Patronized Agents:

Workfare and Clientilism in Hungary *

Attila Gáspár† Győző Gyöngyösi‡ Balázs Reizer§

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Abstract

Conditional government transfers to citizens distributed at the local level can turn elected, independent local elites into clientelistic vote brokers of the party controlling national government. We present this idea in a simple model and test its predictions using a large workfare program in Hungary. We show suggestive evidence that workfare is more prevalent in places where the ruling party (Fidesz) needs more votes ex ante, and quantify the total electoral impact of the workfare program during the 2014-2019 national and local election cycles using difference-in-differences and instrumental variables strategies. Our model gives a testable prediction to discern clientelism (exchange of political support for alienable private benefits) from electoral politics as usual. In the first case political support

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†KRTK-KTI, University of Padua, email: attila.gaspar@unipd.it

‡Leibniz Institute for Financial Research SAFE, email: gyongyosi@safe-frankfurt.de

§KRTK KTI, email: reizer.balazs@krtk.mta.hu

is conditional on the threat of losing the private benefit, in the latter it is not. RDD evidence confirms the presence of clientelism in the Hungarian workfare program: public work only increases the vote share of the party in national government when the government can credibly threaten local elites (independent mayors) with taking away their benefits.

1 Introduction

The decentralization of political power brings politicians closer to voters. It allows politicians to better assess voters' preferences and voters can more easily observe local politicians actions, which allows citizens to hold elected officials accountable.[1] Although decentralization is aimed at enhancing local politicians accountability to citizens, this downward accountability may break down under weak institutions if local politicians have to respond to the incumbent national party, leading to patronage and clientelism. Understanding the behavior of a local politician and the two-way arrangement with national politicians and voters is key in analyzing inefficiency under clientelistic systems. Evidence is still limited on how vertical relations between politicians in a decentralized setting can be shaped by clientelistic politics.

In this paper, we study how reversible government transfers can induce clientelism and turn elected, independent mayors into vote brokers of the incumbent national party. We develop a model where the government allocates reversible transfers between municipalities and gives local mayors the right to select transfer recipients. The reversibility allows both the government and mayors to give the transfer conditional on political support. Assuming that mayors are better at monitoring voters' behavior, a two-layered clientelistic network can form. At the national level, the central government exploits the re-election concerns of mayors and provides the transfer to mayors before local elections in exchange for political support in national elections. At the local level, the mayor exploits the vulnerability of voters and selects transfer recipients in exchange

[1] See for example Alderman (2002); Galasso and Ravallion (2005); Alatas et al. (2012)

for political support in national and local elections.

We test the model predictions using a large-scale welfare reform, which reduced the number of weeks one can receive unemployment benefit and scaled up a public work program. The allocation of public work quotas across municipalities was mostly determined by the government while at the local level mayors decided about participation. Using monthly administrative data on public work, we show that the government increases the number of public workers before national and local elections and public workers are more likely to vote for the incumbent party and local mayor. Exploiting exogenous variation in the allocation rules across municipalities, we use spatial RDD to show that when receiving public work quota unconditionally, the political support for mayors increases while it does not increase the support for the incumbent national party, consistent with a clientelistic relationship between local and national politicians.

Our model provides a test to discern clientelism from electoral politics-as-usual: workfare leads to more votes in any case if there is no clientelism but participants like the program; under clientelism it only leads to more votes for the players who have leverage over the others. Spatial regression discontinuity evidence is consistent with the second explanation (clientelism): public work that is given to microregions unconditionally does not generate votes for the party in government (they have no leverage over the mayor because the program is unconditional), but it generates votes for the mayor (who still has full discretion on whom to employ, so has leverage over voters).

In the second section we develop a model of clientelism with incomplete information. In this setting the patron is the party in government seeking re-election, the intermediary is the independent mayor who distributes public work and seeks re-election herself, and the client is the jobless voter who has to rely on public employment. The mayor depends on the central government for public work quotas, and the voter depends on the mayor for getting an individual job. The mayor can exert costly effort in both elections to punish

workfare recipients who do not vote for the ruling party (in national elections, which take place first) and for herself (in local elections, which take place second). This effort is unobserved, so the government will condition sustained access to workfare before local elections on ex-post national election results.

The first prediction of our model is that workfare should benefit the central government and the mayors at the ballot box if participation in the workfare program can be made contingent on voting outcomes. The second result shows how the emergence of clientelism depends on the models parameters, among them the scope for excluding non-cooperative mayors and voters from public work. We show that the incentive to engage in clientelism increases in the probability of exclusion if caught non-cooperating; we will use this to discern if political support is gained through the popularity of the public work program, or the threat of exclusion from it (which is clientelism).

In the third section we describe the institutional background, our data sources, and show anecdotal evidence that public workers are exploited for political support. We also present descriptive evidence showing that public work is distributed strategically to places where Fidesz needs votes the most. Moreover, mayors of settlements where Fidesz over-performs at the national elections receive more public work quotas before subsequent mayoral elections.

In the fourth section we discuss the main empirical results. We use unique, high frequency administrative data that shows that Fidesz benefits from the public work program in national elections, while mayors benefit from it during local elections. The local elections happen after the national elections so the amount of public work received in a settlement at local elections can be made contingent on political support. Difference-in-differences estimates suggests that settlements where the public worker to population ratio was 1 percentage point higher, Fidesz gained 0.21 percentage points more votes on average in national elections, and mayors gained additional 0.25 percentage points. We argue that these estimates are a lower bound, as popular demand

for workfare is negatively correlated with unobserved economic shocks. Instrumenting public work intensity with the lagged level of mayoral competition (which we interpret as variation in individual mayors incentive to cooperate with the central government), we find that an additional percentage point of public worker share translates into an additional percentage point of Fidesz votes. Back-of-the-envelope calculations suggest that Fidesz would not have obtained a constitutional supermajority either in 2014 or 2018 without the workfare program.

In the fifth section we explicitly test for the presence of clientelism. One third of all public work quotas is allocated based on a policy rule: if the development index of the subregion of a settlement is below the national average of the same development index, the settlement is entitled to receive extra public work quotas. Before the 2014 national and local elections this created a spatial discontinuity in the amount of public work received by settlements at the borders of subregions below and above the national average. Importantly, the mayor did not have to negotiate with government officials for these public worker jobs; it was allocated to her settlement exogenously. In accordance with theoretical predictions, we find that when public work is allocated to settlements through exogenous rules independently from election results, it does not lead to increased support for Fidesz. We argue this happens because the central government cannot threaten the mayor with taking away her public work quota. However, even then it generates support for the mayor as she can threaten individual public workers with the loss of their livelihoods. This strongly suggest that the main channel through which the public work program generates political support is clientelism.

The paper contributes to the literature on clientelism, or voter mobilization through targeted and contingent benefits (Hicken, 2011; Robinson and Verdier, 2013; Bobonis et al., 2019; Fergusson et al., 2020). We know empirically that welfare spending of the central government can decrease the vulnerability of poor voters; in contrast, it can also crowd out local clientelistic networks (Manacorda et al., 2011; Labonne,

2013; Bobonis et al., 2017; Frey, 2019). The role of intermediaries in vote brokering has also been studied extensively (Foucault et al., 2008; Finan and Schechter, 2012; Pop-Eleches and Pop-Eleches, 2012). We add to this literature by analyzing the behavior of voters, intermediaries and patrons in the same theoretical framework, and showing under what incentive structure can they maintain this type of cooperation under informational asymmetries. We also accommodate two seemingly contradictory findings in the previous literature: that central government spending is negatively associated with clientelism locally, but positively with clientelism nationally. We also show clearly identified empirical evidence that distinguishes between the electoral impact of clientelism and the electoral impact realized through the popularity of the social program.

contribution relative to Bardhan and Mookherjee (2012)

We also contribute to the vast literature of active labor market policies (see Card et al. (2018) for a recent review). A puzzle of this literature is that although direct job creation has been consistently shown to be the least effective form of active labor market policies (Card et al., 2010; Kluve, 2010), it still remains a very popular tool in the hands of policy makers. Once the electoral impact is taken into account, this should not be very surprising after all.

2 The model

2.1 Voters and welfare

We build on the clientelism model of Bardhan and Mookherjee (2012). Clientelism is the exchange of political support (votes) for private goods offered by politicians. This model looks at how the policy bundles offered by politicians differ with and without clientelism and how they relate to the welfare optimal allocation. This model allows for k voter groups and a bundle of m elements. We first simplify it to have two only goods:

one public (consumed by all voters) and one private (which is targetable); and to have two voter groups: the Poor and the Rich. The single private good is public work (i.e. participation in the workfare program), and it only gives positive utility to the Poor. For the sake of simplicity, we also simplify political competition at the national level. There is a Party in Government (G) who is running for re-election, and wants to maximize its re-election probability (its expected vote share). We assume away the policy platforms of the opposition candidate; these are incorporated in the random shocks to the popularity of G. Thus the re-election probability of G is fully characterized by its policies and the random shocks to its popularity.

Next we enrich this setting with an agency problem: for clientelism to happen, the principal (the Party in Government) needs an agent (the Mayor) to exert costly effort on its behalf. We do this to show what are the conditions under which clientelism is sustained in equilibrium.

The electorate consists of two groups (indexed by i): the Poor ($i = 1$) and the Rich ($i = 2$). Let μ_i denote the population share of group i. There are two policy dimensions: a common public good g, and a private good (workfare participation). Let q_i be the share of group i who receive workfare from the government. Group i voter's expected utility from the policy bundle is:

$$W_i = q_i v_i + V_i(g),$$

where v_i is group i-s valuation of workfare, and $V_i(g)$ is the group's (concave, increasing) utility from public services. We assume that $v_2 = 0$, so Rich voters derive no utility from workfare. From this also follows that $q_2 = 0$.

Let's assume that the government has a fixed budget (A) that can can be spent on the electorate, that workfare has a fixed unit cost of t, and that the level of public services (g) is continuous and has a unit cost of 1. Then the budget constraint of the government can be expressed as

$$\sum_i \mu_i q_i t + g = A.$$

Since $q_2 = 0$, a policy allocation is the vector $\{q_1, g\}$ with $g = A - \mu_1 q_1 t$, so the share of the Poor who receive workfare (q_1) in practice fully characterizes the allocation.

The utilitarian planner would maximize total utility, weighting each group's utility with their share in the population:

$$\max_{q_1} \ \mu_1 \left(q_1 + V_1(A - \mu_1 q_1 t)\right) + \mu_2 V_2(A - \mu_1 q_1 t)$$

In the optimal allocation the marginal utility of the Poor from workfare equals the population weighted marginal utilities from public service provision:

$$\frac{v_1}{t} = \mu_1 \frac{\partial V_1}{\partial g} + \mu_2 \frac{\partial V_2}{\partial g} \tag{1}$$

This implicitly pins down the optimal level of g^*, from which q_1^* can be calculated.

2.2 The allocation problem under elections

An individual voter has two motives to vote. The non-instrumental motive represents the political preference for the policy platform of the Party in Government (G). This is the intrinsic value of voting for a candidate of one's choice. The instrumental motive means that the election outcome can directly enter voter utility through the decisions of the winner. For example, if a winner can punish those who did not vote for them, this creates an instrumental motive for voting as opposed to the more "abstract" non-instrumental political preference. One may want to vote for a candidate who supports public work because they also like the abstract idea of workfare; another voter may want to vote for the same candidate because of the threat of $losing$ workfare they already have. Clientelism

operates through the instrumental motive. The weights of the two motives are θ and $(1-\theta)$ in our model.

Consider a workfare-recipient Poor voter. If the voter votes for G and G is reelected, the voter will have workfare with probability q_1. However, if the voter did not vote for G and G is reelected, non-cooperating workfare recipients will be excluded from workfare with probability z, so the expected probability of retaining workfare is $q_1(1-z)$. Consequently, the instrumental utility will depend on the ex ante assessment of the voter that G would win the election, which we denote by γ. The total impact on instrumental utility of voting for G is thus $\gamma z q_1 v_1$.

We assume that a voter votes for G if their expected utility from choosing G exceeds a random utility shock ϵ_i which incorporates their personal preferences and the exogenous popularity of the opposition party. We do not model opposition policy choices beyond this. So voter i votes for G if the weighted average of her evaluation of the policy platform of G and the potential threat of being excluded from workfare exceeds a random threshold:

$$\theta\left(V_i(g)+q_i v_i)\right)+(1-\theta)\left(\gamma z q_i v_i\right)>\epsilon_i.$$

We assume that popularity shocks ϵ_i are both distributed uniformly, but we let their parameters differ for the Poor and the Rich capturing that one of the two groups might be more likely to swing either way in the elections (the one that has higher σ_i). The mean values of the shocks are l_i, the densities are σ_i, the ranges are $1/\sigma_i$. Since $v_2 = 0$ and consequently $q_2 = 0$, the Rich voters do not have an instrumental motive to vote, so the probability of voting for the government (π, which equals the expected vote share $E[s]$) is given by

$$\pi = E[s] = \kappa + \mu_1\sigma_1\left(\theta\left(V_1(g)+q_1 v_1)\right)+(1-\theta)\left(\gamma z q_1 v_1\right)\right)+\mu_2\sigma_2\theta V_2(g), \tag{2}$$

where $\kappa = 1/2 + \sum_i \mu_i \sigma_i l_i$ is the baseline probability of winning that is coming from the relative popularity of G disregarding its policy platform. The goal of G is to maximize this vote share in the election.

