

Patronized Agents: Workfare and Clientelism in Hungary*

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Abstract

We study how selective and reversible government transfers can lead to clientelism. We build a model where the government allocates such transfers between municipalities and mayors select transfer recipients. The government exploits the re-election concern of mayors and provide transfer before local elections in exchange for political support in national elections. The mayors provide transfer to voters in exchange for political support in local and national elections. Focusing on a large scale public work program in Hungary and using difference-in-differences and regression discontinuity research designs, we show that the program led to increased support for the government and incumbent mayors. However, when funding for public work is not reversible, it does not lead to increased support for the government.

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1 Introduction

A promise of decentralizing political power is to bring politicians closer to voters and make local elected officials accountable to voters.¹ However, decentralization may lead to patronage and clientelism as it enables politicians to target benefits in exchange for political support (León and Wantchekon, 2019). 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 selective and reversible transfers can induce clientelism. We develop a model where the government allocates transfers between municipalities and gives local mayors the right to select transfer recipients. The selectivity and reversibility of transfer allows both the government and mayors to give the transfer conditional on political support, which leads to a two-layered clientelistic network. At the national level, the central government exploits the re-election concerns of mayors and provides the transfer in exchange for the mayor brokering votes in national elections. At the local level, the mayor exploits the economic vulnerability of voters and selects transfer recipients in exchange for political support in national and local elections.

We test the model predictions using a large-scale welfare reform in Hungary, which reduced the amount of time one can receive unemployment benefit and scaled up a public work program. The allocation of public work quotas across municipalities was partly determined by the discretionary decision of 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 elections leading to higher political support for the government. The number of public workers also increases before local elections, however, less so in municipalities with worse government performance in the previous election, suggesting punishment. Exploiting a regional eligibility criteria for a public work subprogram, we further show using spatial regression discontinuity design that when unconditionally receiving the public work quota, mayors do not broker votes for the government.

In Section 2 we develop a model of clientelism with intermediaries and incomplete information building on Bardhan and Mookherjee (2012). The party in government is

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

seeking to win the national election and it can provide public goods or private benefits to voters. Private benefit is public work, which provides a flow of income to program participants. In contrast with public goods, public work is selective and reversible, hence it can be targeted and taken away. This allows the government to engage in clientelism and buy votes by making participation in the public work program conditional on political support. However, it needs an intermediary for vote buying as it is too distant from voters to be able to monitor their behavior directly ([Gallego, Li, and Wantchekon, 2020](#)). The intermediaries are mayors who receive funding for public work from the government and decide on participation in the program. However, beyond brokering votes for the government, incumbent mayors themselves also seek re-election in local elections. As vote brokering is costly to intermediaries and their effort is not observable, the government motivates mayors by providing funding for public work before local elections. This allows mayors to use public work for their own benefits and increase their own re-election chances by making participation in the program conditional on voting for them in local elections.

How does the government sustain clientelism and ensure that mayors exert costly effort in vote brokering? As mayors' effort is not observable, the government's optimal strategy is to make funding for public work before local elections contingent on national election outcomes. If political support for the government in national elections exceeds a threshold, the government infers that the mayor is cooperating by exerting effort to broker votes, hence it provides funding for public work for the mayor before local elections. However, if the political support falls below the threshold, the government takes away funding for public work. Therefore the selective and reversible nature of public work funding makes the threat of reducing it credible, which enables the government to incentivize mayors to broker votes. However, if public work is not selective and reversible, but it is allocated by a rule, the clientelistic relationship between the government and the mayor breaks down. As mayors cannot be punished by taking away public work, they have no incentive to cooperate with the government and broker votes for it.

The model predicts that both national and local electoral competition affects the patron-client relationship between the government and the mayor, however, with an opposing sign. Higher national level competition leads to less clientelism as it decreases the chance of the government to win the election. Without remaining in office, the government cannot punish a non-cooperating mayor, and the lower probability of being

re-elected decreases the credibility of threat of taking away funding for public work. Therefore increased national level political competition lowers the incentive of the mayor to broker votes for the government, leading to less clientelism. At the same time, increased local political competition leads to more clientelism. A mayor being afraid of loosing her seat because of increased electoral competition is more likely to cooperate with the government as she does not wish to risk loosing public workers and their support before local elections. As a result, increased local electoral competition can strengthen the patron-client relationship between the government and the incumbent mayor.

Buying votes by offering participation in the public work program is easier when there are more poor voters in the municipality. As poor voters value the income stream of public work more relative to the provision of public goods, the patron-client relationship between the mayor and public workers is stronger when higher share of the population is poor.

We test these model predictions by exploiting a labor code and welfare system reform in Hungary, which are described in Section 3. After winning the 2010 election, the Fidesz government significantly reduced the amount of time people are eligible for unemployment benefit and reduced other types of social transfers as well. At the same time, the government increased funding for public work and made local mayors manage the program at the local level, including the selection of participants. With limited other types of social transfers, public work has a flavor of welfare as people have to work in order to get some assistance from the state. The government scaled up the program by increasing number of public workers by approximately 30 percent between October 2013 and April 2014 when national elections were held.

Section 4 describes the data sources and the empirical strategy. We build a municipality level panel database combining several administrative data sources. To estimate the effect of public work on political preferences, we use a difference-in-differences research design and compare the election results in high public work share municipalities to the political outcomes in low public work share municipalities before and after the reform. As public work is a substitute for unemployment benefit and it provides work opportunities to jobless people, it is higher in municipalities with weak local labor markets. Additionally, we exploit a subprogram of public work, whose funding dependend on the disadvantaged status of the micro region allowing us to spatial regression discontinuity design at the border of disadvantaged microregions.

We begin our analysis in Section 5 by showing that public work significantly contributed to the political support of the incumbent Fidesz in the 2014 national elections. One percentage point higher share of public workers relative to the working age population led to 0.14 higher Fidesz votes relative to the number of eligible voters. The increase in Fidesz popularity comes from higher higher vote share and higher turnout. Before the 2014 election, municipalities with high and low public work share did not exhibit differential Fidesz popularity, supporting the parallel trend assumption. Public work positively affected the support of incumbent mayors as well. We find that one percentage point increase in public work share raised the support for mayors among eligible voters by XX percentage point. The public work program also led to the entrenchment of mayors, as higher public work share lowered turnover of mayors.

Next, we examine the heterogeneity in the effect of public work. First, we find that public work increases support of Fidesz and the incumbent mayor more in weaker local labor markets, consistent with our model. When splitting our sample into two groups by local unemployment rate and education, we find that the coefficient of public work share is higher in municipalities with higher local unemployment and lower educational attainment. Second, stronger electoral competition at the local level also leads to bigger effect of public work share on political outcomes. Proxying the expected electoral competition by the number of candidates running for the mayoral position in the previous local election, we find that public work has significantly stronger effect in municipalities with higher electoral competition.

