432* [0.223]	0.059 [0.355]
Obs.	44,238	42,144	46,457	44,238	31,652	42,144	50,685	50,685
Panel C: Non-elected candidates								
Log (wage)	0.876** [0.353]	-0.238 [0.597]	-0.355 [0.447]	0.115 [0.381]	0.189 [0.128]	0.169 [0.227]	0.165 [0.380]	0.557 [0.526]
Obs.	35,827	33,449	33,449	42,578	38,217	51,368	42,578	35,827
Region FE	X	X	X	X	X	X	X	X
Threshold FE	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Bandwidth	CCT	CCT	CCT	CCT	CCT	CCT	CCT	CCT
Polynomial	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic

Notes: All entries report the coefficient for log wages from Eq. (1). Robust standard errors clustered by municipality are presented in parenthesis, ***p<0.01, **p<0.05, *p<0.1.

TABLE A.5

Incumbency effects on willingness to re-run and re-election

Subsample:	All candidates	Candidates with university degree	Candidates without university degree	Candidates from white-collar occupations	Candidates other than white-collar occupations	Candidates younger than 45	Candidates older than 45 years
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A – Dependent variable: Willingness to re-run (all past candidates)							
Incumbency	0.177*** [0.022]	0.259*** [0.076]	0.170*** [0.024]	0.167*** [0.055]	0.178*** [0.024]	0.244*** [0.032]	0.120*** [0.032]
Obs.	18,284	1,593	16,274	2,795	15,969	8,456	9,273
Panel B - Dependent variable: Re-election (all past candidates)							
Incumbency	0.174*** [0.020]	0.231*** [0.074]	0.169*** [0.022]	0.219*** [0.055]	0.166*** [0.022]	0.227*** [0.028]	0.138*** [0.031]
Obs.	18,446	1,576	16,455	2,592	16,099	8,386	9,300
Region FE	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X
Bandwidth	CCT	CCT	CCT	CCT	CCT	CCT	CCT
Polynomial	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic

Notes: The table reports coefficients for the binary indicator of political incumbency from Eq. (3) for different samples of candidates. Robust standard errors clustered by municipality are presented in parenthesis, ***p<0.01, **p<0.05, *p<0.1.

TABLE A.6
Specification checks – Wage effects on re-election (all past candidates)

	Re-election (1)	Re-election (2)	Re-election (3)	Re-election (4)	Re-election (5)
Panel A: Linear control function					
Incumbent	0.200*** [0.020]	0.200*** [0.020]	0.200*** [0.019]	0.232*** [0.028]	0.204*** [0.016]
Log(Wage)	0.476 [0.377]	0.415 [0.376]	0.430 [0.375]	0.194 [0.547]	0.379 [0.304]
Log(Wage)*Incumbent	-0.220* [0.122]	-0.179 [0.122]	-0.209* [0.117]	-0.304* [0.173]	-0.152 [0.099]
Obs.	13,334	13,410	13,432	6,740	20,032
R2	0.055	0.055	0.055	0.067	0.053
Panel B: Quadratic control function					
Incumbent	0.190*** [0.029]	0.197*** [0.028]	0.200*** [0.027]	0.215*** [0.040]	0.192*** [0.023]
Log(Wage)	0.468 [0.386]	0.516 [0.385]	0.428 [0.382]	0.390 [0.560]	0.405 [0.309]
Log(Wage)*Incumbent	-0.124 [0.184]	-0.219 [0.179]	-0.182 [0.161]	-0.309 [0.253]	-0.150 [0.142]
Obs.	13,334	13,410	13,432	6,740	20,032
R2	0.055	0.055	0.055	0.067	0.053
District fixed effects	X	X	X	X	X
Year fixed effects	X	X	X	X	X
Threshold fixed effects	X	X	X	X	X
Wage bandwidth (residents)	+/- 30	+/- 30	+/- 30	+/- 15	+/- 45
Incumbency bandwidth (votes)	+/- 75	+/- 100	+/- 150	+/- 100	+/- 100

Notes: The table reports estimates from Eq. (4). Robust standard errors clustered by municipality are presented in parenthesis, ***p<0.01, **p<0.05, *p<0.1.