Lemma, from Bardhan and Mookherjee (2012): In this setting G will provide less public services and more workfare if clientelism is possible, compared to both the welfare-maximizing allocation (where a benevolent dictator decides over the policy bundle, exclusively considering voter utility). and the allocation under elections without clientelism (where the only motivation to deviate from the welfare-maximizing allocation is that some voters are more likely to swing their votes than others, see the Appendix A for details).

$$(q_1^{*,O} <) q_1^{*,E} < q_1^{*,C}.$$

2.3 Clientelism with a principal-agent problem

Assume now that there are two separate elections: a national, and a local. National elections come first, but during both elections only another player, the mayor can enforce clientelism. This means that in our model z is a choice variable of the mayor (henceforth called M). She decides whether to monitor/coerce voters before any election. If M pays an exogenous cost $c > 0$, she can set $z = \overline{z} > 0$; if she decides not to, $z = 0$ and voters are neither monitored nor coerced.

M has an incentive to co-operate with G, because the amount of workfare received has an impact on her own re-election probability $m(q_1)$, which which we assume to be strictly increasing and concave in q_1.

If M could commit to a cooperation decision openly, then G would set $q_1 = q_1^{*,C}$ if M paid the cost, while $q_1 = q_1^{*,E}$ if she did not. We assume, however, that this decision is not observed by the central government. Instead, the game proceeds as follows:

1. G decides whether to co-opt the mayor or not. If it co-opts, then it sets $q_1 = q_1^{*,C}$ and announces $\underline{s}$ minimum required vote share during national elections. If G does not co-opt, it sets $q_1 = q_1^{*,E}$.

2. If co-opted, the mayor decides whether to cooperate (pay the effort cost and engage in clientelism during national elections for G's sake).

3. National election is held.

4. If the vote share of G is above the threshold $\underline{s}$, nothing happens, G maintains the level of public work allocated to the town until the mayoral elections. If the vote share falls below $\underline{s}$, the amount of public work allocated to the town is cut back to $q_1 = q_1^{*,E}$ as a punishment meted out against M. [2]

5. M decides whether or not to engage in clientelism during mayoral elections.

6. Mayoral election is held.

To characterize the conditions under which clientelism happens in this setting, let's introduce two probabilities, which are endogenous variables of the model. Let p_H denote the probability that M gets punished before her own election given she has not cooperated. Let p_L denote the probability that she gets punished in case she has cooperated with G ($p_H > p_L$). We call the difference $p^H - p^L$ *incentive efficiency*: the higher is the difference between the chance of getting "punished" when "guilty" and the chance of getting "punished" when "innocent", the more likely that the prospect of punishment deters from non-cooperation.

Proposition 1: the condition for clientelism. G and M will engage in clientelism

[2] It is not cut back even further, because that would mean hurting some voters who would have voted for G even without clientelism. This cut back might hurt re-election probability of G in an (unmodeled) future election.

during national elections if

$$c < (p^H - p^L)\left(m(q_1^{*,C}) - m(q_1^{*,E})\right). \tag{3}$$

This means that the mayor is ceteris paribus more likely to engage in clientelism on behalf of the party in government

1. when incentive efficiency is higher,

2. and when public work has a higher marginal impact on mayoral races.

Proof: We solve the game by backward induction. For the sake of simplicity we assume that the mayor always wants to engage in clientelism for her own sake.[3] How about national elections? Cooperation with G is optimal for M if her expected re-election probability under cooperation is higher than under non-cooperation, net of the cost of clientelism:

$$p^H m(q_1^{*,E}) + (1 - p^H) m(q_1^{*,C}) < p^L m(q_1^{*,E}) + (1 - p^L) m(q_1^{*,C}) - c$$

Rearranging this results in Inequality 3. The mayor cooperates if the cost of cooperation is smaller than the product of two terms: incentive efficiency (the probability of being caught if not co-operating voters minus the probability of looking uncooperative when in fact the mayor had been coercing voters) and the marginal impact of clientelism on mayoral elections.

Corollary: no clientelism without negative incentives. If $p_H \leq p_L$ the mayor will not engage in clientelism as Inequality 3 does not hold. This will be the case when $p_H = 0$ (for any reason G cannot take away public work from M).

[3] If the mayor does not want or need clientelism in her own election, she cannot be punished for not cooperating with G through taking away public work, so she will not be co-opted by the government. This would be the case if any of v_1 or μ_1 were sufficiently low (there are few poor people and/or they value workfare less), or if there is a high enough baseline popularity for M. This is also the case if c is prohibitively high, because of high transparency of public life or because the mayor personally dislikes clientelism.

Proposition 2: the determinants of incentive efficiency. Incentive efficiency is monotonically increasing in μ_1, σ_1, γ, z, $1-\theta$ and ν_1, so mayoral cooperation with G is more likely in the following cases: if the share of Poor is higher; if their vote is more likely to swing; if G is ex-ante perceived as more likely to win the national election; if non-cooperative voters are more easily excluded; if instrumental voting is relatively more important; and if Poor voters value workfare more.

Sketch of the proof: The Party in Government wants to maximize the difference between p^H and p^L as this ceteris paribus makes a mayor more likely to cooperate (by Proposition 1). It can do this by setting $\underline{s}$, as p^H (p^L) is the probability that the actual vote share falls below the threshold vote share $\underline{s}$ without (with) cooperating with G.

Let's denote the expected vote share as π^C if the mayor cooperates, and π^{NC} if the mayor does not. These are given by substituting $z = \overline{z}$ or $z = 0$ into Equation 2, respectively. Then p^H is given by $p^H = Pr\left(s < \underline{s} | E(s) = \pi^{NC}\right)$ and p^L is given by $p^H = Pr\left(s < \underline{s} | E(s) = \pi^{C}\right)$. We can calculate the limiting values of these expressions using the central limit theorem.

From this we can calculate the optimal $\underline{s}$ for G, which is a weighted average of π^C and π^{NC}, in a way that the optimal $\underline{s}$ is closer to π^{NC} if π^{NC} is low, and closer to π^C if π^{NC} is high. The maximized $p^H - p^L$ value is monotonically increasing in the product

$$\mu_1 \sigma_1 (1-\theta) \gamma \overline{z} q_1^{*,C} \nu_1.$$

Since all of the parameters are positive, the product is an increasing function of all parameters.

3 Background, data and descriptives

3.1 Political context

National elections are held in the spring of every four years since 1990; mayoral elections were held in the fall the same years until 2014, then in the fall of every 5th year starting from 2019. National elections were won by alternating right and left coalitions until 2010 (the right won in 1990, 1998 and 2010;the left won in 1994, 2002 and 2006).

Table 1 summarizes the national election results. In 2010 the then-center right party Fidesz won a supermajority (2/3 of all seats) in parliament which allowed them to transform the political system fundamentally. In 2011 they changed the constitution and the election system. The electoral system was made increasingly majoritarian and constituencies were gerrymandered to favor the incumbent. The ruling party have been extending its control over the media, the judiciary, and state resources.[4] The new institutional framework ensured that Fidesz won a supermajority of the seats again in 2014 and 2018 with securing the plurality of the votes.

Under both the pre-2011 and post-2011 voting rules voters cast two votes in national elections, one for a party list, and the other for an individual candidate in their constituency. Party lists have to get 5% of the valid vote casts to gain seats, while constituency seats are allocated on a first-past-the-post basis. The constituency voting represents the majoritarian side of the election process, while the party lists bring in an element of proportionality. An important feature of the election law enacted in 2011 is the compensation of parties that win constituency seats. Every vote cast in the constituency arm of the elections that did not earn a seat (ie. that is above the number of votes cast for the runner-up) is added to total number of votes gained on party lists as a "fragmentary vote". The consequence of this is that a party has an incentive to maximize its votes in any

[4] See Freedom House (2018); Bozóki and Hegedűs (2018); Bogaards (2018) for a discussion on democratic backsliding in Hungary; Szeidl and Szucs (2021) discuss the case of the media.

given constituency rather than getting 50%+1 of the valid votes cast. Mayors are elected through a first-past-the-post system local elections that take place independently from national elections at a different time in the fall.

Figure 12 plots the timeline of the reforms and the elections. Fidesz won supermajority in 2010; then implemented election reform and benefits reform in 2011. National elections took place in April 2014 and 2018; mayoral elections took place in October 2014 and 2019.

3.2 Public work program

The origin of the PW program. Workfare has been around since the late 2000s. Individuals who lost their jobs were eligible for unemployment benefit depending on their work history. When they ran out of unemployment benefit eligibility, they would either receive a means tested welfare subsidy or could enroll in public work (PW). The PW program was financed by the central government. This was not a job guarantee program then, and neither it is now. The number of PW jobs has always been lower than the number of eligible workers, and there has been no obligation to hire the unemployed; also, workfare recipients could be fired at will at any time. vagy

Until 2009, the PW programs were mostly centrally organized and PW was not a dominant element of active labor market programs. As Figure 10 in the Appendix B shows the average number of PW workers was 60 thousand compared the total number of 350 thousand registered unemployed. The PW program initially aimed to provide short term support to unemployed who were not eligible for unemployment benefit and it was not politicized (Bördős, 2015). In the wake of the Great Recession the Socialist government increased PW funding. As a result, the number of public workers increased to 170 thousand in 2010. Organization of the program was decentralized to the municipal level.

The PW program under Fidesz. The new Fidesz government in 2010 did not change the unemployment insurance and PW rules significantly until September 2011. The prime minister then announced that the government will "provide job to everybody who is able to work". In practice this meant that the unemployment benefit and the welfare eligibility rules became stricter and the number of PW jobs increased significantly.

The government created two main PW programs: long term PW programs[5] and Start PW programs. These two programs covered 80% of all public work.

Long term public work was organized mainly by the mayor and local governments. This meant that the mayor had to claim funds from the local office of the central administration. Having received the public work quota she then had full discretion over whom she would employ and what workers' duties would entail. There is no statistical data collection on what public workers are actually doing in their working hours; in the Appendix B we review some of the anecdotal evidence on how the timing of the individual public work contracts and the organizational tinkering of some sub-programs suggested a political motive from the get-go.

The Start program sightly differed from the other programs as it did not only aim to support the unemployed but also to develop small villages with adverse labor market conditions.(Ministry of Interior, 2020) To support this goal, the Start program did not only cover the wage bill of PW workers but municipalities could also apply for some basic investments as well (e.g. buying machinery). Furthermore, the Start program only targeted villages in "disadvantaged microregions"(Bördős, 2015). Microregions (i.e. NUTS-4 regions) were ordered based on a continuous "complex development index" calculated by the Hungarian Central Statistical office. A microregion were considered to be disadvantaged if its development index was below the national average. We exploit this allocation rule by using a geographical regression discontinuity design in Section 5. We compare villages that are located at the border between disadvantaged and not

[5]The long term program started in 2012. Its predecessor in 2011 was called "short term PW program". In that year, the maximum length of PW contracts was restricted to 3 month but it was renewable in practice.

disadvantaged regions.

The remaining 20 percent of PW jobs were was part of the "national PW program". In this scheme the central government specified a quota of public workers to be hired by state owned corporations.(Molnár et al., 2019)

3.3 Local politics and clientelism

Local government reform in 2011 substantially increased the power of mayors vis-à-vis local state officials and city councils, while reduced the scope for setting local policies and increased their dependence vis-à-vis the central government (Dobos and Papp, 2017). The mayor's power also increased relative to voters, especially in small, rural settlements, as the change of labor code in September 2011 substituted normative welfare payments with workfare in temporary public employment.

Being both selective and reversible, public work is an ideal policy for maintaining clientelistic relationships (Robinson and Verdier, 2013). In line with this, there has been ample anecdotal evidence that public work is not only used as a substitute for unconditional welfare payments, but also as a bargaining chip for recruiting voters for the mayor and Fidesz. Mares and Young (2018) and Mares and Young (2019) show survey evidence that mayors used access to the public workfare program both as a promise and a coercive tool for persuading prospective voters to vote for Fidesz. Their interview respondents mentioned that participation in public works was directly conditioned on "X on the ballot [being] placed in the right spot" (quote from an interview, see p. 452 Mares and Young (Mares and Young, 2019)). The authors argue that mayors act as brokers for the ruling party in national elections. They are efficient in mobilizing, because they control a network of state employees, and have access to information of political attachment of citizens Mares and Muntean (2015). This is also well-documented by Hungarian journalists and NGOs.[6] One investigative journalist worded this very clearly:

[6] See page 22 in Gyulai (2017) for an overview in Hungarian.

"Mayors of small towns are by and large vassals, political vassals, who are responsible to the Member of Parliament for keeping things in order."[7]

Figure 15 in the Appendix shows that until 2010 competitiveness of local elections has shown broadly similar trends in small and large towns, while small-town mayoral elections have become significantly less competitive since. Small towns and villagers are where public work is the most prevalent and where residents have the worst outside options and the least amount of bargaining power vis-à-vis the mayor.