To support our empirical approach, we conduct several robustness checks. First, we show that the strategic allocation of public work quotas across municipalities cannot explain our results. Instrumenting public work share before the national election in 2014 with pre-election allocation gives similar results. Second, we use propensity score matching to ensure that it is not limited overlap in observable characteristics between high and low public share municipalities driving our results. Re-estimating our main regression on a matched sample gives similar results to our main estimates. Third, we use survey data that is not prone to ecological fallacy and show that public workers themselves have higher intention to vote and are more likely to support Fidesz.

In Section 6, we show that it is the selective and reversible nature of public work that allows the government to exploit the re-election concerns of mayors leading to clientelism. If voters value public work, increasing public work can lead to higher political support for

the incumbent politicians even in the absence of clientelism. To show that clientelistic relationship explains the previously documented voting patterns, we show two pieces of evidence.

First, we show that funding for public work before mayoral elections is conditional on the political support of the government in national elections. As the effort of mayor to broker votes for the government is not observable, it is optimal for the government to make funding for public work before local elections contingent on national election results. If the political support of the government falls below a certain threshold, the government decreases the funding for public work, leading to a negative relationship between national election results and public work share before local elections. Using a difference-in-differences design, we show that the number of public workers falls before local elections in municipalities where the political support of the government was lower in the preceding national election.

Second, when public work allocation across municipalities is rule-based, government cannot threaten mayors with taking away the funding for public work. Hence mayors have no incentive to broker votes for the government. We test this conjecture using the rule-based allocation of a public work subprogram. Eligibility for this subprogram depended on the disadvantaged status of the micro region of the municipality. Using spatial regression discontinuity design on the borders of eligible and non-eligible microregions, we show that eligibility to the program indeed leads to higher public work share. However, higher public work share does not lead to higher support for the government, suggesting that rule-based allocation prevents that government to take away funding for public work and hence there is no incentive for mayors to broker votes for the government. However, this does not abolish clientelism at the local level, as the mayor can still select public work participants in exchange for political support. These pieces of evidence provides support to the predictions of our model that the selective and reversible nature of public work is important for sustaining a patron-client relationship between the government and the mayor.

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). What welfare spending of the central government can decrease the vulnerability of poor voters, 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.

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; Kluge, 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. Our paper contributes to the literature on clientelism.

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 welfare 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:

$$W_i = q_i \nu_i + V_i(g),$$

where ν_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 $\nu_2 = 0$, 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 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:

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

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

$$\frac{\nu_1}{t} = \mu_1 \frac{\partial V_1}{\partial g} + \mu_2 \frac{\partial V_2}{\partial g} \tag{1}$$

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 their evaluation of the policy platform of G and the potential threat of being excluded from workfare exceeds a random threshold:

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

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

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

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 welfare 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). They decide whether to monitor/coerce voters before any election. If M pays an exogenous cost $c > 0$, they can set $z = \bar{z} > 0$; if they decide not to, $z = 0$ and voters are neither monitored nor coerced.

M has an incentive to co-operate with G, because the amount of welfare received has an impact on their own re-election probability $m(q_1)$, 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 they 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 their own election given they have not cooperated. Let p_L denote the probability that they get 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 during national elections if

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

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.

²It 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.

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 their own sake.³ How about national elections? Cooperation with G is optimal for M if their 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).

Proposition 2: the determinants of incentive efficiency. Incentive efficiency is monotonically increasing in μ_1 , σ_1 , γ , z , $1 - \theta$ and v_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 welfare 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 $z = \bar{z}$ or $z = 0$ into Equation 2, respectively. Then p^H is given by $p^H = \Pr(s < \underline{s} | E(s) = \pi^{NC})$ and p^L is given by $p^L = \Pr(s < \underline{s} | E(s) = \pi^C)$. We can calculate the limiting values of these expressions using the central limit theorem.

³If the mayor does not want or need clientelism in their 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 welfare 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.

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

$$\mu_1 \sigma_1 (1-\theta) \gamma \bar{z} q_1^{*,C} v_1.$$

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

3 Context

3.1 Political landscape

Political parties in Hungary are organized at the national level. The national parliamentary election consists of a majoritarian part, where voters can vote for candidates, and a proportional part, where voters can vote for party lists. The majoritarian component of the election system may motivate supporters of smaller parties to cast their votes strategically for candidates of larger parties. On the other hand, strategic voting behavior plays less of a role in voting decisions for party lists, so we focus on votes cast on party lists.

National elections are held in the spring of every four years since 1990. Panel A of Table 1 summarizes the national election results. Left-wing parties won the election in 2002 and 2006, then the right-wing Fidesz won the elections in 2010, 2014 and 2018, leading to supermajority in all of these elections.⁴ Turnout fluctuated between 60 and 70 percent in these elections, reaching the lowest in 2014 with 61 percent.

At the local level, voters can directly elect mayors along with municipality council members. We focus on the electoral results of mayors as they manage the local apparatus. Independent, non-partisan politicians are common at the local level, especially in smaller municipalities.

Municipalities have limited power to raise revenue by taxes, most of the public goods

⁴By winning the 2010 election with supermajority, which allowed it to change the constitution without the consent of opposition parties, Fidesz fundamentally transformed the political system. 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 Fidesz. The ruling party has been extending its control over the media, the judiciary, and other state resources, see [Scheppele \(2015\)](#); [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 in detail.

are financed by the government. This limited capacity and scope for setting local policies were further reduced by the local government reform in 2011 increasing their dependence on the central government ([Dobos and Papp, 2017](#)).

Local election were held in the fall of the same years as the parliamentary elections until 2014, and in the fall of every 5 years starting from 2019. Panel B of Table 1 shows the election results for the mayoral position. Independent candidates winning the elections are common. The turnout in local elections is significantly smaller than in parliamentary elections.

3.2 Public work program

Public work has existed to help jobless people since the early 2000s. After exhausting the unemployment benefit, people could receive a means-tested social transfer or could enroll in public work program, which was financed by the central government. Participation in the program has never been guaranteed for the eligible as the number of public work job opportunities has been lower than the number of eligible people. Moreover, public workers could be laid off without notice.

Until the 2008 financial crisis, the PW program was not a dominant element of active labor market policies. In the wake of the 2008 financial crisis, the left-wing government increased public work funding. As a result, the number of public workers increased to 170 thousand in 2010.

Labor code reform in 2011 After winning the 2010 election, the Fidesz government changed the labor code in 2011 and made the unemployment insurance system stricter by reducing the unemployment benefit period to 3 months. Moreover, the government also significantly reduced the social transfers that inactive and unemployed people can receive. The government announced the reform by declaring that it will provide jobs to everybody who is able to work. The public work program was scaled up to provide jobs and become the most important active labor market policy in Hungary. Following the reform, public workers received less than the minimum wage for their work ([Bördős, 2015](#)). With scaling down social transfers, public work had become similar to welfare as jobless and disadvantaged people were required to work in order to receive benefits from the state.⁵

⁵[Szabó \(2022\)](#) presents descriptive statistics on the characteristics of public workers. There is no statistical data collection on what public workers are actually doing in their working hours. It was criticised for its

Figure 1 plots the aggregate share of unemployed and public workers relative to the working age population. but still lagged behind the actual number of the unemployed. In the beginning, there was strong seasonality in the program as the number of public workers fell significantly during the winter period, when job opportunities like temporary agricultural work is also scarce. This pattern changed with the coming of Parliamentary election in April 2014 when public work did not fall but increased.