TABLE A.7
Specification checks – Wage effects on willingness to re-run

	Willingness to re-run (1)	Willingness to re-run (2)	Willingness to re-run (3)	Willingness to re-run (4)	Willingness to re-run (5)
Panel A: Linear control function					
Incumbent	0.230*** [0.021]	0.233*** [0.021]	0.236*** [0.021]	0.254*** [0.029]	0.236*** [0.017]
Log(Wage)	0.917** [0.412]	0.874** [0.411]	0.909** [0.410]	0.663 [0.597]	0.687** [0.334]
Log(Wage)*Incumbent	-0.492*** [0.128]	-0.461*** [0.126]	-0.496*** [0.123]	-0.456** [0.178]	-0.378*** [0.105]
Obs.	13,334	13,410	13,432	6,740	20,032
R2	0.055	0.055	0.055	0.067	0.053
Panel B: Quadratic control function					
Incumbent	0.220*** [0.030]	0.218*** [0.029]	0.221*** [0.029]	0.258*** [0.041]	0.217*** [0.024]
Log(Wage)	0.832* [0.424]	0.836** [0.422]	0.788* [0.419]	0.798 [0.615]	0.634* [0.341]
Log(Wage)*Incumbent	-0.350* [0.187]	-0.420** [0.182]	-0.390** [0.167]	-0.480* [0.258]	-0.335** [0.146]
Obs.	13,334	13,410	13,432	6,740	20,032
R2	0.055	0.055	0.055	0.067	0.053
District fixed effects	X	X	X	X	X
Year fixed effects	X	X	X	X	X
Threshold fixed effects	X	X	X	X	X
Wage bandwidth (residents)	+/- 30	+/- 30	+/- 30	+/- 15	+/- 45
Incumbency bandwidth (votes)	+/- 75	+/- 100	+/- 150	+/- 100	+/- 100

Notes: The table reports estimates from Eq. (4). Robust standard errors clustered by municipality are presented in parenthesis, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix 2 – Reduced form estimates of wage effects on municipal budget outcomes

Data. The budget outcomes are available for the 2006-2010 period from the Ministry of Finance of the Czech Republic. These data include information about municipal revenue and expenditure categories and budget deficits.

Columns (1) and (2) in Table A.8 describe budget outcomes for all municipalities and for municipalities with fewer than 1,050 residents, respectively. The table indicates that municipal budget revenues mostly come from taxes (59.7%) and transfers from the central government (21.9%), which are not controlled by municipalities. Municipalities, however, can set local fees and tariffs or earn income from capital revenue, which respectively correspond to 12.6 % and 5.8 % of municipal budgets.

TABLE A.8
Summary statistics – budget outcomes

	All municipalities	Municipalities with ≤ 1,050 residents
	(1)	(2)
Total revenues (mil. CZK)	42.599	6.201
- Tax revenues (%) ^a	0.597	0.613
- Non-tax revenues (%) ^a	0.126	0.125
- Capital revenues (%) ^a	0.058	0.055
- Transfers (%) ^a	0.219	0.207
Total expenditures (mil. CZK)	42.490	6.014
- Education, health care, housing, and culture (%) ^b	0.401	0.379
- Industrial policy (%) ^b	0.240	0.248
- Social security and employment (%) ^b	0.016	0.005
- Public administration (%) ^b	0.302	0.325
Budget deficit (%) ^b	-0.062	-0.073

Notes: a) % of total budget revenues. b) % of total budget expenditures. 1 USD ≈ 20 CZK.

Regarding municipal expenditures, most of the budget is typically spent on public services, including education, health care, housing, and cultural events (40.1%), followed by public administration (30.2%) and industrial policies (24%). Municipalities run modest deficits, on average, of 6 % of their expenditures. Although municipalities in column (2) operate with smaller budgets, their budget composition is very similar.

RDD estimates. Table A.9 reports estimates of coefficient α_1 from Eq. (1) when the main categories of municipal budget revenues and expenditures as well as budget deficits serve as the dependent variables. The corresponding graphical evidence is provided in Figure A.10, which corrects the estimates for fixed effects for population thresholds and administrative districts. Figure A.11 visualizes the RDD estimates unadjusted for the fixed effects.

The estimates suggest that politicians with higher wages can influence the composition of municipal budgets, especially of budget revenues. Specifically, column (2) in Table A.9 shows that better-paid politicians lower the share of revenues from local fees, tariffs and other non-tax income (column 2). The share of capital revenues on the total municipal income also increases (column 3). The two effects are highly significant at least at the 5% level.