A decline in competition is not necessarily driven by increased entrenchment of incumbents; one could argue that being a mayor has simply become less desirable over time, and the supply of mayors is elastic. If this were the case, we should see the number of people running for office responding sharply to variation in the incentives. In Appendix Figure 16 we show, using large, discrete jumps in mayoral compensations that were introduced in 2011 that this is hardly the case. For example, a mayor who is elected in a village that has 501 inhabitants will earn 33% percent more than the mayor who is elected in village that has only 499; yet we see no jump in the number of people running for mayor at the cutoff.

3.4 Data sources

We build a municipality level database that combines information from many data sources.

Public employment. We obtained settlement-month level data on the number of public workers from the ministry of the interior for the period after 2010. Data on previous time periods comes from the T-STAR database. The T-STAR is a yearly database of diverse settlement level statistics compiled by the Central Statistical office of Hungary (KSH).

[7] "A kistelepülések polgármesterei gyakorlatilag vazallusok, politikai vazallusok, akik felelnek az országgylési képviselnek azért, hogy minden rendben menjen" - Róbert Báthory, journalist at RFE/RL Hungary for the online news outlet Partizán (May 8 2021). https://youtu.be/1hNRah82D8Q?t=679

Election data. We use settlement level parliamentary and municipal election results from the National Election Office. Both data are available at the polling station level that we aggregate to municipality level. The data contains the number of votes by political parties and candidates, turnout, and the number of invalid votes.

Other data sources. We also use several other municipality level data sources as control variables. Data on settlement level educational attainment and ethnic composition comes from the 2011 census. Information on personal income tax, unemployment, demographics are from the T-STAR database.

We also use the T-STAR database to generate three municipality level indices, which capture different dimensions of wellbeing. First we classify the variables of interest into groups of which we generate the indices. The groups are 1) quality of life, 2) local infrastructure and 3) local public services. Then we calculate the standardized z-score of the raw variables in each group, then generate the index as the average of the z-scores in each group. The quality of life index includes the per capita rates of divorce, death, outmigration, abortion and crime. The local infrastructure index includes the share of households connected to the water, electricity, gas, central heating and sewers networks. The local public services index includes the number of general practitioners, nurses, pharmacies, nurseries, kindergartens and cultural institutions relative to the population.[8]

To complement our municipality level analysis, we use the Tárki Monitor household level survey data from October 2014, which contains detailed information on the employment status of individuals and their party preferences.

3.5 The correlates of public work exposure

In this section we investigate the distribution of public work across settlements. To measure public work program exposure at the municipality level, we use the share of

[8] In generating the indices we loosely follows the methodology of Martinez-Bravo et al. (2017).

public work program participants relative to the working age (18-59) population.

As the government aims to support locations with adverse labor market situation, we investigate the spatial distribution of public work schemes. Figure 1 shows that the public work is concentrated in smaller municipalities. In villages with less than 500 inhabitants, the share of public workers is more than 8 percent while in municipalities with more than 10 thousand inhabitants this ratio is less than 2 percent. Figure 2 shows that there is substantial variation across regions as well, for example in the North-East the South-West regions public work program exposure is close to 20 percent in many small settlements. Since these regions are poorer on average, next we explore which settlement characteristics are correlated with public work exposure.

To better understand the variation in the public work program, we run bivariate regressions of public work exposure on various settlement characteristics:

$$PW_{i,2014m4}/Pop_{i,2014m4} = \alpha + \beta X_i + \varepsilon_i, \tag{4}$$

where $p_{i,2014m4}$ is the public work program exposure in April 2014, when the election took place, and X_i is a municipality characteristic, such as education or income.

Table 2 summarizes the estimates. It shows that public work exposure is not random but correlated with several settlement characteristics. In poorer municipalities with a lower average level of education the share of public workers tends to be higher, moreover, these relationships are strong as the R^2 is close to half in several bivariate regressions. In our empirical design we directly take into account these differences between more exposed and less exposed municipalities.

3.6 Descriptive evidence on clientelism

In this section we provide correlational evidence that the patterns of distributing public work quotas across settlements are consistent with clientelism. In particular, we test

corollaries from Inequality 3 of our model.

Where mayoral races are tighter, clientelism is more likely: Since m is increasing and concave, the marginal impact of public work will be larger for a mayor whose baseline reelection probability is lower. Consequently, mayors who face tougher election contests will on average have more public workers.

Public work quotas in the fall depend on Fidesz performance in the spring: In our model the government can threaten mayors by cutting back public work quotas from the settlement if public workers are not turned out to vote for the party in government during national elections. If this was the case, we would see a positive correlation between local Fidesz performance in April 2014 (2018) and public worker share in the settlement in October 2014 (2019).

A partisan mayors get more public work, and are punished/rewarded more efficiently:: If the Party in Government can more easily monitor its own members' activities, then $p^H - p^L$ will be ceteris paribus higher for Fidesz-mayors, so there will be a tighter correlation between Fidesz vote share in national elections and public work share before subsequent mayoral elections; also, on average more of them will co-operate, so Fidesz-mayors should get more public work on average.

To see if these predictions hold water, we estimate the following regression:

$$PW_{it}/Pop_{it} = \beta_0 + \beta_1 C_{i,t-4} + \beta_2 s_{i,t-4} + \beta_3 F_{it} + \beta_4 C_{i,t-4} \times F_{it} + \beta_5 \mathbf{X_i t} + \epsilon_{it} \tag{5}$$

PW_{it}/Pop_{it} is public work intensity in settlement i at the October of year $t \in$ 2014, 2019 before mayoral election. $C_{i,t-4}$ is the number of candidates that ran for mayor during the previous election cycle (i.e. a proxy for the historical electoral competition intensity for the mayoral seat). $s_{i,t-4}$ is the vote share of Fidesz in the settlement during the preceding national election (April 2014 or April 2018, respectively). $F_{i,t}$ is a dummy if the incumbent mayor is a member of Fidesz.

We present the results in Table 3. We estimate the equation both in levels (columns 1,

2 and 3) , and in first differences (columns 4 and 5, differenced over the election cycle). In column 1 we omit control variables.

The results show that having an additional mayoral candidate over the previous election cycle is associated with an increase in the share of public workers to the working age population by 0.15 to 0.23 percentage points.

Consistently with our model, we see a strong correlation between Fidesz performance a couple of months before and public work allocated to the settlement before mayoral elections. In particular, a hypothetical town where Fidesz captured 100% of the ballot, the incumbent would have expected to have about 6% of the working age population employed as public workers before mayoral elections.

Perhaps more importantly, Fidesz rewards its own mayors more on average, both also in a way that is more tightly linked to the election result in national elections. Fidesz nominated mayors on average employ an additional 1.3 percentage points of the population as public workers, and the interaction shows that the slope on Fidesz support is about twice as high for them. A hypothetical Fidesz mayor leading a settlement where Fidesz had won 100% of the vote during the spring would expect to have $100 * 0.047 + 1.3 + 100 * 0.054 = 11.4$ percentage points of the working age population employed as public workers during the fall, before the elections.

We conclude the section by noting that the results are consistent with the three empirical predictions of the model.

4 The causal impact of public work on voting

4.1 Specification

In this section we estimate how public work affected the performance of Fidesz and incumbent mayors at the ballot box. We first consider the vote share of Fidesz in time t and location i in the following linear model:

$$s_{it} = \beta_0 + \beta_1(PW_{it}/Pop_{it}) + \beta_2 g_{it} + e_{it} \tag{6}$$

Where PW_{it}/Pop is the public worker to population ratio in settlement i in year t. This can be trivially expressed from model parameters, as $PW_{it} = Pop_{it} \times \mu_1 q_1$ (working age population times the share of the poor times the share of the poor who are public workers, so $PW/Pop_{it} = \mu_1 q_1$.

Importantly, a positive correlation in this regression does not imply clientelism. From Equation (2) we know that $\beta_{1,NC} = \partial s/\partial(\mu_1 q_1) = \sigma_1 v_1 \theta$ without clientelism and $\beta_{1,C} = \partial s/\partial(\mu_1 q_1) = \sigma_1 v_1(\theta + (1-\theta)\gamma z)$ with clientelism. This means that if there are poor voters and there they have a positive valuation of public work, we should see a positive correlation. This is the fundamental empirical problem: it is hard to distinguish support for the Party in Government that is a response to the platform, and the part which is achieved through clientelism.

What are the relative effect sizes? If we could estimate the relationships under clientelism and without clientelism separately, the ratio β_C/β_{NC} would be given by

$$\frac{\beta_C}{\beta_{NC}} = \frac{\sigma_1 v_1(\theta + (1-\theta)\gamma z)}{\sigma_1 v_1 \theta} = 1 + \frac{\sigma_1 v_1(1-\theta)\gamma z}{\sigma_1 v_1 \theta} = 1 + \frac{1-\theta}{\theta}\gamma z$$

This means that the correlation between PW and votes can be an order of magnitude larger than under non-clientelism in the extreme case where the re-election of G and the exclusion of non-obedient public workers is almost certain and instrumental voting has a large weight in voter decision (ie. $\gamma = 1, z = 1, \theta = 0.1$).

Based on this it would be tempting to say that the estimated correlation between PW and pro-government vote $\hat{\beta}_1$ is an average of $\beta_{1,C}$ and $\beta_{1,NC}$ weighted by the probability of clientelism. However, it would be a biased estimate.

To see this, consider that the residuals in Equation (6) will take up unobserved baseline popularity $\kappa = 1/2 + \sum_i \mu_i \sigma_i l_i$. This can easily be correlated, however, with μ_1:

negative economic shocks often erode incumbent popularity, and also increase the share of the unemployed (the Poor in the model). This creates an omitted variable issue.

This problem can be avoided, however, by instrumentation: whether or not a mayor is engaging in clientelism is partly driven by local idiosyncratic differences in political competition. Measures of such (e.g. previous vote margins and number of candidates in previous elections) represent exogenous differences in meeting the condition formulated in (3), so they can serve as an instrument for public worker count to get an unbiased estimate of $\beta_{1,C}$.

4.2 Estimation

4.2.1 The impact of public work in national elections

We start the investigation by estimating the municipal level election results conditional on on the ratio of public workers and working age population In particular we estimate the following regression:

$$Fidesz_{it} = \alpha + \beta_1 (PW/Pop)_{it} + \beta_2 \mathbf{X_{it}} + \epsilon_{it}, \tag{7}$$

where the dependent variable is the share of Fidesz votes at municipality i at year 2014 and 2018. The main coefficient of interest is β_1 which shows how much the share of Fidesz vote increases if the ratio of public workers and the working age population in the month of election increases by one percentage point. $\mathbf{X_i t}$ denotes the control variables, most importantly the share of individuals by educational level and three indices which measure the development of the municipality and NUTS-4 microregion fixed effects (174 units). We also cluster standard errors at the NUTS-4 microregion level.

We also estimate a long differenced version of Equation 7 which helps us to get rid of settlement level time invariant omitted variables. Since we still include NUTS-4 microregion fixed effects, those in this setting capture that diffent micro-regions might

follow different development paths which might be correlated with Fidesz support:

$$\Delta Fidesz_{it} = \delta + \gamma_1 \Delta(PW/Pop)_{it} + \gamma_2 \mathbf{X_{it}} + \varepsilon_{it}, \tag{8}$$

where the dependent variable is the change of Fidesz vote share between 2010 and 2014 and between 2014 and 2018. Similarly, to the previous equation, the main variable of interest is γ_1 which shows how much the support of Fidesz increases between election in municipality i if the share of public workers changes with one percentage point. Figure 13 shows the timeline that represents the First Difference identification.

Columns 1 to 3 of Table 5 contains the results from the regression. In the OLS regressions we see that a one percentage point increase in the public worker to population ratio is associated with a 0.05 percentage points increase in the vote share of Fidesz relative to the population, which increase to 0.14 percentage points once we include control variables (Column 1), and to 0.2 percentage points when take the difference over the election cycle (Column 3). This is probably realised through new turnout rather than shifting of the voting patterns: when turnout is the outcome variable, it is strongly significant and of the same order of magnitude as the previous regressions (Column 5). We carry out a placebo experiment putting the vote share of the Left wing opposition parties on the left hand side, and this is unaffected by public work (Column 6)

4.2.2 The impact of public work in mayoral elections

We run a similar regression to assess the impact of public work on the support for the incumbent mayor. The specification is identical to Equation 7 with the exception that public work intensity is now measured in the month preceding mayoral elections (September), and the sample is restricted to town-year observations where the incumbent mayor ran for reelection. Column 6 of Table 5 shows the results. A one percentage point increase of the public worker to population ratio is associated with a 0.37 percentage points increase in the vote share of the incumbent mayor.

4.2.3 Instrumental Variables estimates on the impact of public work on national elections

Finally, we build on the model's intuition to instrument public worker to population ratio before national elections with the intensity of mayoral competition in the preceding election cycle (four years ago). The assumption is that differences in initial competition intensity are uncorrelated with later economic shocks that drive the popularity of politicians; they only enter through the mayor's decision to engage in clientelism.