Three subprograms of public work The government created three main public work programs: Long-term, National and Start public work programs.⁶ Bördős (2015) provides an excellent overview of these programs and Molnár et al. (2019) discuss the allocation mechanisms. Below we focus on main features of these programs and their allocation rules.

In the Long-term public work program, mayors receive funding for public work by applying at the local office of the central administration. In the national program, state-owned companies employ public workers by a quota specified by the central government. In contrast, the Start program only targeted municipalities in „disadvantaged microregions”. There are 175 microregions, and the disadvantaged status was decided in 2007 based on a development index, relying on 34 economic and social indicators, ranging from unemployment rate to the number of high-speed internet subscriptions.⁷ A microregion was 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 6.

The programs did not only aim to support the non-employed but also to develop small villages with adverse labor market conditions . To support this goal, funding not only cover the wage bill of public workers but can be used for other nonwage direct costs, for example buying machinery (Bördős, 2015; Ministry of Interior, 2020).

The long-term and Start public work programs are organized by mayors at the local level. Having received the funding for public work, mayors had full discretion to select public work participants and to determine the duties of public workers.

ineffectiveness to help public workers to find jobs in the labor market (Cseres-Gergely and Molnár, 2014), and it is generally considered the least effective active labor market policy (Card et al., 2010, 2018).

⁶At the beginning, there were other smaller programs, but these were merged into these three main programs soon.

⁷<https://mkogy.jogtar.hu/jogsabaly?docid=a07h0067.0GY>

3.3 Clientelism at the local level

The labor code change in 2011 increased the power of mayors relative to poor voters. Scaling back the welfare system and increasing the discretion of mayors to select public work participants made poor voters vulnerable and allowed the mayor to take advantage of their situation, especially in weak labor markets with limited job opportunities. These changes allowed mayors to establish patron-client relationships with their voters by providing public work in exchange for political support. Being both selective and reversible, public work allows mayors to maintain clientelistic relationships (Robinson and Verdier, 2013).

In line with this, there has been ample anecdotal evidence that public work was exploited to broker votes for the mayor and Fidesz. Mares and Young (2018) and Mares and Young (2019a) show survey evidence that mayors used access to the public welfare 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(Mares and Young, 2019a, p. 452)).⁸ In some polling stations, voters even showed their ballot to the mayor's people openly before casting it.⁹ An investigative journalist even compared mayors to vassals of the local members of Parliament.¹⁰

4 Data and empirical strategy

We build a municipality level database that combines information from many data sources. There are 3176 municipalities in Hungary and the average population was approximately 3100 in 2014.

4.1 Data

Public employment We obtain settlement-month level data on the number of public workers from the Ministry of Interior starting from 2011. THe data contains the total number of public workers as well as the number of public workers by its type (Start,

⁸Mares and Young (2019b) provides several additional interview pieces.

⁹<https://atlatszo.hu/kozpenz/2014/10/14/kozmunka-csak-a-megfelelo-voksert-nyilt-szavazas-volt-borsodban/>

¹⁰"Mayors of small towns are by and large vassals, political vassals, who are responsible to the Member of Parliament for keeping things in order." (Source: <https://youtu.be/lhNRah82D8Q?t=679>). For further overview, see Gyulai (2017).

long-term and national). As short-term, temporary employment in public work program is common, our focus is on the full time equivalent number of public workers.

Data on previous time period comes from the T-STAR municipality-year level database of the Central Statistical Office (KSH). This contains the number of public workers.

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 eligible voters, turnout and the number of votes by political parties and candidates.

Using the mayoral candidates' name, we define a mayor as incumbent in an election if he or she won the previous election in the same municipality. If the incumbent mayor does not run in an election then the incumbent vote share is missing.

Other data sources We also use several other municipality level data sources as control variables. First, data on settlement level average educational attainment comes from the 2011 census. Second, yearly information on municipality income, employment at the 1-digit ISCO occupation code, unemployment and demographics are from the T-STAR database.

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.

4.2 Measuring public work exposure

We measure public work exposure at the municipality level by the share of public workers among the working age (18-59) population:

$$PW_{it} = \frac{N_{PW,it}}{N_{W,it}},$$

where $N_{PW,it}$ is the number of public workers in municipality i at time t and $N_{W,it}$ is the number of people aged 18-59. We focus on the public work share in April 2014 when national election was held and in October 2014 when local election ws held.

Figure 2 shows the municipality level map of PW in April 2014 when national elections were held. The coloring corresponds to the deciles of PW . While in the lowest deciles

only a few percent of the working age population worked as public workers, the median is approximately 5 percent and more than 17 percent of the working age population were employed as public workers in the highest decile.

Variation in public work share is driven by local labor market conditions to a large extent. As the government designed the public work program to provide work opportunities instead of giving unemployment benefit and other social transfers, it is higher in regions with weaker local labor markets. To show this, we correlate municipality characteristics with public work share. Table 2 presents results from regressions of PW on municipality level characteristics, where each row represents one bivariate regression.

Table 2 shows that municipalities with higher share of public workers tend to have lower population, lower income and lower educational attainment. Moreover, municipalities with higher public work share had higher unemployment both before the scaling up of public work program in 2010 and in 2014. These regressions show significant differences between low and high public work share municipalities for most variables as the R^2 is high in most of them. Our estimation strategy will control for these covariates to make sure that the results are not driven by compositional differences in observables.

Figure B.1 shows the allocation of public workers and working age population by settlement type. While approximately one-third of the working age population live in county capitals, towns and villages, only 10 percent of public workers live in county capitals, 31 percent in towns and remaining 59 percent in villages.

This uneven distribution of public workers motivate us to narrow our sample and focus only on towns and villages in our analysis.

4.3 Empirical strategy

To estimate the effect of public work on election outcomes, we use a difference-in-differences research design and examine whether the political support for the incumbent Fidesz party increased more in municipalities with high public work share following the public work reform in 2011:

$$FideszSupport_{it} = \alpha_i + \delta_t + \mu_{ct} + \beta PW_{i,2014m4} \times Post_t + \Gamma X_{it} + \varepsilon_{it}, \quad (4)$$

where $FideszSupport_{it}$ is the share of votes casted on Fidesz relative to the eligible number of voters in municipality i and election year t , $PW_{i,2014m4}$ is the share of public

workers relative to the working age population in April 2014, $Post_t$ is post-reform dummy variable that is equal to one after 2011 and zero otherwise, α_i and δ_t are municipality and election year fixed effects, respectively. The control variables are pre-2014 municipality characteristics interacted with $Post_t$. The covariates are educational shares, log population, log after-tax income per capita, share of employed relative to the working age population, occupational shares of employed people, unemployment relative to working age population. We also control for microregion-election year fixed effects, μ_{ct} , which captures local, microregion level time-varying shocks to political preferences. The coefficient of interest is β , which measures the effect of public work share on Fidesz support.