On the other hand, tax revenues (column 1), transfers from the higher levels of public administration (column 4) and other inspected categories of municipal expenditures (columns 5 - 8) do not seem to be affected by the remuneration of politicians. Likewise, we do not find statistically significant effects of higher wages on budget deficits (column 9).

Overall, our evidence suggests that higher wages can impact incumbents' performance relating to the real economic outcomes of municipalities. Yet, it is still unclear if the effects are driven mainly by the selection of politicians with better outside option on the labor market or greater re-election incentives of incumbents. In this study we do not distinguish between these two mechanisms of wage effects on in-office performance, as budgetary outcomes do not have a suitable counterpart among narrowly non-elected candidates.

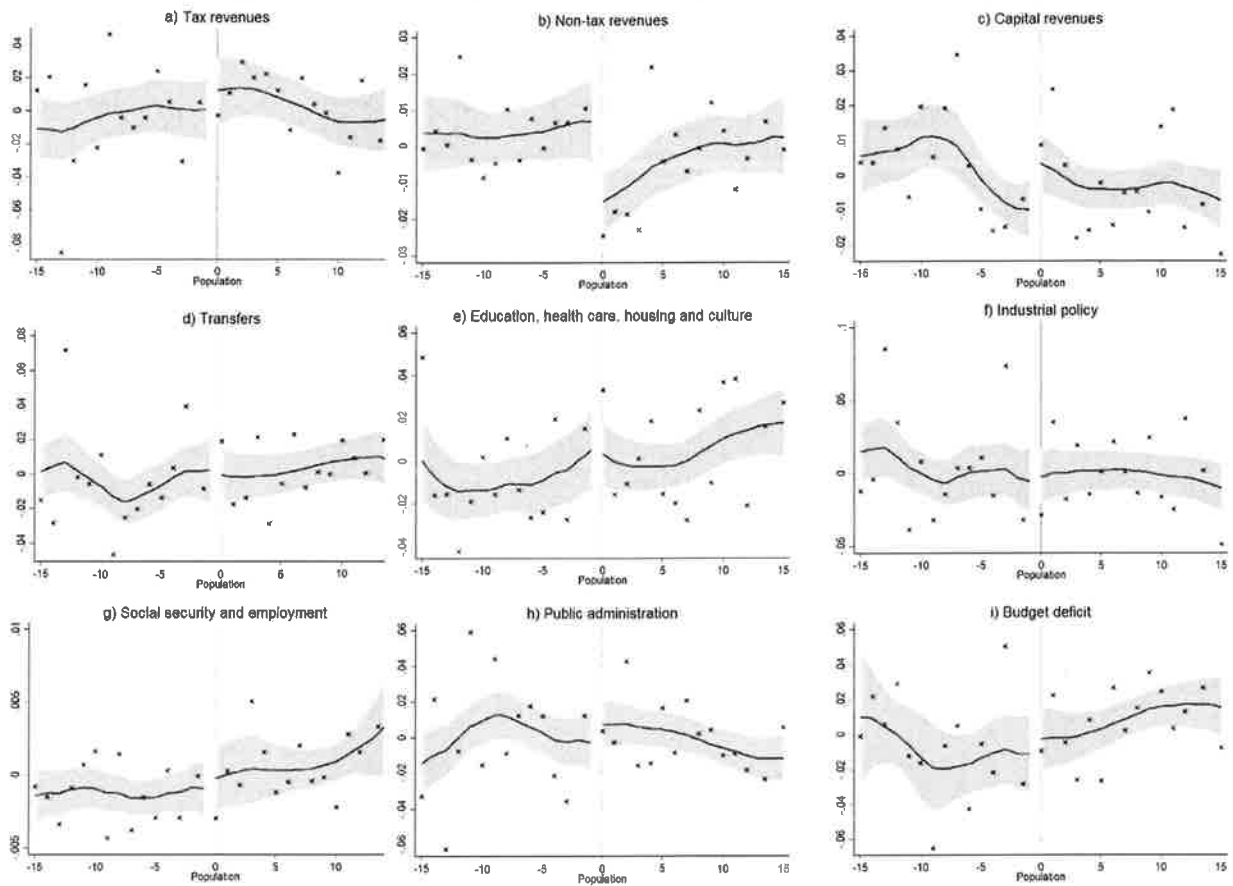
TABLE A.9
Wage effects on budget outcomes