We use two instruments: the margin of the vote share of incumbent mayor (the difference between her vote share and the runner-up's vote share), and the number of competitors in the previous election. Column 4 of Table 5 shows the result. The first stage F-statistics is large (19.73), indicating that past mayoral competition is a strong predictor of the present public worker to population ratio. Importantly, the coefficient is larger than before: a one percentage point increase in the public worker to population ratio from one election to the next is associated with a 1.032 percentage points increase in the vote share of Fidesz.

Our interpretation of this result is that when we compare two otherwise identical towns, then a ceteris paribus increase in mayoral race intensity translates to a ceteris paribus increase in the probability of engaging in clientelism; and if the mayor decides to co-operate because of this, then any increase in public worker count will translate to an identical increase in the number of votes for the ruling party. In other words, the IV regression identifies the local average treatment effect under clientelism: $\hat{\beta}^{IV} = \beta^{LATE} = \beta_C$.

In Appendix C we provide survey evidence that are results are not driven by the ecological fallacy: auxiliary data suggests that public workers themselves do vote for the ruling party in large numbers.

5 Evidence on the presence of clientelism

To better understand what drives the voting behavior of public workers, we examine how public work quotas, that are not allocated through negotiations between the mayor and the government, affect election outcomes. Our model suggests that unconditionally allocated public work does not cause mayoral clientelism: if public work cannot be taken away from the mayor, then $p_H = p_L = 0$, so no mayor with a positive clientelism cost would engage in clientelism for the Party in Government.

We exploit exogenous variation in local public work exposure around the borders of disadvantaged microregions and use spatial regression discontinuity design. Municipalities in disadvantaged microregions are eligible for additional funding for public workers through the "Start Program" and they have higher share of public workers. The disadvantaged status of a microregion was decided in 2007 and depends on a continuous index number that is based on 31 microregion characteristics ranging from local unemployment to internet penetration (KSH, 2008). 94 of 174 microregions were classified as disadvantaged in 2007, and in 2011 an additional 12 microregions were classified as disadvantaged microregion. We focus on the border regions between disadvantaged and not disadvantaged microregions and use a spatial regression discontinuity design.

Figure 3a plots the disadvantaged status of microregions, where blue denotes disadvantaged microregions and red denotes not disadvantaged microregions. We drop the microregions of county capitals from our analysis and focus on municipalities that are close to the remaining borders. The red and blue municipalities on 3b are used for the analysis while grey color indicates those that are not included in our main sample. Figure 8 plots the distribution of distance to the nearest disadvantaged border. It shows that municipalities are approximately evenly distributed on both sides of the border.

5 plots different types of public work program participation as a function of distance to the border in October 2014. There is a discontinuous jump in total public work

participation at the border. This is driven by the Start microregional program as disadvantaged microregions have almost 3 percentage point higher share of public workers (Figure 5b). There is a small decline in long-term public work at the border and there is no jump in the national PW exposure around the border. Therefore total public work is higher in disadvantaged regions by approximately 2.5 percentage points. Using the bias-corrected RD estimator with optimal bandwidth, Table 5 summarizes these findings.

Next, we examine political outcomes around the border. While we do not find evidence for higher Fidesz support in national elections in disadvantaged microregions around the border, we do find higher support for incumbent mayors. Figure 6a plots the support for Fidesz in national elections in April 2014. This shows that Fidesz support is continuous at the border. On the other hand, incumbent mayors have significantly higher support in the October 2014 local elections in disadvantaged microregions (Figure 6b).

Since this approach focuses on the border regions between disadvantaged and not disadvantaged regions, the main identification concern is that municipalities in disadvantaged microregions have worse characteristics as they are located in disadvantaged microregions. To explore this concern, Figure 4 plots several settlement characteristics as a function of distance to border to show that settlements are indeed similar around the border. Tables 6 to 10 show the RD tables that correspond to the figures. In all tables we calculate the effect at the border by calculating an optimal bandwidth with and without controls (Columns 1 and 2); also with restricting the sample to towns where there were multiple candidates running for mayor (Columns 3 and 4); and also by looking at a short bandwidth (5km around the border, Columns 5-6). The regression results are in line with the graphic results.

To support our identification, we conduct a placebo test by re-estimating our main RDD regression for incumbent mayor support at placebo borders. We select these placebo borders at different distances of the true Figure 7 plots the estimated coefficients

and shows that the impact is largest at the true border. Moreover, all other estimates are insignificant at conventional levels.

These results show that rule-based allocation of public workers can limit clientelistic voting. When public work is not negotiated but allocated based on objectively measured disadvantaged status of settlements, it does not increase vote share for the government, but it does increase the vote share of the mayor. The rule-based allocation ensures that there is no threat of losing public work quotas so mayors do not have an incentive to make public workers vote for the government. But in mayoral elections, where the mayor's own re-election is at stake, she still get public workers to vote for her by threatening public workers with exclusion from the program. We interpret this as evidence that clientelism, rather than voters' preference for public work is driving the correlation between public work and Fidesz votes.

6 Discussion and Conclusion

To discuss the magnitude of the results, we carry out a back-of-the-envelope counterfactual analysis to assess the potential impact of the public work program on election outcomes. We use the previously calculated regression coefficients to estimate what would have been the election results without the public work program.

For the calculations we assumed that public workers represent new turnout, so in absence of public employment they would have abstained from voting. We also assume away any positive or negative spillover effect of public work on the settlements which would have induced other voters than public workers to adjust their political preferences.

We first calculate who wins individual constituency seats and calculate fragmentary votes for each each candidate from the constituency vote (according to the Hungarian voting rules, the winning candidate also gets a fragmentary vote that equals her margin of victory over the runner-up). Then we calculate counterfactual party list votes, and add

them together with the fragmentary vote. Finally, we use the d'Hondt formula to allocate the remaining 93 seats in 2014 and 92 seats in 2018 (the German minority list received a preferential mandate in 2018).

Figure 9 shows the results. In Panels (a) and (b) we used the most conservative First Difference coefficients from Table 5.We calculated counterfactual Fidesz votes with 0 public work using the coefficient from the last column, which is a conservative estimate given that potentially overcontrolling for a host of factors. In Panels (c) and (d) we repeat this process using the IV coefficients instead of FD coefficients. The black bars represent actual election outcomes, while the gray bars represent our counterfactual estimates.

We argue that the IV estimates represent a higher bound of the election results, while the First Difference results show a lower bound. The Instrumental Variables regressions yield an unbiased estimate of the Local Average Treatment effect, in our case the impact on the public workers' political preferences who decide their vote under political pressure. As we have shown the previous section, this is not necessarily the case, as rule-based public work allocation does not seem to impact political behavior. Consequently Panel (c) and (d) shows what would have happened if all public workers had been subjected to the "worst case scenario".

As opposed to this, the First Differenced results show an average effect on all public workers, some of whom are under pressure, some of whom are probably not. However, we also argued that these estimates are downward biased because negative shocks to the economy increase the pool of potential and actual public workers and decrease the support for the government in general. So the "true average result" lies somewhere in between.

There are two important conclusions to be drawn from these results. First is that Fidesz would have been able to form a majority government without public work in both cycles under both sets of assumptions. The second is that even under the most conservative estimates they would have been unable to hold onto their supermajority as

early as 2014.

In this paper we produced evidence that the public work program in Hungary was not only used to support unemployed but also to build clientistic networks as well. First we showed that public work increases the support of Fidesz, the ruling party in power since 2010. Furthermore, we show that the allocation of public work is affected by political means, not just economic needs of disadvantaged regions. Fidesz allocates more public workers to rural areas in electoral districts where the opposition was relatively stronger in urban areas. Besides, mayors who turned out public workers to vote for Fidesz in higher number got higher public worker quotas before their own re-election contest.

We think that these clientistic relationships could be weakened if public work was allocated based on universal eligibility rules and local mayors had less discretion in choosing public workers. This is corroborated by the Regression Discontinuity results that show that public work allocated based on objective criteria does not have an impact on elections.

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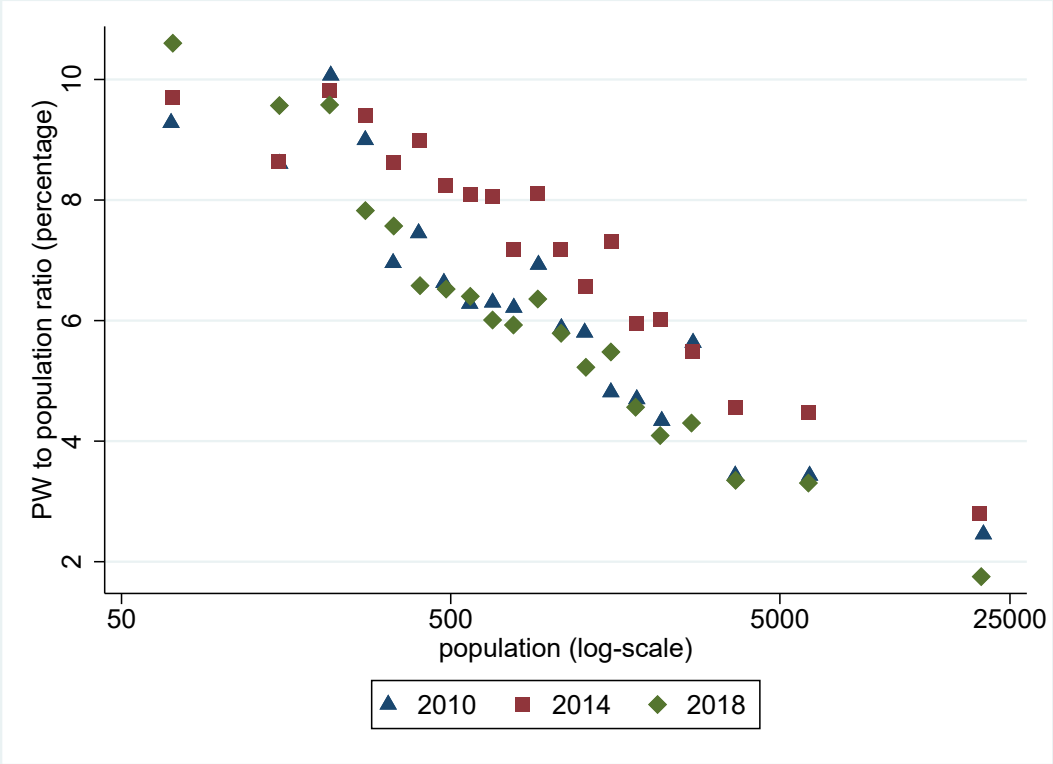
7 Figures and Tables

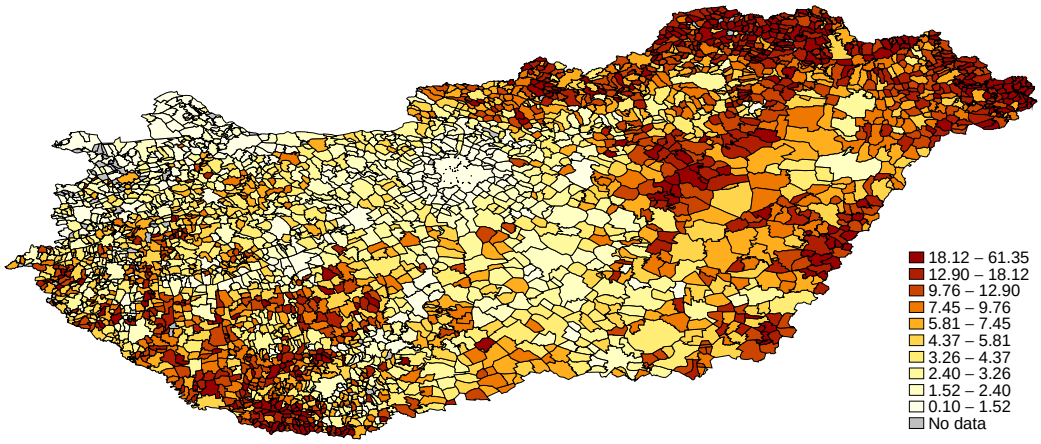
7.1 Figures

Figure 1: Share of public workers by the size of the municipality (percent)



Note: This figure plots the number of public workers relateive to working age (18-59) population the months of elections.