We use the national elections from 2002 to 2014, and we separately analyze the 2018 election. We cluster standard errors at the subregion level (175 units).

Similarly, we estimate the effect of public work on incumbent mayor's political support:

$$IncumbentMayor_{it} = \alpha_i + \delta_t + \beta PW_{i,2014m10} \times Post_t + \Gamma X_{it} + \varepsilon_{it}, \quad (5)$$

where $IncumbentMayor_{it}$ is the number of votes casted on the incumbent mayor relative to the eligible number of voters. As sometimes incumbent mayors do not run in elections, the sample size is lower than the total number of municipalities.

The main identifying assumption for both regressions is the parallel trend assumption. This means that there are no time-varying shocks to political preferences that are correlated with public work share, conditional on covariates.

5 Results

5.1 Main results

Table 3 presents the main results. Panel A reports the effect of public work on Fidesz support. Column 1 reports the results when controlling for only municipality and election year fixed effects. This shows that one percentage point increase in public work share is associated with 0.14 percentage point increase in Fidesz votes relative to the eligible number of voters. Controlling for municipality characteristics in column 2 does not change the coefficient qualitatively, one percentage point increase in public work share increases Fidesz support by 0.12 percentage point and it is highly significant.

In column 3, we control for subregion-election year fixed effects, which control for time-varying local shocks to political preferences. These fixed effects can capture changes in local labor market conditions as well as changes in subregional political preferences. The point estimate of public work share remains similar to the previous estimates, indicating that the public work significantly increased political support for Fidesz.

As the positive effect of public work on Fidesz support can be attributed to higher Fidesz popularity among voters and to higher turnout, in the last two columns we decompose Fidesz support into these two margins. We separately examine how the public work program affected Fidesz vote share and turnout by re-estimating Equation (4) for these outcomes. Column 4 shows that public work share significantly increased the vote share of Fidesz by 0.125. Moreover, it also significantly raised the turnout (column 5). These results suggest that public work program is used for vote buying as well as turnout-buying.

As public work might have been scaled up most in regions with already increasing Fidesz popularity, we examine the parallel trend assumption for the pre-reform period by estimating the following regression:

$$FideszSupport_{it} = \alpha_i + \delta_t + \sum_{j \neq 2010} \beta_j PW_{i,2014m4} \times I(j = t) + \Gamma X_{it} + \varepsilon_{it}, \quad (6)$$

where $I(j = t)$ is a dummy variable that equals one in year t and zero otherwise. Election year 2010 is the reference election.

Figure 4 plots the estimated β_j coefficients and shows that they are close to zero and insignificant in the pre-reform period. This indicates that there was no differential trend in the popularity of Fidesz between low public work share and high public work share municipalities. Following the reform, Fidesz support increases sharply in 2014

Panel B of Table 3 shows the estimates for the support of incumbent mayors.

The increased support for incumbent mayors through the public work program also suggests weakened accountability of mayors as it makes it harder to replace incumbent mayors. We formally test this hypothesis by re-estimating Equation (5) using the re-election of the incumbent mayor as the outcome variable.

?? shows the estimates. It shows that the public work program significantly decreased political turnover.

A decline in political turnover is not necessarily driven by the entrenchment of the incumbent, instead, the position of the mayor might have become less desirable in

municipalities with a lot of public workers. Although we cannot test for the change in the quality composition of candidates, we examine whether the number of mayoral candidates decreased following the reform, which could explain the lower turnover of mayors.

Column 3 and 4 of shows that ?? shows

5.2 Heterogeneous effect of public work

Next, we explore the heterogeneity of the effect of public work on political outcomes. Our model predicts that some municipality characteristics make a clientelistic relationship more likely. Politicians can more easily exploit voters in municipalities with weak labor markets as often public work offers the only income opportunities. This is also consistent with the idea that political allegiance of clients is cheaper to buy at low income levels ([Robinson and Verdier, 2013](#)).

To examine how local poverty influences our results, we split our sample into groups based on local unemployment rate and re-estimate our main regressions. Table 4 presents the results. We find that the public work has no significant effect on Fidesz support in municipalities with low unemployment but there is a strong effect in municipalities with high unemployment. We find similar results when we proxy local poverty by educational attainment in column 3 and 4. While there is a strong and significant effect in low education municipalities, there is no significant impact in high education settlements. In Panel B, we find similar results for incumbent mayors.

We also examine the heterogeneity in the effect of public work by mayoral competition. Mayors facing tougher local elections may more likely to cooperate with the government, leading to stronger effect of public work. The intensity of local elections is measured by the number of candidates running in the 2010 election. In column 5 of Panel A, we find smaller effect in municipalities with lower electoral competition and higher effect in more competitive municipalities (column 6).

5.3 Robustness

Strategic allocation of public work One concern with our research design is the potential strategic, non-random allocation of public workers across municipalities. The government may use public work to reward its own supporters ([Maurer, 2018](#)), which

would lead to upward bias in the estimates. However, the government may allocate public work to municipalities where its support is lower to win over undecided voters.

To show that such strategic allocation of public work is not driving our results, we instrument public work share. Figure 1 shows strong within-year seasonality in public work as it is the highest during the summer. This pattern changed with the coming of national election in April 2014. Instead of decreasing at the end of 2013, it increased by approximately 30 percent and reached its peak right before the election. While the scaling up of the public work program before election may reflect political motives, the allocation of public work a year before reflects needs and available funding. Therefore we use the April 2013 public work share to instrument public work in April 2014.

?? shows that the estimates are similar to our main results indicating that our results are not driven by strategic allocation of public work.

Propensity score matching As public work share correlates with many municipality characteristics, we use propensity score matching to make sure that our results are not driven by limited overlap in observable characteristics between high public work share and low public work share municipalities. We split our sample into two groups based on the municipalities' public work share in April 2014.

?? presents the balance table for the matched sample.

?? reports the results of estimating our main equations on the selected sample.

Individual survey on voting 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 A.1 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.

6 Reversible funding for public work

6.1 Punishment

How are clientelistic relationships sustained? In particular, what happens to public work when political support of Fidesz is not high enough despite the mayor receiving public work quotas? As public work was designed to help regions with weak labor markets, there should be no change in the allocation as long as the labor market conditions do not change. However, if public work was used to buy votes by the vote-brokering mayor, the government should punish the mayor for not delivering enough support by cutting public work funding.

We test this conjecture using monthly data on the share of public workers following the national election in April 2014. We estimate the following difference-in-differences regression:

$$PW_{it} = \alpha_i + \delta_t + \gamma FideszSupport_{i,2014m4} \times I(t > 2014m4) + \Gamma X_{it} + \varepsilon_{it},$$

where PW_{it} is the share of public workers relative to working age population in municipality i in time t , $FideszSupport_{i,2014m4}$ is a measure of electoral support on the April 2014 election in municipality i , $I(t > 2014m4)$ is dummy variable equal to one after April 2014 and zero otherwise. We use the period between the Parliamentary election in April 2014 and the mayoral election in October 2014 for the estimation. The coefficient of interest is γ , which captures how public work allocation is affected by the local electoral performance of the governing party. We use the period between July 2013 and October

2014 for the estimation.