	Budget revenues			Budget expenditures					Budget deficit ^b
	Tax revenues ^a	Non-tax revenues ^a	Capital revenues ^a	Transfers ^a	Education, health care, housing, and culture ^b	Industrial policy ^b	Social security and employment ^b	Public administration ^b	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log (wage)	0.581 [0.608]	-0.906*** [0.301]	0.778*** [0.280]	-0.452 [0.582]	-0.196 [0.562]	-0.137 [0.660]	0.029 [0.060]	0.550 [0.497]	-0.103 [0.744]
Polynomial	linear	linear	linear	linear	linear	linear	linear	linear	linear
Obs.	1,003	1,003	831	1,003	1,003	1,078	1,003	918	995
Log (wage)	0.398 [0.683]	-0.953** [0.386]	0.879*** [0.320]	-0.305 [0.619]	-0.186 [0.697]	0.020 [0.766]	0.000 [0.064]	0.605 [0.620]	-0.000 [0.905]
Polynomial	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic	quadratic
Obs.	1,575	1,410	1,484	1,803	1,410	1,484	1,718	1,325	1,325
Region FE	X	X	X	X	X	X	X	X	X
Threshold FE	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X
Bandwidth	CCT	CCT	CCT	CCT	CCT	CCT	CCT	CCT	CCT

Notes: a) Calculated as % of total budget revenues. b) Calculated as % of total budget expenditures. All entries report the coefficient for log wages from Eq. (1). The coefficients divided by 100 are average changes in the dependent variable associated with a 1% increase in wages. Bandwidths are chosen using an automatic CCT bandwidth selection procedure. Robust standard errors clustered by municipality are in parenthesis, ***p<0.01, **p<0.05, *p<0.1.

FIGURE A.10

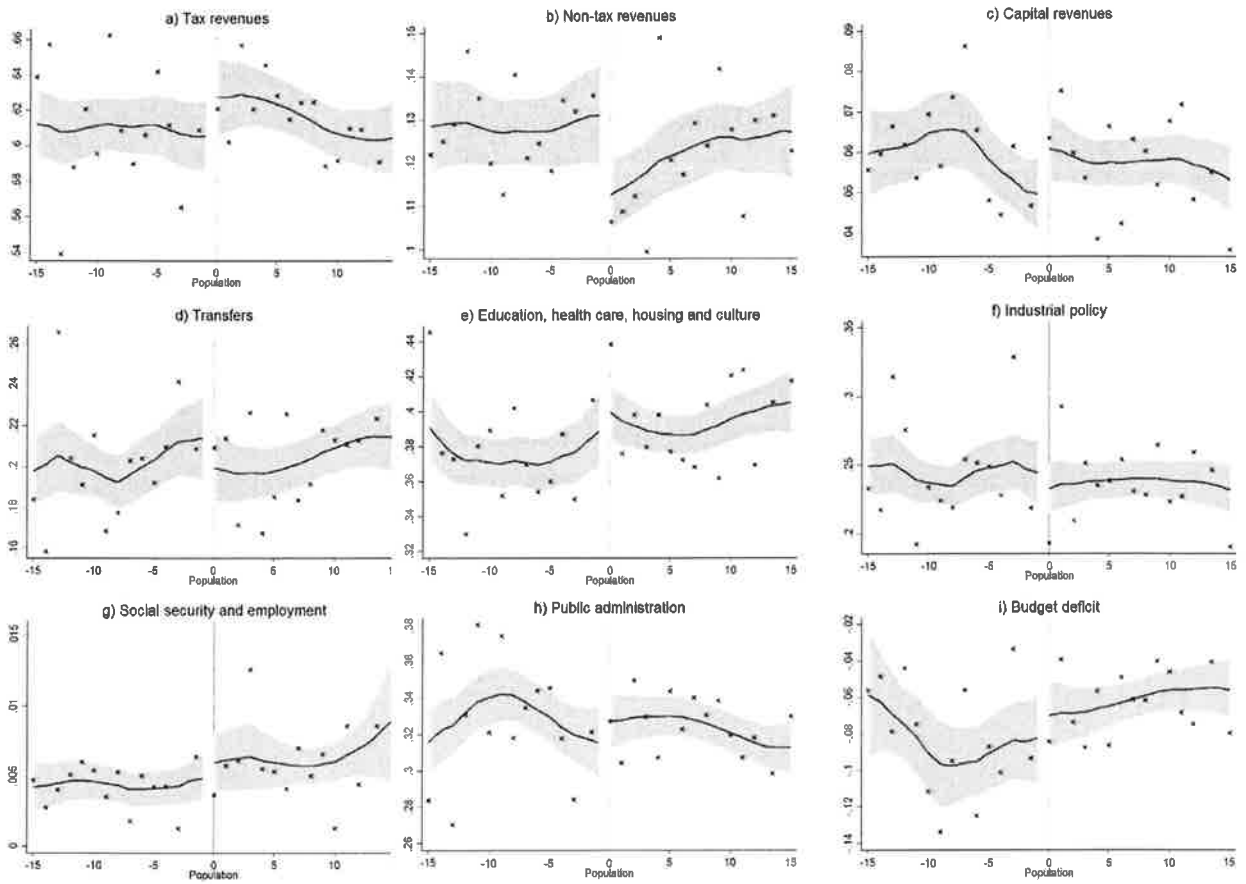
Wage effects on budget outcomes— adjusted for fixed effects