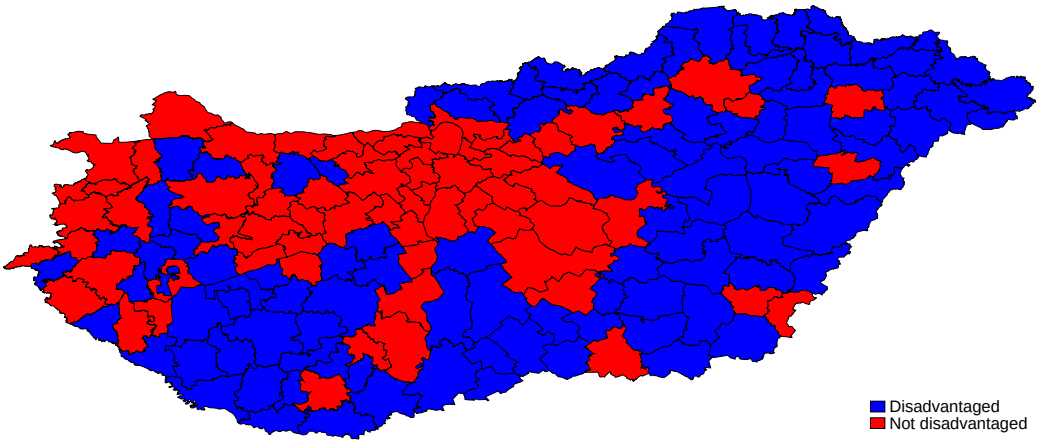
Figure 2: Share of public workers relative to working age population (percent)



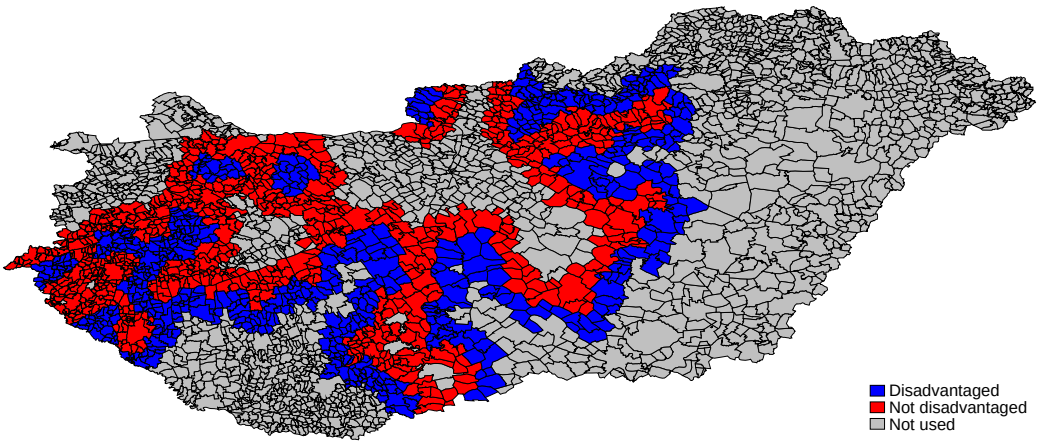
Note: This figure plots geographical distribution of public workers relative to working age (18-59) population in April 2014.

Figure 3: Subregions by disadvantaged status

(a) Disadvantaged subregions



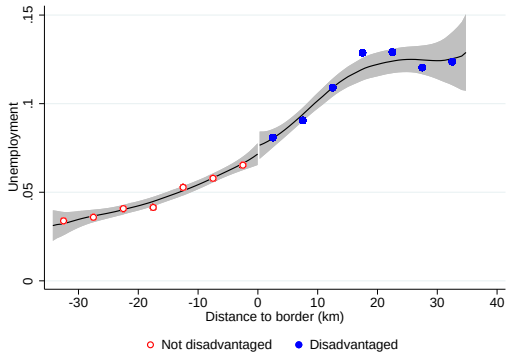
(b) Settlements near the disadvantaged-not disadvantaged subregion borders



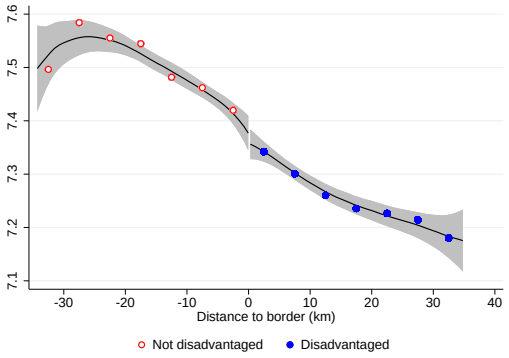
Note: Figure (a) plots the spatial distribution of disadvantaged subregions. Blue color indicates disadvantaged subregions and red color indicates non-disadvantaged subregions. Figure (b) plots the border settlements near the disadvantaged-not disadvantaged subregions. Blue color indicates settlements in disadvantaged subregions and red color indicates settlements in non-disadvantaged subregions. Grey color indicates settlements that are far from the border.

Figure 4

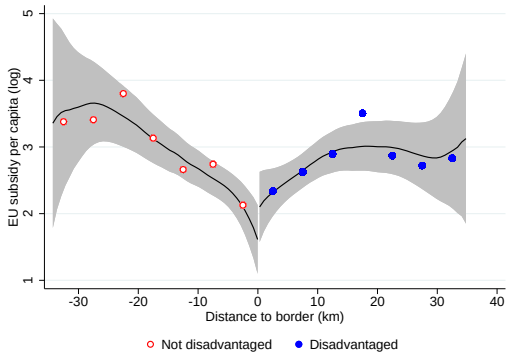
(a) Unemployment



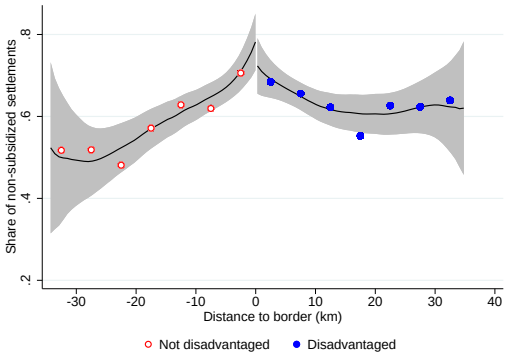
(b) Log per capita income



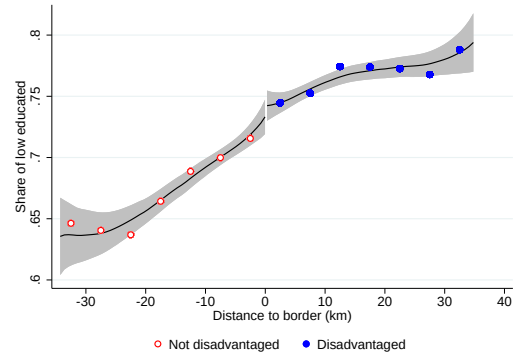
(c) EU subsidy per capita



(d) Share of zero EU subsidy



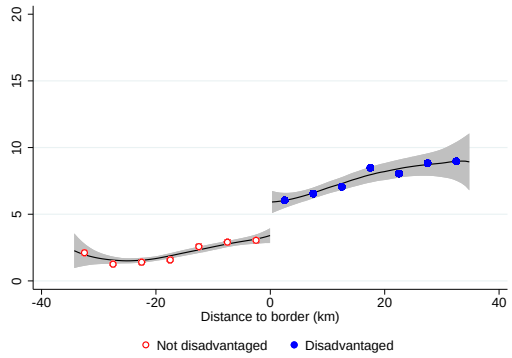
(e) Share of people with less than high school



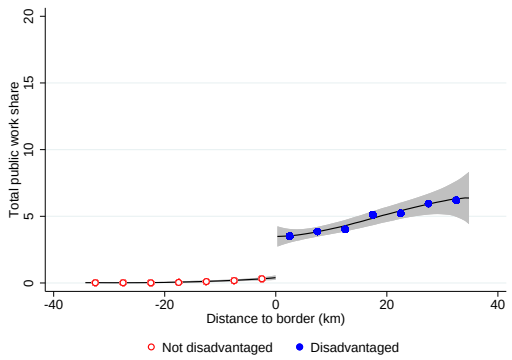
Note: These figures plot different settlement characteristics near the border between disadvantaged and not disadvantaged micro regions. Figure a)-d) the educational attainment, Figure e) plots the log population, Figure f) plots the log per capita income. Source of the EU fund data is CRCB (2021).

Figure 5: Public work exposure in April 2014 around the border region

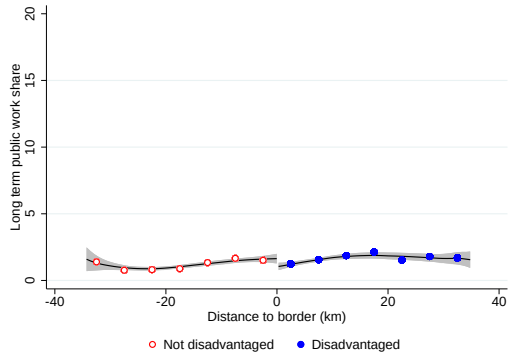
(a) Total public work exposure



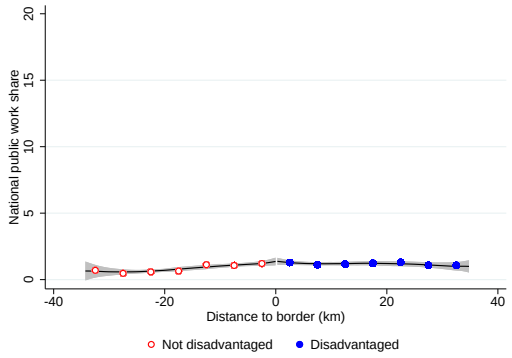
(b) Start microregional public work exposure



(c) Long term public work exposure



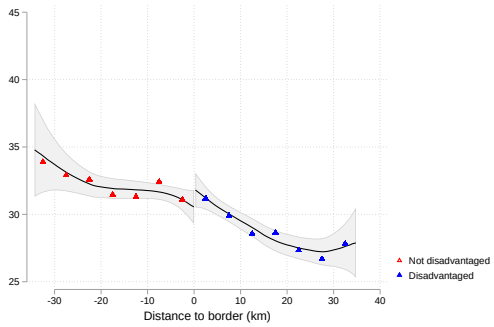
(d) National public work exposure



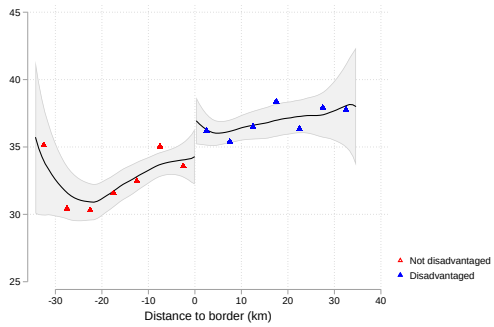
Note: These figures plot different measures of public work exposure near the border between disadvantaged and not disadvantaged micro regions. Figure a) plots the total public work, Figure b) plots the Start microregional public work expoure, Figure c) plots the long term public work exposure, and Figure d) plots the national public work exposure.