Table 5 present the results of Fidesz electoral performance on public work allocation. In column 1, we find that in municipalities with higher Fidesz support, public work share increased. In column 2, we add control variables as well as subregion-month fixed effects, which controls for changes in local labor market conditions. The point estimate is 0.03, implying that 1 percentage point higher Fidesz support in the Parliamentary elections led to 0.03 higher public work share. As a robustness check, we report the results when Fidesz vote share is used in Table B.2.

Figure 3 plots the dynamic impact of Fidesz support on public work share. Public work evolved similarly in municipalities with high and low Fidesz support until the national elections in April 2014. Then public work share increased in municipalities with higher support until the local elections in October 2014. Following the local elections, there was no significant difference in the allocation of public work by Fidesz support, suggesting that Fidesz allocated less public workers before local elections to punish mayors who did not brokered enough support for Fidesz in the national elections. However, following the local elections, there was no rationale to continue punishing these municipalities and the difference in public work share disappeared.

An alternative way of examining the punishing behavior of the government is to look at the various subprograms of public work. As Start public work is allocated based on the disadvantageous status of the microregion, Fidesz can only punish municipalities by withdrawing the funding for the other types of public work schemes. aggregate PW by type to the appendix??

To assess the magnitude of this effect, we multiply the coefficient with the difference between the 10th and 90th percentile of Fidesz support, $0.033 \times (33 - 20) = .4$, which is approximately 10 percent of the average public work share in October 2014. This suggests that Fidesz used the allocation of public work funding to punish incumbent mayors before local elections.

6.2 Non-reversible funding

What happens when public work cannot be taken away to punish incumbent mayors? Our model suggests that unconditionally allocated public work does not cause mayoral clientelism: if public work cannot be taken away from the mayor in absence of cooperation with the government, then mayors have no incentive to engage in clientelism.

To test this conjecture, we exploit variation in the Start subprogram of public work. As the eligibility of this program depended on the disadvantaged status of the microregion, funding could not be made contingent on election outcomes. We use spatial regression discontinuity design around the border of disadvantaged microregions to examine how non-reversible funding affects national and mayoral election outcomes.

Figure 5a 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 Figure 5b are used for the analysis while grey color indicates those that are not included in our main sample. Figure B.6 plots the distribution of distance to the nearest disadvantaged border. It shows that municipalities are approximately evenly distributed on both sides of the border.

Figure 7 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 7b). 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 ?? 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 8a 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 8b).

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 6 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 B.5 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 them 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.

7 Conclusion

In this paper we show how selective and reversible government transfers can induce clientelism. We build a model where the government allocates such transfers across municipalities. In addition, the government gives the right to mayors to select transfer recipients, leading to a two-layered clientelistic network. The mayor provides the transfer to people in exchange for political support. The government exploits the re-election concerns of incumbent mayors, who broker votes for the government.

We test the prediction of the model using a large scale welfare reform in Hungary. As a result of the reform, the amount of time one can receive unemployment benefit significantly decreased, while funding for a public work program increased. The allocation of public work quotas across municipalities was partly determined by the discretionary decision of the government while at the local level mayors decided about participation. We

show that higher public work share increased the political support of the government and the incumbent mayors. However, this result depends on the reversibility of public work funding as in municipalities where the government could not take away funding for public work, higher public work increases only the support of the mayor and not the government.

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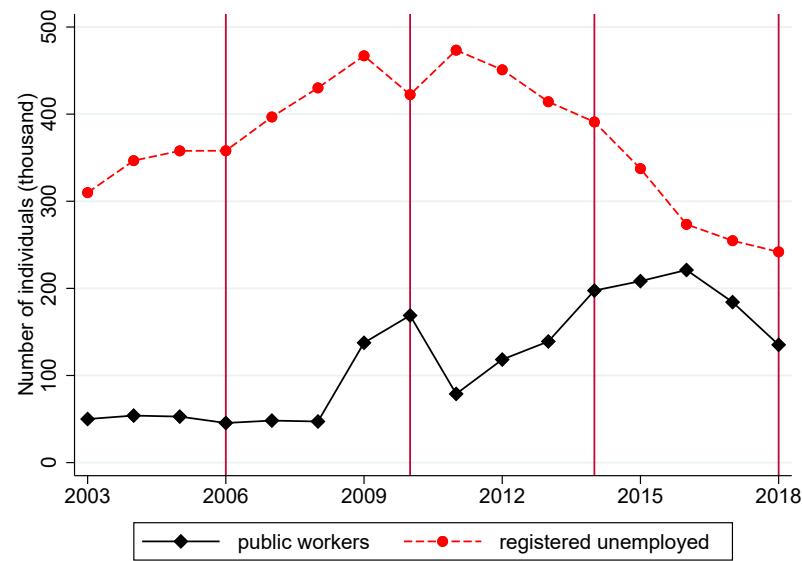
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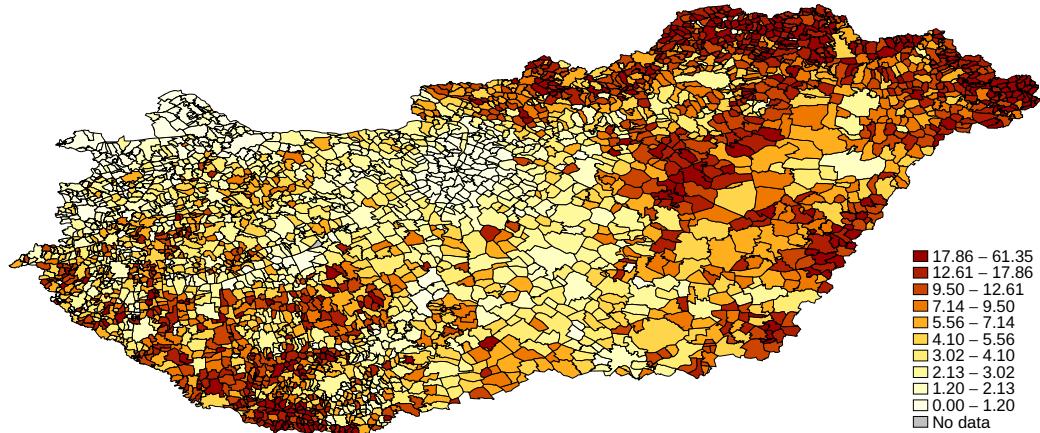
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Figure 1: Aggregate share of public workers