Notes: The figure displays budget outcomes against municipal populations using the methodology of Figures 4 and 5. The grey-shaded areas are 95% confidence intervals.

FIGURE A.11

Wage effects on municipal budget outcomes – unadjusted for fixed effects



Notes: The figure displays municipal budget outcomes against municipal populations. The grey-shaded areas are 95% confidence intervals.

Abstrakt

Jak ovlivňuje výše platů politiků šance na znovuzvolení? Platy mohou ovlivňovat jak selekci kandidátů do volební soutěže, tak snahu stávajících politiků o znovuzvolení. V této studii se zaměřujeme na oddělení efektu platů na selekci do politiky od efektu platu na snahu stávajících politiků o znovuzvolení. Používáme k tomu metod dvou regresních diskontinuit založených na dvou typech legislativních hranic. První typ určuje platové ohodnocení politiků podle velikosti místní populace a druhý určuje, kteří kandidáti jsou mezně zvoleni a kteří nikoliv. Zjišťujeme, že pokud na volebních limitech kontrolujeme pro selekci kandidátů do politiky, vyšší platy nezvyšují politikům šance na znovuzvolení. To ukazuje, že efekt platů na motivace snažit se o znovuzvolení je u stávajících politiků spíše slabý. Naše výsledky dále ukazují, že vyšší platy mnohem *méně* motivují znovu se ucházet o funkci ty kandidáty, kteří v předchozích volbách byli těsně zvoleni, než politiky, kteří v přechozích volbách mandát těsně nezískali.

Working Paper Series
ISSN 1211-3298
Registration No. (Ministry of Culture): E 19443

Individual researchers, as well as the on-line and printed versions of the CERGE-EI Working Papers (including their dissemination) were supported from institutional support RVO 67985998 from Economics Institute of the CAS, v. v. i.

Specific research support and/or other grants the researchers/publications benefited from are acknowledged at the beginning of the Paper.

(c) Ján Palguta and Filip Pertold, 2018

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical or photocopying, recording, or otherwise without the prior permission of the publisher.

Published by
Charles University, Center for Economic Research and Graduate Education (CERGE)
and
Economics Institute of the CAS, v. v. i. (EI)
CERGE-EI, Politických vězňů 7, 111 21 Prague 1, tel.: +420 224 005 153, Czech Republic.
Printed by CERGE-EI, Prague
Subscription: CERGE-EI homepage: <http://www.cerge-ei.cz>

Phone: + 420 224 005 153
Email: office@cerge-ei.cz
Web: <http://www.cerge-ei.cz>

Editor: Byeongju Jeong

The paper is available online at http://www.cerge-ei.cz/publications/working_papers/.

ISBN 978-80-7343-437-3 (Univerzita Karlova, Centrum pro ekonomický výzkum a doktorské studium)
ISBN 978-80-7344-485-3 (Národohospodářský ústav AV ČR, v. v. i.)