Figure 6: Political outcomes in 2014

(a) Fidesz support in 2014

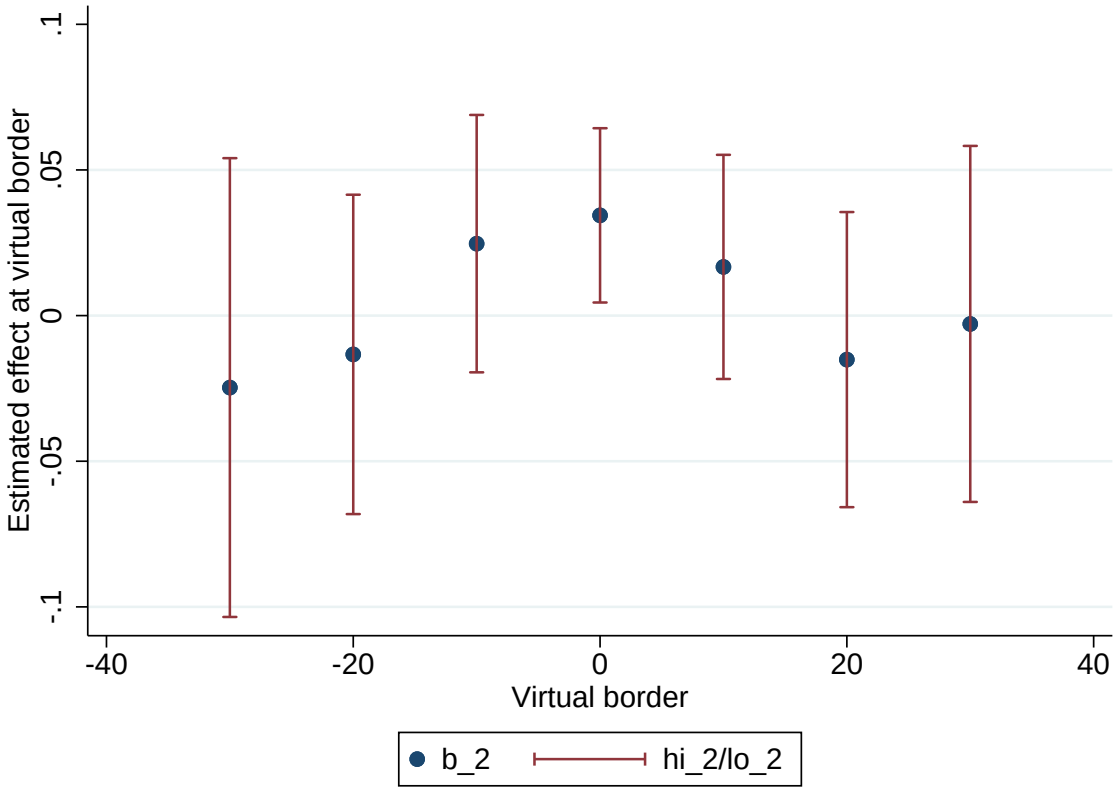


(b) Incumbent mayor support in 2014



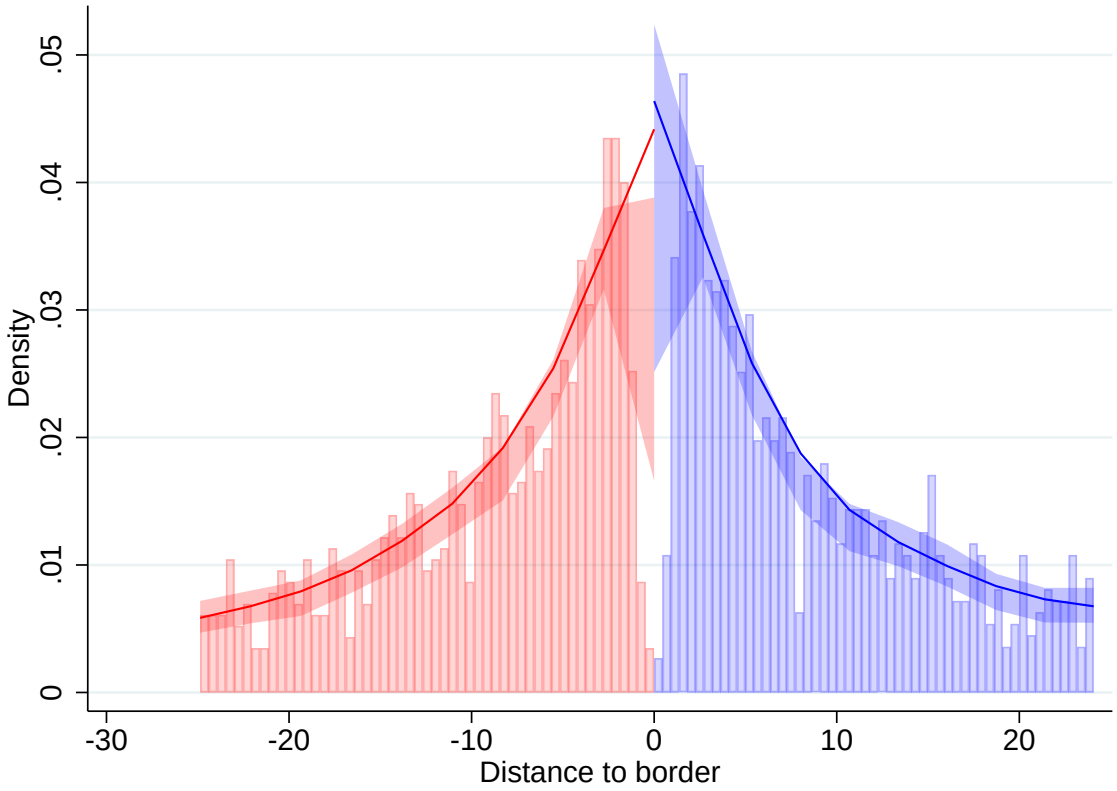
Note: These figures plot the Fidesz vote share near the border between disadvantaged and not disadvantaged micro regions.

Figure 7: Placebo RDD



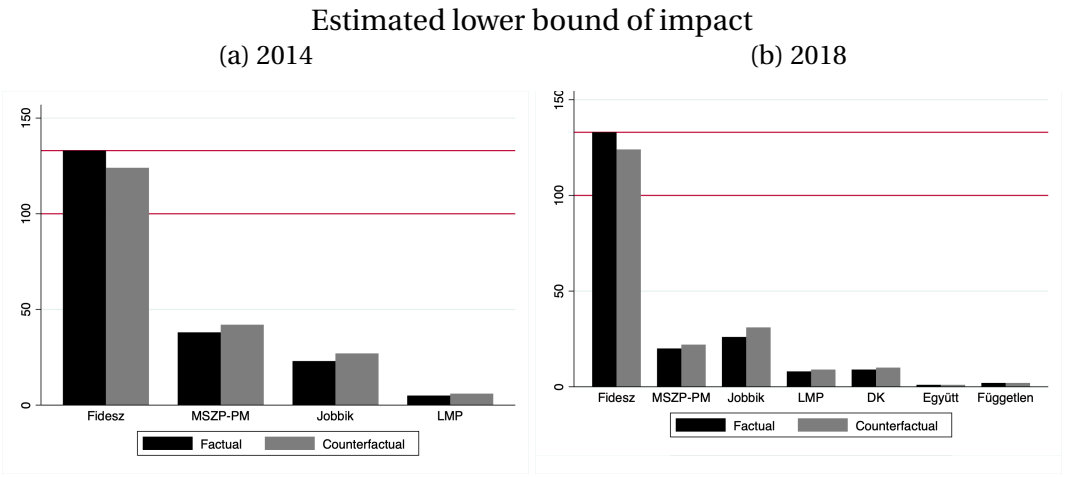
Note: These figure plots the estimated effects of disadvantaged subregion on the support of the incumbent mayor at various distances to the true border.

Figure 8: Distribution of distance to the disadvantaged border



Note: These figure plots the distribution of distance to the nearest disadvantaged border.

Figure 9: Back-of-the-envelope calculation on the impact of Public Work on the election result in 2014 and 2018



Note: The figures show back of the envelope calculations on the impact of public work on the election outcomes in 2014 and 2018. The horizontal line at 100 represents the majority threshold in parliament; the second horizontal line at 133 represents the supermajority threshold. We used First Differenced coefficients from Table 5 to calculate counterfactual vote shares. The black bars represent actual election outcomes;the gray bars are the corresponding counterfactual estimates.

7.2 Tables

Table 1: Election results and turnout

Election year	Fidesz & KDNP	Center left	Far right	Far left	Green	Turnout
2006	42.03	**49.71**	2.20	0.41	-	67.83
2010	**52.73**	19.30	16.67	0.11	7.48	64.38
2014	**43.55**	26.21	20.69	0.57	5.47	61.24
2018	**47.36**	17.95	19.80	0.28	7.31	70.22

Notes: This table reports vote shares received in percent on party lists in parliamentary elections from 2006 to 2018 and turnout in each election. Center-left parties include: Hungarian Socialist Party (Magyar Szocialista Párt), Alliance of Free Democrats (Szabad Demokraták Szövetsége), Democratic Coalition (Demokratikus Koalíció), Dialogue for Hungary (Párbeszéd Magyarországért). Far-right parties include Movement for a Better Hungary (Jobbik) and Hungarian Justice and Life Party (Magyar Igazság és Élet Pártja). Far-left party is Workers' Party (Munkáspárt). Green party is Politics Can Be Different (Lehet más a politika). Bold numbers represent the parties of the governing coalition.

Table 2: Correlates of the municipality level public workers share

	Coefficient	Standard error	N	R^2
Primary school share	.3**	.0093	3176	.55
Vocational share	.25**	.016	3176	.1
High school share	-.45**	.013	3176	.49
College share	-.26**	.026	3176	.31
Log population	-.0099**	.00026	3176	.31
Unemployment rate, 2014	.68**	.02	3152	.46
Share of Roma minority	.65**	.021	3176	.43

Notes: In the table, each line presents bivariate regression results by estimating equation 4 of the form:

$$PW_{i,2014m4}/Pop_{i,2014m4} = \alpha + \beta X_i + \varepsilon_i$$

The regressions are weighted. Standard errors are clustered at the subregion level. ** = significant at 1-percent level; * = significant at 5-percent level; + = significant at 10-percent level.

Table 3: Strategical placement of public work

VARIABLES	(1)	(2)	(3)	(4)	(5)
# candidates at last election	0.235***	0.153***	0.166***	0.151***	0.164***
	(0.0816)	(0.0577)	(0.0574)	(0.0572)	(0.0569)
Fidesz vote share at national election	0.0150	0.0610***	0.0472***	0.0604***	0.0467***
	(0.0135)	(0.0103)	(0.0102)	(0.0102)	(0.0101)
Fidesz nom. mayor			1.343***		1.330***
			(0.220)		(0.218)
interaction			0.0549***		0.0541***
			(0.0196)		(0.0194)
Observations	6,059	6,059	6,050	6,059	6,050
R-squared	0.045	0.470	0.476	0.469	0.475
Outcome	Level	Level	Level	Difference	Difference
Controls	No	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The regressions show how the central government allocates public work and their own mayoral candidates. The dependent variable is the share of public workers in the working age population of the settlement. In columns 1-3 we look at levels; in columns 4-5 we estimate it in First Differences (subtracting the level of the variables from four years prior). *** = significant at 1% level; ** = significant at 5% level; * = significant at 1% level.

Table 4: The impact of public work on election results

VARIABLES	(1) OLS Fidesz vote	(2) OLS Fidesz vote	(3) FD Fidesz vote	(4) IV Fidesz vote	(5) FD Turnout	(6) FD MSZP vote	(7) FD Incumbent mayor vote
PW/pop	0.047**	0.141***	0.198***	1.032**	0.092***	0.010	0.365***
	(0.020)	(0.027)	(0.028)	(0.421)	(0.019)	(0.015)	(0.086)
Fidesz votes 4 years before	0.654***	0.620***					
	(0.020)	(0.020)					
Fidesz votes 8 years before	0.125***	0.101***					
	(0.021)	(0.022)					
Observations	6,248	6,248	6,246	6,238	6,246	6,246	2,123
R-squared	0.701	0.724	0.714	0.643	0.634	0.377	0.034
Outcome	Level	Level	Difference	Difference	Difference	Difference	Difference
Controls	No	Yes	Yes	Yes	Yes	Yes	Yes
F-stat				19.73			

Notes: The table shows the main regression results on the impact of public work on different election outcomes. The main independent variable is the ratio of public workers to the working age population in the settlement. In the first two columns we estimate pooled OLS regressions without and with a host of control variables. In the third column we difference the variables over the election cycle. In column 4 we present the IV regression results (the first stage F statistic is in the bottom row). In column 5 we look at turnout share as outcome variable. Column 6 contains a placebo regressions where the outcome variable is the vote share of the Hungarian Socialist Party. In the final, 7th column the outcome variable is the vote share of the incumbent mayor in mayoral elections in October, and the main independent variable is the public work to population ratio in September. *** = significant at 1% level; ** = significant at 5% level; * = significant at 1% level.

Table 5: The effect of disadvantaged region on public work share at the border

	(1) Subregional PW	(2) Long-term PW	(3) National PW	(4) Total PW
Disadv. region	3.200***	-0.535*	0.0144	2.679***
	(0.463)	(0.257)	(0.280)	(0.582)
Observations	1224	1224	1224	1224
Bandwidth	12 km	12 km	12 km	12 km

Notes: This table reports spatial regression discontinuity estimates for being in a disadvantaged micro region for measures of public work share. *** = significant at 1% level; ** = significant at 5% level; * = significant at 1% level.

Table 6: The effect of disadvantaged region on settlement characteristics at the border

	(1) Share of low educated	(2) Unemployment	(3) Log EU subsidy per cap.	(4) Log population
Disadv. region	0.000762	0.00765	0.663	-0.281*
	(0.0109)	(0.00659)	(0.363)	(0.118)
Observations	1224	1206	1224	1224
Bandwidth	12 km	12 km	12 km	12 km

Notes: This table reports the RD estimates for being in a disadvantaged micro region for various settlement characteristics. *** = significant at 1% level; ** = significant at 5% level; * =

A Appendix

A.1 Proof of propositions

Lemma 1 from Bardhan and Mookherjee (2012): Let's denote the level of public services in utilitarian optimum by "$g^{*,O}$", the optimal choice with elections but without

Table 7: The effect of disadvantaged region on Fidesz support at the border

	Fidesz support					
	(1)	(2)	(3)	(4)	(5)	(6)
Disadv. region	1.613	1.869	0.993	1.459	0.134	0.991
	(1.090)	(1.024)	(1.190)	(1.119)	(1.783)	(1.650)
Observations	1228	1210	868	860	790	782
Bandwidth	12 km	12 km	12 km	12 km	6 km	6 km
Controls		Yes		Yes		Yes
Sample	Full	Full	Competitive	Competitive	Competitive	Competitive

Notes: This table reports the RD estimates for being in a disadvantaged micro region for public work exposure and Fidesz vote share. In columns 1-2 we include all villages; in columns 3-6 we concentrate on villages where there were at least 2 mayoral candidates. *** = significant at 1% level; ** = significant at 5% level; * = significant at 1% level.

Table 8: The effect of disadvantaged region on mayor's support at the border

	Incumbent mayor support					
	(1)	(2)	(3)	(4)	(5)	(6)
Disadv. region	3.441*	3.601*	5.653**	5.163**	4.268	5.189
	(1.526)	(1.474)	(1.858)	(1.814)	(3.095)	(2.973)
Observations	1042	1028	720	714	458	456
Bandwidth	12 km	12 km	12 km	12 km	6 km	6 km
Controls		Yes		Yes		Yes
Sample	Full	Full	Competitive	Competitive	Competitive	Competitive

Notes: This table reports the RD estimates for being in a disadvantaged micro region for mayoral vote share. In columns 1-2 we include all villages; in columns 3-6 we concentrate on villages where there were at least 2 mayoral candidates. *** = significant at 1% level; ** = significant at 5% level; * = significant at 1% level.

clientelism by "$g^{*,E}$" and the optimal choice under clientelism by "$g^{*,C}$". Then we have

$$g^{*,E} > g^{*,C},$$

If $\sigma_1 > \sigma_2$ is also true (the Poor are more likely to swing), then

$$g^{*,O} > g^{*,E} > g^{*,C},$$

The converse is true for the share of workfare recipients, so

$$(q_1^{*,O} <) q_1^{*,E} < q_1^{*,C}.$$

That is, workfare is overproduced (and the public good is underproduced) in the electoral equilibrium if poor voters are relatively more likely to swing than rich voters; workfare is always overproduced (and the public good is underproduced) in a clientelistic equilibrium relative to the electoral equilibrium.