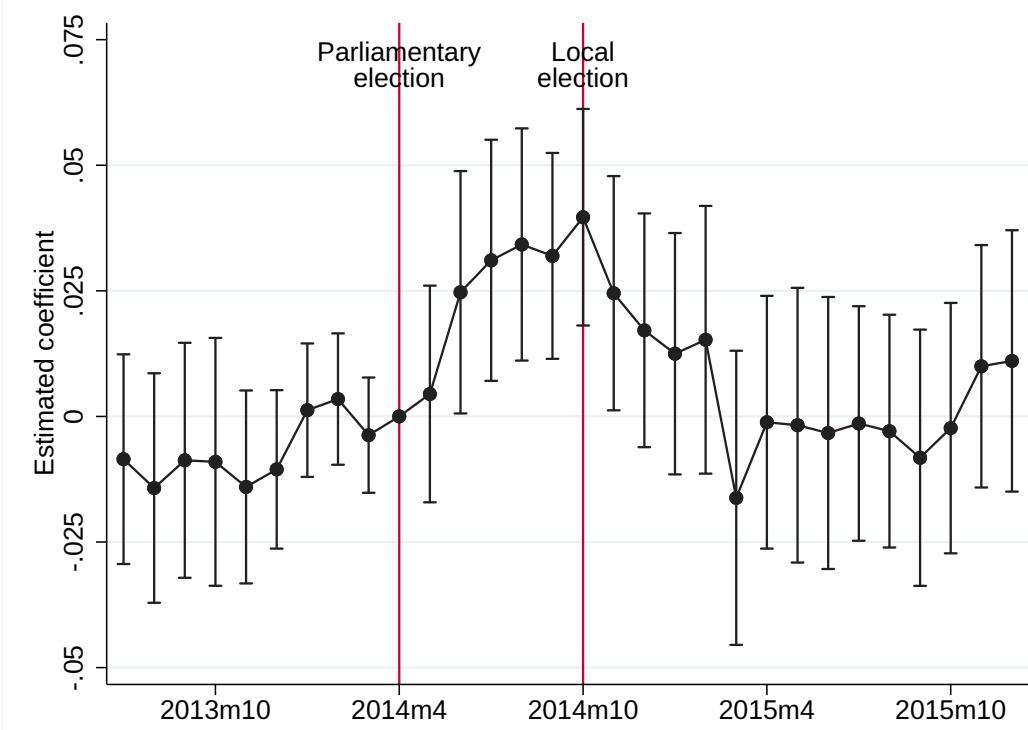
Note:

Figure 2: Spatial distribution of the share of public workers in April 2014



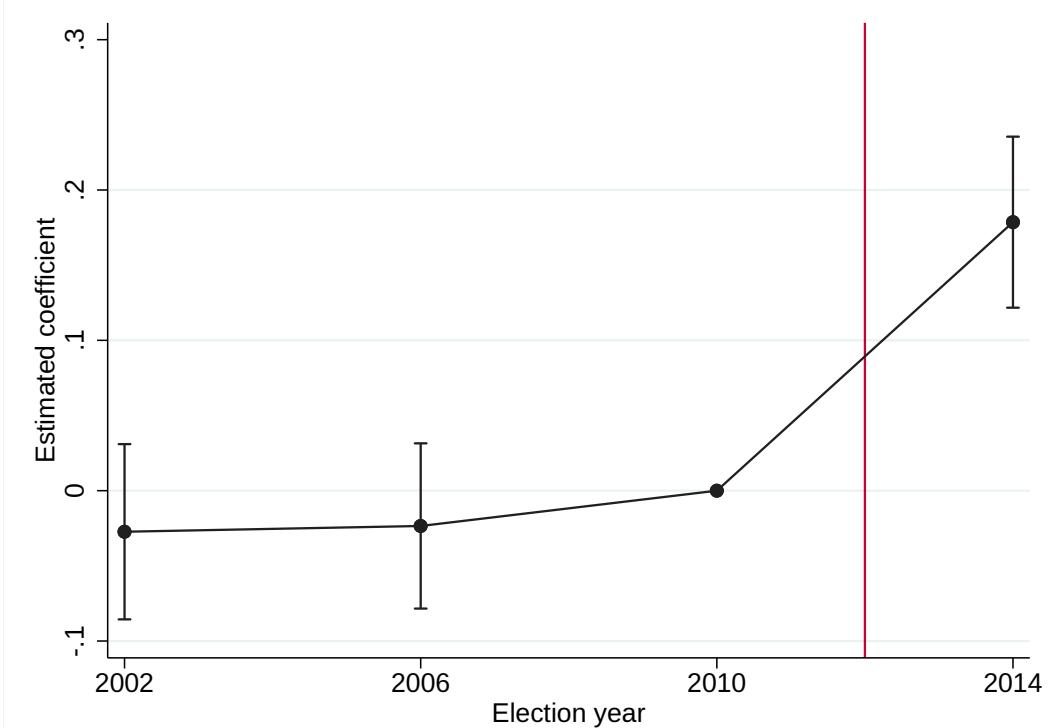
Note:

Figure 3: The effect of Fidesz support on public work share



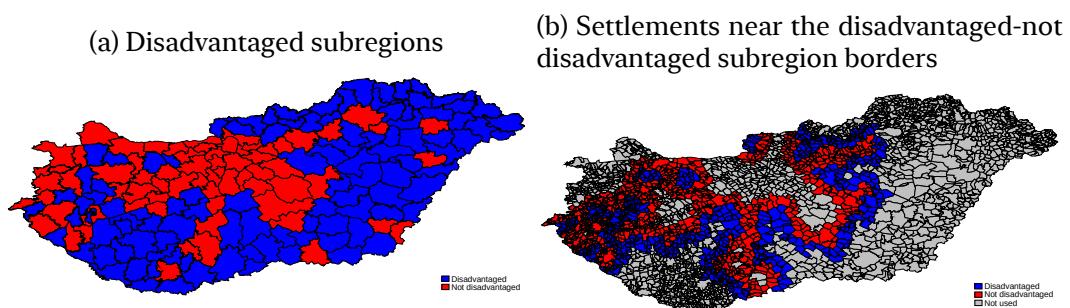
Note:

Figure 4: Parallel trend



Note:

Figure 5: Subregions by disadvantaged status



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 subregion borders. 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 6

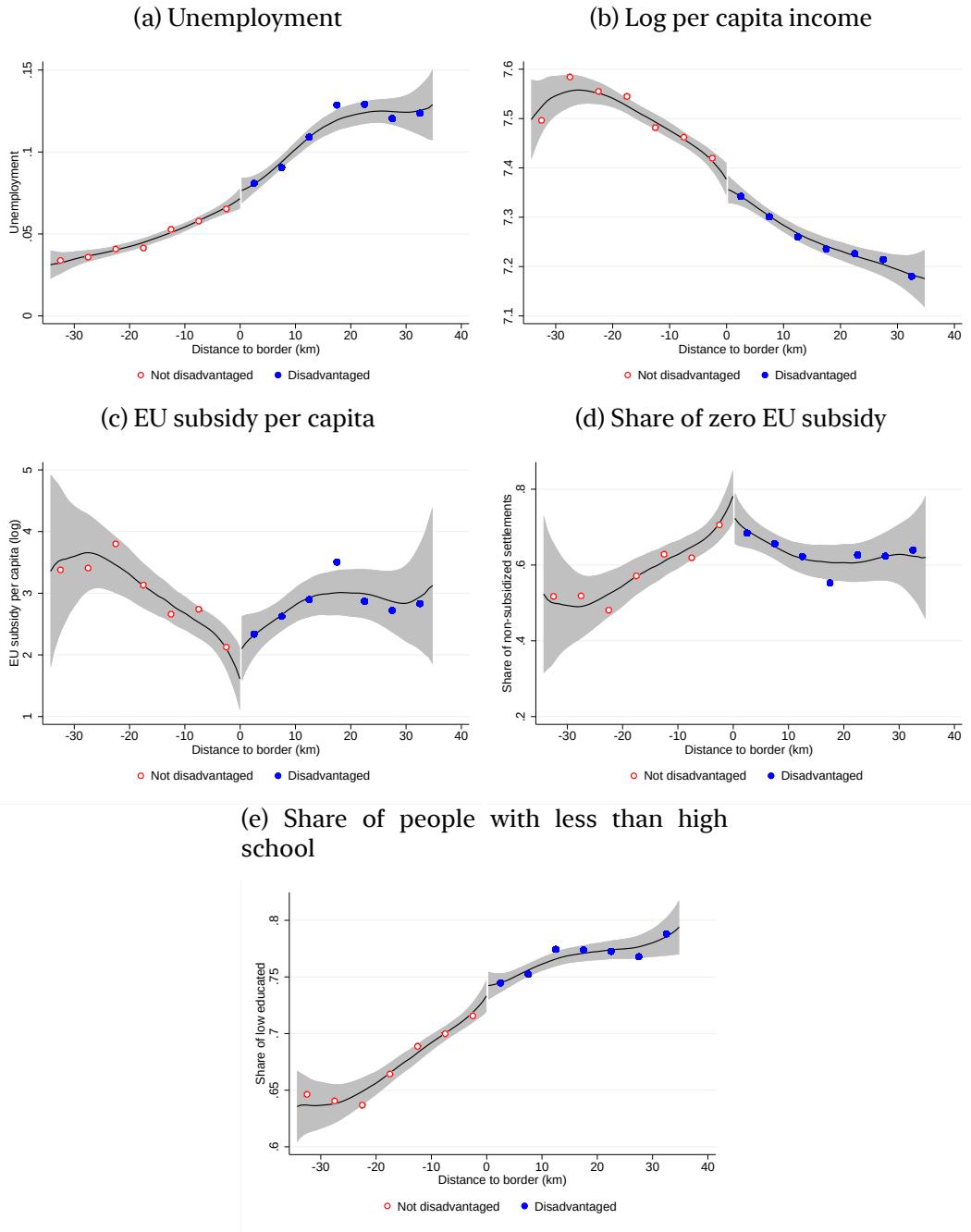
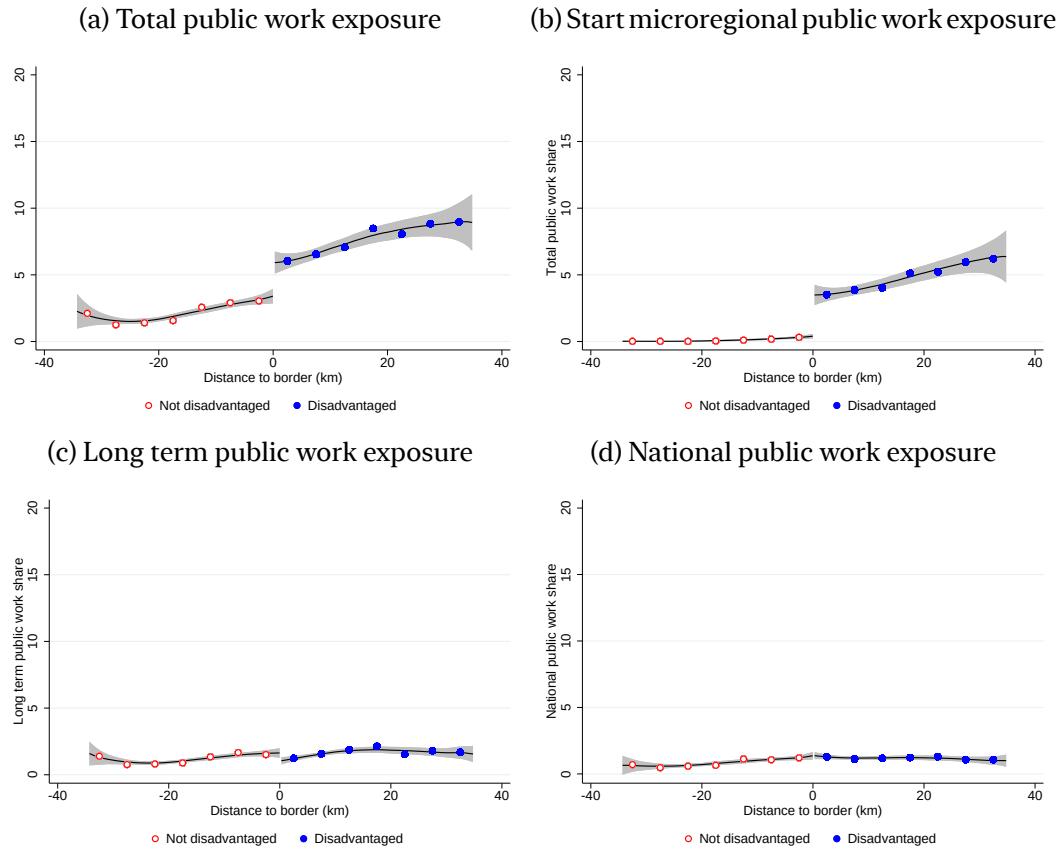
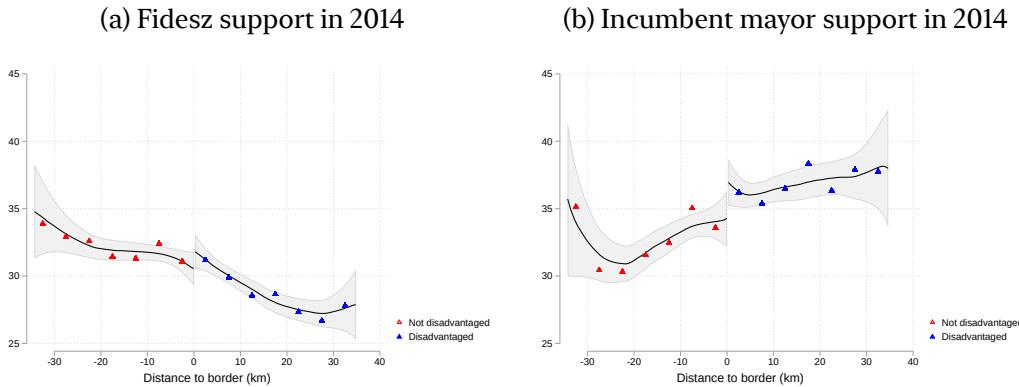


Figure 7: Public work exposure in April 2014 around the border region



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 exposure, Figure c) plots the long term public work exposure, and Figure d) plots the national public work exposure.