Proof: The first order condition for G's decision is:

$$\frac{v_1}{t}\sigma_1\left(1+\frac{1-\theta}{\theta}\gamma z\right) = \mu_1\sigma_1\frac{\partial V_1}{\partial g} + \mu_2\sigma_2\frac{\partial V_2}{\partial g} \tag{9}$$

Imagine first that $z = 0$, so the clientelistic motive is not present, as recipients cannot be excluded from workfare. Note that even in this case the vote-maximizing allocation is different from the welfare-maximizing allocation. If $\sigma_1 > \sigma_2$, meaning that the Poor vote is more amenable to swings than the Rich vote, then workfare will be underprovided while the private good (consumed by the Poor only) will be overprovided relative to the welfare-maximizing allocation. Conversely, the public good will overprovided if the Rich vote is more likely to swing.

The term in parenthesis, $1 + \frac{1-\theta}{\theta}\gamma z$ represents the scope for clientelism. Note that it is always greater then one when $\theta < 1$, $z > 0$ and $\gamma > 0$, that is, if instrumental voting has non-zero weight, "deserting" workfare recipients can be excluded with at least some probability, and G has a non-zero ex ante chance of re-election.

Proposition 2: Let's denote the probability of voting for the government in national

elections under clientelism as:

$$\pi^C = \kappa + \mu_1\sigma_1\left(\theta\left(V_1(g) + q_1\nu_1\right)\right) + (1-\theta)\left(\gamma z q_1\nu_1\right)\right) + \mu_2\sigma_2\theta V_2(g)$$

.

If the mayor shirks his clientelistic duties ($z = 0$), this reduces to

$$\pi^{NC} = \kappa + \mu_1\sigma_1\theta\left(V_1(g) + q_1\nu_1\right)\right) + \mu_2\sigma_2\theta V_2(g)$$

.

From the point of view of the mayor, every individual ballot cast is a Bernoulli-trial with success probabilities $\pi^{C,NC}$ depending on the mayors' action; with corresponding variance $\delta^2_{C,NC} = \pi^{C,NC}(1-\pi^{C,NC})$. The realized vote share is the sample average of successes, which we denote by $s\%$, while the expected value of the vote share is the voting probability itself.

The probability that the mayor does not pass the vote share threshold set by the government is given by $\Pr\left(s\% < \underline{s}\right)$. By subtracting, multiplying with and diving both sides in the parentheses by the same terms (expected value, square root of the number of trials and standard deviation) we can expand this formula as

$$Pr\left(\frac{\sqrt{n}\left(s\% - \pi^{C,NC}\right)}{\delta_{C,NC}} < \frac{\sqrt{n}\left(\underline{s} - \pi^{C,NC}\right)}{\delta_{C,NC}}\right).$$

The central limit theorem implies that the term on the left hand side converges in distribution to a standard normal distribution, implying that

$$p^H = \Phi\left(\frac{\sqrt{n}\left(\underline{s} - \pi^{NC}\right)}{\delta_{NC}}\right)$$

and

$$p^L = \Phi\left(\frac{\sqrt{n}\left(\underline{s} - \pi^C\right)}{\delta_C}\right),$$

where Φ is the cumulative density function of the standard normal distribution function. The government wants to maximize

$$p^H - p^L = \Phi\left(\frac{\sqrt{n}\left(\underline{s} - \pi^{NC}\right)}{\delta_{NC}}\right) - \Phi\left(\frac{\sqrt{n}\left(\underline{s} - \pi^C\right)}{\delta_C}\right)$$

according to $\underline{s}$. The first order condition can be reorganized as

$$\left(\frac{\sqrt{n}\left(\underline{s} - \pi^{NC}\right)}{\delta_{NC}}\right)^2 = \left(\frac{\sqrt{n}\left(\underline{s} - \pi^C\right)}{\delta_C}\right)^2.$$

The solution is a maximum if

$$\left(\frac{\sqrt{n}\left(\underline{s} - \pi^{NC}\right)}{\delta_{NC}}\right) = -\left(\frac{\sqrt{n}\left(\underline{s} - \pi^C\right)}{\delta_C}\right).$$

We can express the optimal $\underline{s}$ as

$$\underline{s} = \frac{\delta_C}{\delta_C + \delta_{NC}}\pi^{NC} + \frac{\delta_{NC}}{\delta_C + \delta_{NC}}\pi^C$$

This is the weighted average of expected vote shares, and the weights are given by the relative variances of the voting probabilities. These all are functions of optimal public work levels $q_1^{*,C}$, $q_1^{*,NC}$ and the model's parameters. In particular, the marginal impact of clientelism, $\pi^C - \pi^{NC}$ is given by $\mu_1\sigma_1(1-\theta)\gamma z q_1^{*,C} v_1$.

The maximized $p^H - p^L$ value simplifies to

$$p^H - p^L = \Phi\left(\frac{\sqrt{n}\left(\pi^C - \pi^{NC}\right)}{\delta_C + \delta_{NC}}\right) - \Phi\left(\frac{\sqrt{n}\left(\pi^{NC} - \pi^C\right)}{\delta_C + \delta_{NC}}\right) = 2\Phi\left(\frac{\sqrt{n}\left(\pi^C - \pi^{NC}\right)}{\delta_C + \delta_{NC}}\right) - 1$$

For any π_{NC}, the above value is increasing in $\pi_C - \pi_{NC}$, which will be increasing in z,

γ and $1-\theta$.

B Political cycles in public work

There were no major changes to the public work scheme except for the year 2013. The standard practice was that PW contract expired in December, and would be renewed then after stakeholders would know how many public workers they would need in the new years. In contrast to previous years, the government did not let public job contracts expire in December 2013, but instead only four months later, on 30th April 2014, which was three weeks after the national election. At the end of the month, 190 thousand public work contract were terminated out of the 220 thousand contracts. The timing of the expiration of these public job contracts provided a great discretion for the government to reallocate public work jobs across municipalities before the mayoral elections in October (Figure 10).

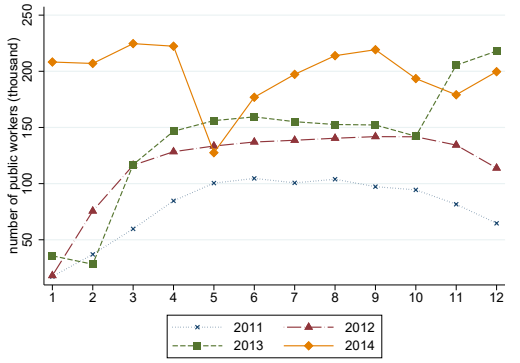
Perhaps by coincidence, the government also announced an additional training program within the public work ecosystem in December 2013 which also ended on 30th April 2014, right after the elections. The training program was called "winter temporary public work" and was allegedly aimed to increase the elementary skills of unemployed.[9]

[9]The program was heavily criticized in the media. The opponents argued the training program was organized in very low quality and did not differentiate based on the skill level of participants. The most important critique was that the teaching material was copied from a text book written for elementary school pupils and it was not suitable for the use by adults (Index, 2013). To convince the reader that the ultimate goal was hardly to improve the human capital of the participants, we include an infamous excerpt from the teaching material in Figure 11. This type of "training program" was abandoned in later years.

Figure 10: Number of public workers and unemployed

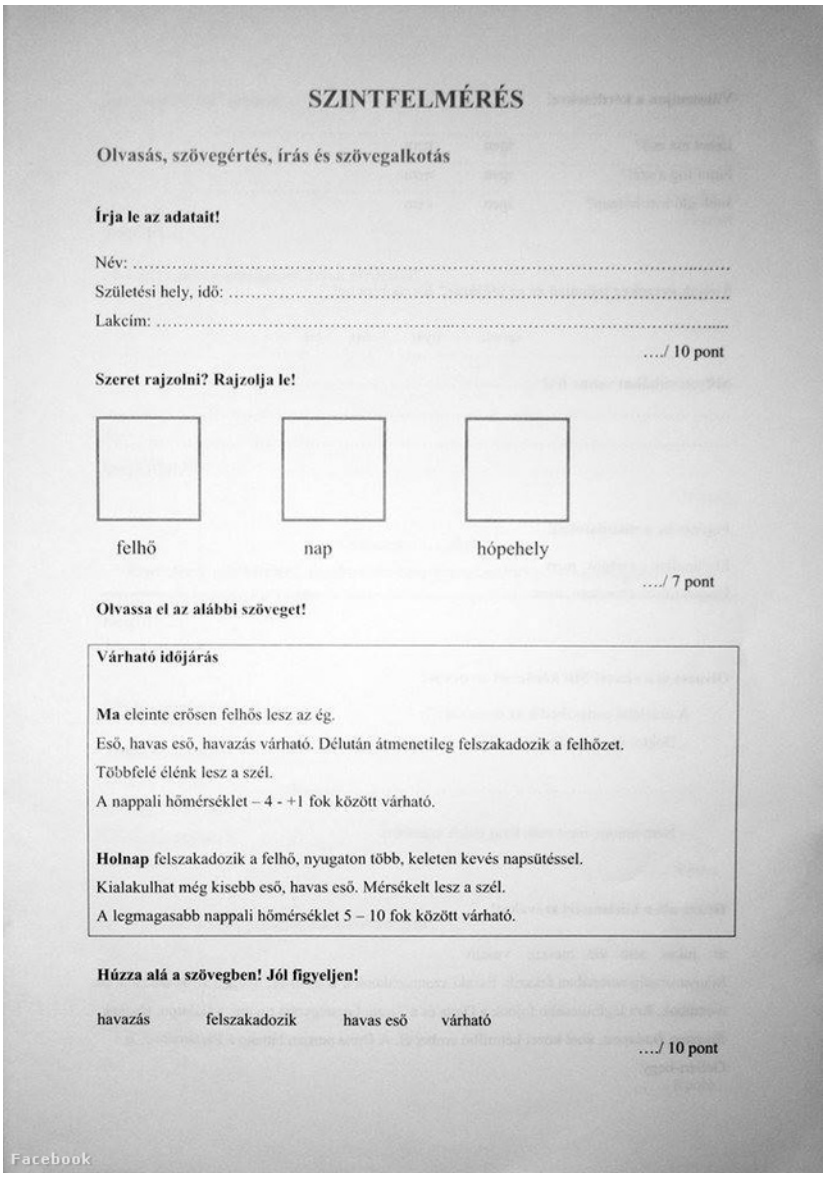
(a) Number of public workers and unemployed

(b) Number of public workers by month



Note: Panel (a) plots the number of public workers and unemployed. The dashed lines shows the number of registered unemployed who do not participate in PW. The vertical lines denote the election years. Panel (b) plots the number of public workers by month.

Figure 11: Example from the "learning material" of the 2014 public worker "training program"



SZINTFELMÉRÉS

Olvasás, szövegértés, írás és szövegalkotás

Írja le az adatait!

Név: .....

Születési hely, idő: .....

Lakcím: .....

..../ 10 pont

Szeret rajzolni? Rajzolja le!

felhő nap hópehely

..../ 7 pont

Olvassa el az alábbi szöveget!

Várható időjárás

Ma eleinte erősen felhős lesz az ég.
Eső, havas eső, havazás várható. Délután átmenetileg felszakadozik a felhőzet.
Többfelé élénk lesz a szél.
A nappali hőmérséklet – 4 - +1 fok között várható.

Holnap felszakadozik a felhő, nyugaton több, keleten kevés napsütéssel.
Kialakulhat még kisebb eső, havas eső. Mérsékelt lesz a szél.
A legmagasabb nappali hőmérséklet 5 – 10 fok között várható.

Húzza alá a szövegben! Jól figyeljen!

havazás felszakadozik havas eső várható

..../ 10 pont

Facebook

Note: The figure is a sample page from the 2014 winter training program of public workers. The page is originally from a textbook intended for dyslexic elementary school aged children; note that many of public workers were vocational, high school or even college graduates.
The title is "Test of Skill Level". The sheet first asks for information on name, birth date and place, and residential address. Then it ask the public worker if (s)he likes to draw, and then instructs to draw a cloud, a Sun, and a snowflake in the boxes. Then the reader is instructed to read carefully the read the text in the box (a weather forecast), then underline five words in the text.
Source of the picture: https://index.hu/belfold/2013/12/14/minosithetetlen_a_kozmunkaskepzes_egesze

C Concerns about ecological fallacy

One concern with our results might be that we cannot be sure that a correlation between a public worker count and a vote count means that public workers are the ones who vote for the ruling party or the mayor.

We corroborate previous findings by using survey data on employment status and party preference. The advantage of using survey data is that it allows us to test whether public workers *themselves* are more likely to support Fidesz, and hence our results are not driven by the ecological inference problem (King, 1997). We use the Tárki Monitor household level survey data collected in October 2014, which contains information on detailed employment status and political preferences.

We estimate a linear probability model and measure the party preference of public workers relative to the unemployed. Table 9 column 1 shows that the public worker status is positively correlated with party preference as public workers are 23 percentage points more likely to support Fidesz compared to the unemployed, which is significant at the 10 percent level. Adding individual level controls slightly decreases the point estimate but it remains significant at the 10 percent level. In column 3 we add county fixed effect to control for regional differences in labor market opportunities. The inclusion of county fixed effect makes the coefficient of public work 15 percentage points, however it is not significant at conventional levels.

Column 4-6 examine the relationship between public work and intention to vote. It reveals that public workers have 23 percentage points higher willingness to vote than the unemployed. The inclusion of individual control variables and county fixed effect does not change this pattern notably.

Table 9: Survey evidence on the party preference and voting intention of public workers

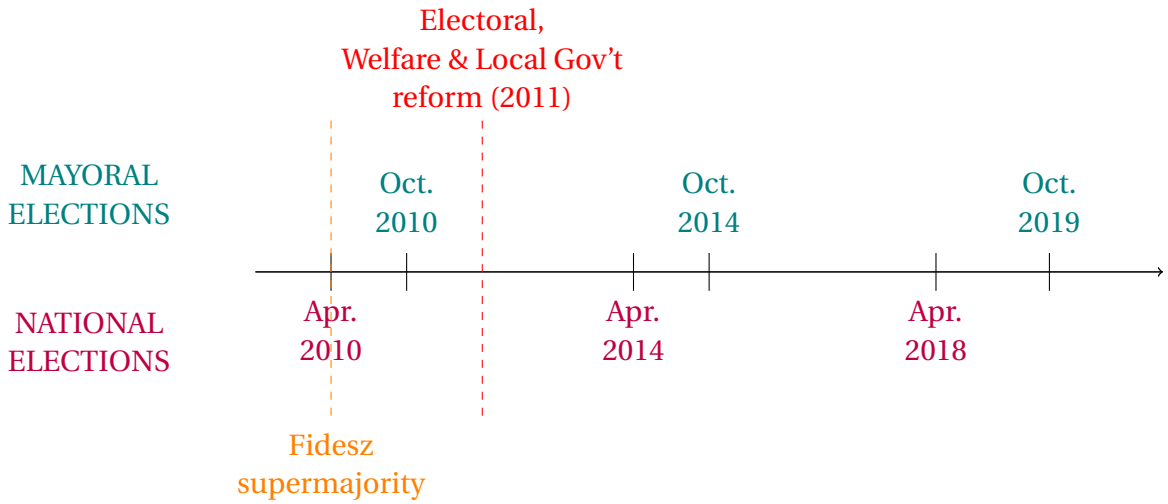
	Pr(Fidesz support)			Intention to vote		
	(1)	(2)	(3)	(4)	(5)	(6)
Public worker	0.229^{+}	0.197^{+}	0.151	0.229*	0.253**	0.206*
	(0.119)	(0.120)	(0.112)	(0.0926)	(0.0903)	(0.0837)
Controls		Yes	Yes		Yes	Yes
County FE			Yes			Yes
Observations	1670	1670	1670	3214	3214	3214

Notes: The table presents the estimates of public worker status on Fidesz support and turnout using linear probability models. The omitted baseline category is the unemployed. The survey data was collected in October 2014.
The control variables are education, gender, age, household size, employment status. The regressions are weighted. Robust standard errors are in parentheses.

** = significant at 1-percent level; * = significant at 5-percent level; + = significant at 10-percent level.

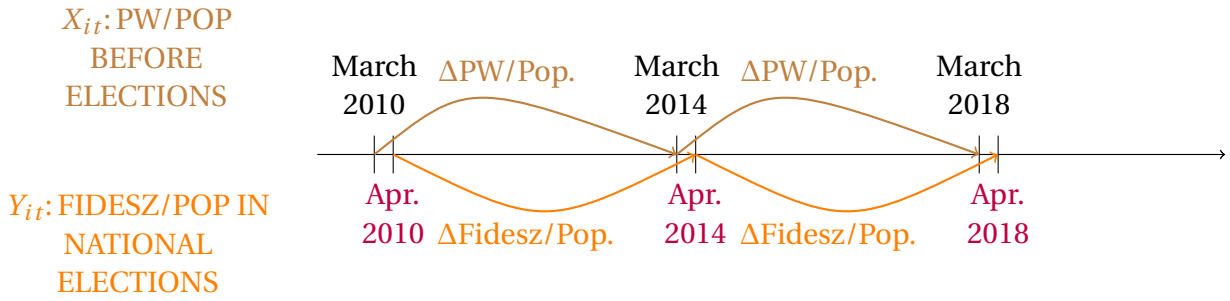
D Additional figures and tables

Figure 12: Timeline



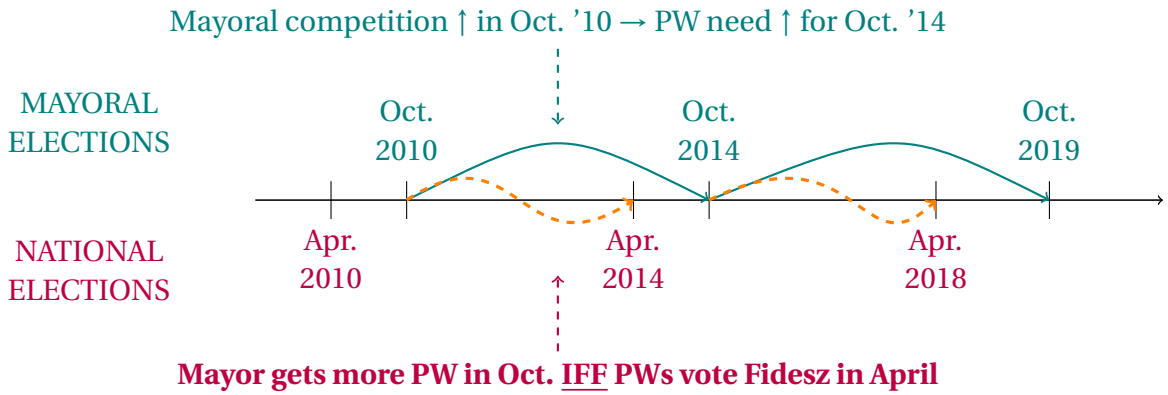
Note: The figure plots the timeline of elections and reforms.

Figure 13: Timeline for the First Difference Regressions



Note: The figure shows the time horizon for the First Differenced regression (Table 5). We use regress the difference of different measures of Fidesz support between April 2014 (2018) and April 2010 (2014) on the difference in the public worker to population share between March 2014 (2018) and March 2010 (2014).

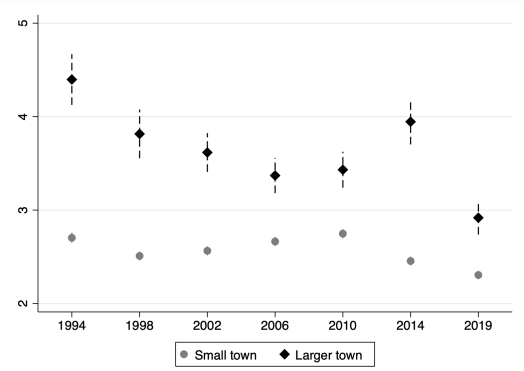
Figure 14: Timeline for the Instrumental Variables Regressions



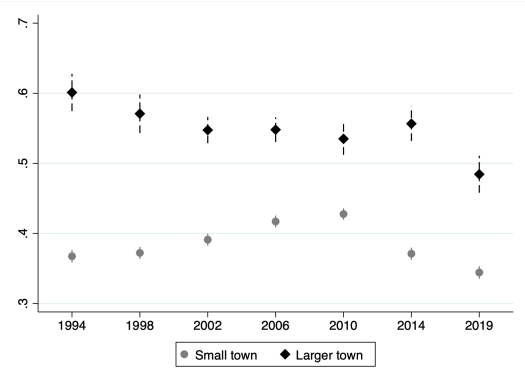
Note: The figure shows the logic behind the identification in the Instrumental Variables regression (Table 5). Mayoral and national elections are not synchronized, and most mayors are non-partisan. The mayor who wins in October 2010 (2014) assesses the competition (s)he has faced, and forms an expectation on future competition in October 2014 (2019). When facing higher competition *ceteris paribus*, (s)he will need a higher public worker quota from the central government. However, the national elections take place first, and the mayor has to make sure the workers vote for Fidesz, the party in government during the national elections in April 2014 (2018), in order to sustain their contracts into October of the same year. Thus variation in local competition in October 2010 (2014), which is plausibly unrelated to national politics, creates higher levels of public work (first stage), which is translated to more votes for Fidesz in April 2014 (2018).

Figure 15: Dimensions of mayoral competition over time

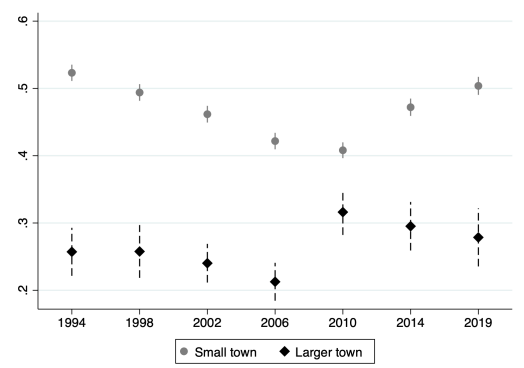
(a) Number of candidates



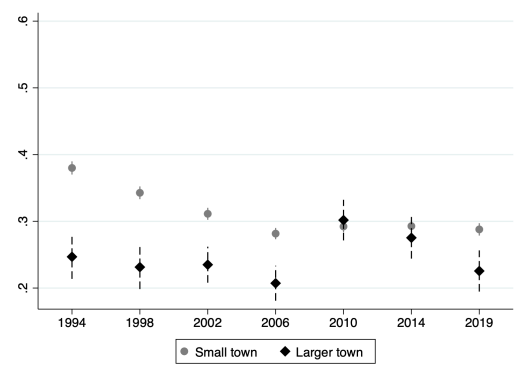
(b) Herfindahl-Hirschman Index



(c) Winner's margin



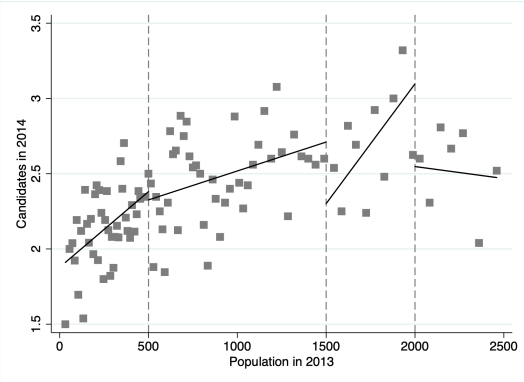
(d) Winner's margin if race contested



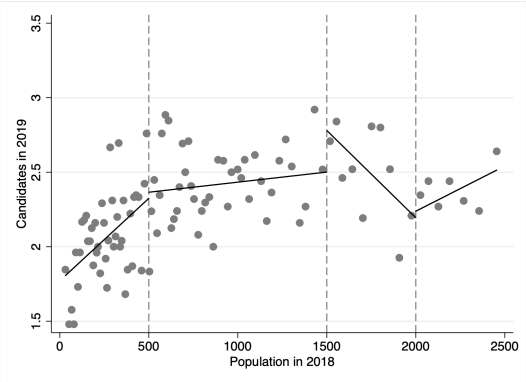
Note: The figure shows four dimensions of mayoral competition from 1994 to 2019. Panel A shows the total number of candidates running. Panel B shows the Herfindahl-Hirschman Index of competition, which is calculated as $HHI = 1 - \sum voteshare_i^2$, where i indexes candidates running in the settlement. Panel C shows the winner's average advantage over the runner-up; this is coded as 1 where the mayor runs unopposed and 0 in the case of a draw (which results in a sequence of recounts, and then, if necessary, a special election). Panel C shows the average advantage of the winner in those cases where at least two candidates ran for office. The ticks represent 95% confidence intervals. Diamonds correspond to settlements with at least 10.000 inhabitants; circles correspond to all settlement below that threshold.

Figure 16: Mayoral competition as a function of settlement population

(a) 2014



(b) 2019



Note: The figures show binned scatterplots of the number of candidates running for mayor as a function of the population in the preceding year in all setlements with at most 2500 inhabitants (80% of all). Mayoral salaries are determined by law as a fixed percentage of a benchmark salary that changes discontinuously at different values of the population. The benchmark salary is gross 997200 Forint and is earned by the 23 biggest cities excluding Budapest ("megyei jogú városok"). The plotted cutoffs are at 500 inhabitants (30% vs. 40% of the baseline), 1500 inhabitants (40% vs. 50% of the baseline), 2000 inhabitants (50% vs. 55% of the baseline). The further (omitted) cutoffs are at 5000 inhabitants (60%), 10000 inhabitants (70%) and 30000 inhabitants (80%). The average gross salary of full time employees was 237695 Forint in 2014 and 367833 Forint in 2019. This means that the average full time employee salary increased from 24% of the benchmark mayoral salary in 2014 to 37% of the benchmark mayoral salary in 2019. Consequently, all mayors earned above average in 2014 and mayors of towns above 500 inhabitants earned above average in 2019 (two-thirds of all mayors).