Figure 8: Political outcomes in 2014



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

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 Magyarországról). 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 public work share

	Coefficient	Standard error	N	R^2
Primary school share	.35**	.009	3133	.49
Vocational share	-.015	.045	3133	.00014
High school share	-.51**	.016	3133	.4
College share	-.44**	.025	3133	.27
Log population	-.015**	.00069	3133	.18
Unemployment rate, 2014	.62**	.02	3111	.38
Share of Roma minority	.58**	.02	3133	.4
Share of employed, 2013	-.032*	.015	3133	.0031
Share of employed in manager occupations, 2013	-.91**	.048	3130	.3
Share of employed in elementary occupations, 2013	.4**	.0079	3130	.66

Notes: Each row in this table reports a bivariate regression where the dependent variable is public worker share in April 2014 and the independent variable is listed in the first column. The regressions are weighted by the number of eligible voters in 2014. Standard errors are clustered at the microregion level (175 units).

+, *, ** indicate significance at the 0.1, 0.05 and 0.01 levels, respectively.

Table 3: Election results and turnout

	Fidesz support			Fidesz vote share	Turnout
	(1)	(2)	(3)	(4)	(5)
Public work share × Post	0.142** (0.0227)	0.122** (0.0292)	0.143** (0.0345)	0.125** (0.0343)	0.0566* (0.0224)
Municipality & election year FE	Yes	Yes	Yes	Yes	Yes
Controls		Yes	Yes	Yes	Yes
Subregion-election year FE			Yes		
R^2	0.841	0.843	0.856	0.823	0.845
N	12672	12608	12608	12608	12608

Notes: This table reports

Table 4: Heterogeneous effect of public work on Fidesz

	Education		Unemployment		Mayoral competition in 2010	
	(1) Low	(2) High	(3) Low	(4) High	(5) Low	(6) High
Public work share × Post	0.147** (0.0362)	0.0295 (0.0463)	0.0630 (0.0508)	0.146** (0.0355)	0.0687* (0.0275)	0.125* (0.0608)
Municipality & year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	6314	6294	6299	6309	9460	3052

Notes: This table reports

Table 5: The effect of Fidesz support in Parliamentary elections on public work share

	Total PW share		Long-term PW in non-disadv. regions	
	(1)	(2)	(3)	(4)
Fidesz support × Post	0.0230** (0.00639)	0.0331** (0.00897)	0.0192** (0.00520)	0.0196+ (0.0102)
Municipality & month FE	Yes	Yes	Yes	Yes
Controls		Yes		Yes
Subregion-time FE		Yes		Yes
N	50336	50032	18576	18464

Notes: This table reports

Patronized agents: workfare and clientelism

Online Appendix

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- Appendix A provides proofs of the propositions
- Appendix B presents additional tables and figures

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A 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 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:

$$\frac{v_1}{t} \sigma_1 \left(1 + \frac{1-\theta}{\theta} \gamma z \right) = \mu_1 \sigma_1 \frac{\partial V_1}{\partial g} + \mu_2 \sigma_2 \frac{\partial V_2}{\partial g} \quad (\text{A.7})$$

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 than 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:

$$\pi^C = \kappa + \mu_1 \sigma_1 (\theta (V_1(g) + q_1 v_1) + (1 - \theta) (\gamma z q_1 v_1)) + \mu_2 \sigma_2 \theta V_2(g)$$

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

$$\pi^{NC} = \kappa + \mu_1 \sigma_1 \theta (V_1(g) + q_1 v_1) + \mu_2 \sigma_2 \theta V_2(g)$$

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 $\delta_{C,NC}^2 = \pi^{C,NC}(1 - \pi^{C,NC})$. 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 $\Pr(s\% < \underline{s})$. 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

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

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

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

and

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

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

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

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

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

The solution is a maximum if

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

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

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

For any π_{NC} , the above value is increasing in $\pi_C - \pi_{NC}$, which will be increasing in z , γ and $1-\theta$.

Table A.1: 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 ⁺ (0.119)	0.197 ⁺ (0.120)	0.151 (0.112)	0.229* (0.0926)	0.253** (0.0903)	0.206* (0.0837)
Controls		Yes	Yes		Yes	Yes
County FE			Yes			Yes
Observations	1670	1670	1670	3214	3214	3214

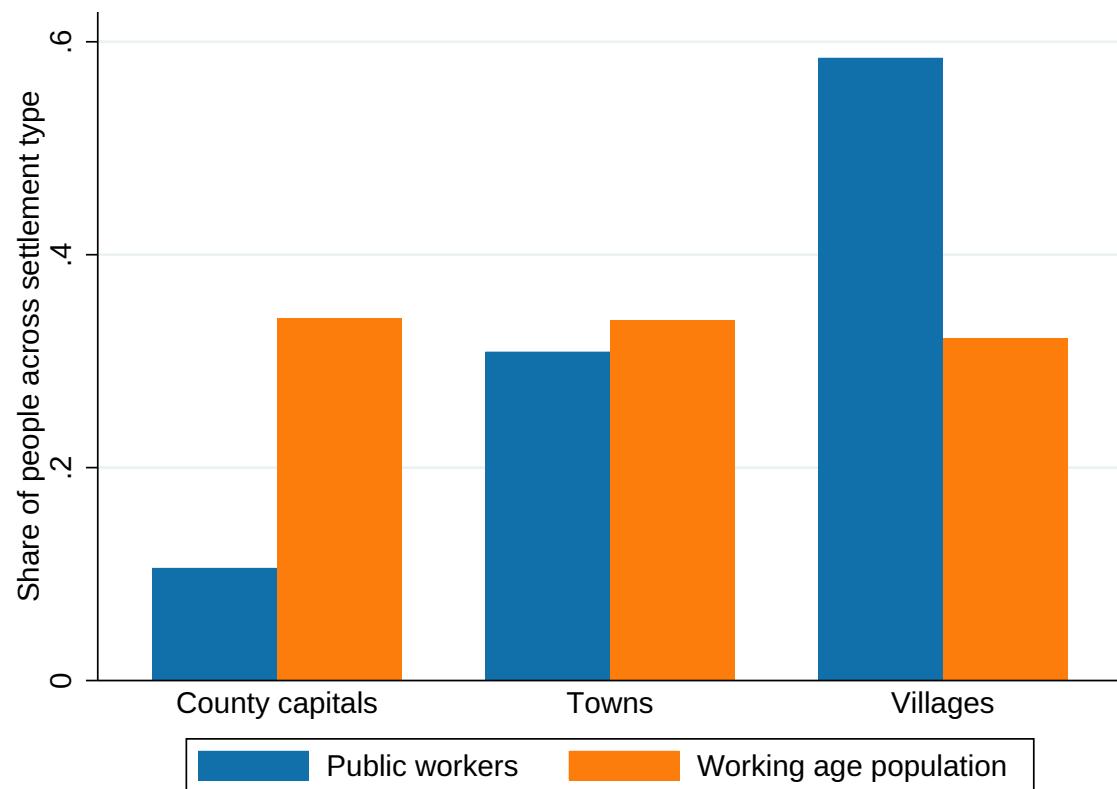
Notes: The table presents the estimates of public worker status on Fidesz support and turnout using linear probability models. The omitted baseline category is the unemployed. The survey data was collected in October 2014.

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.

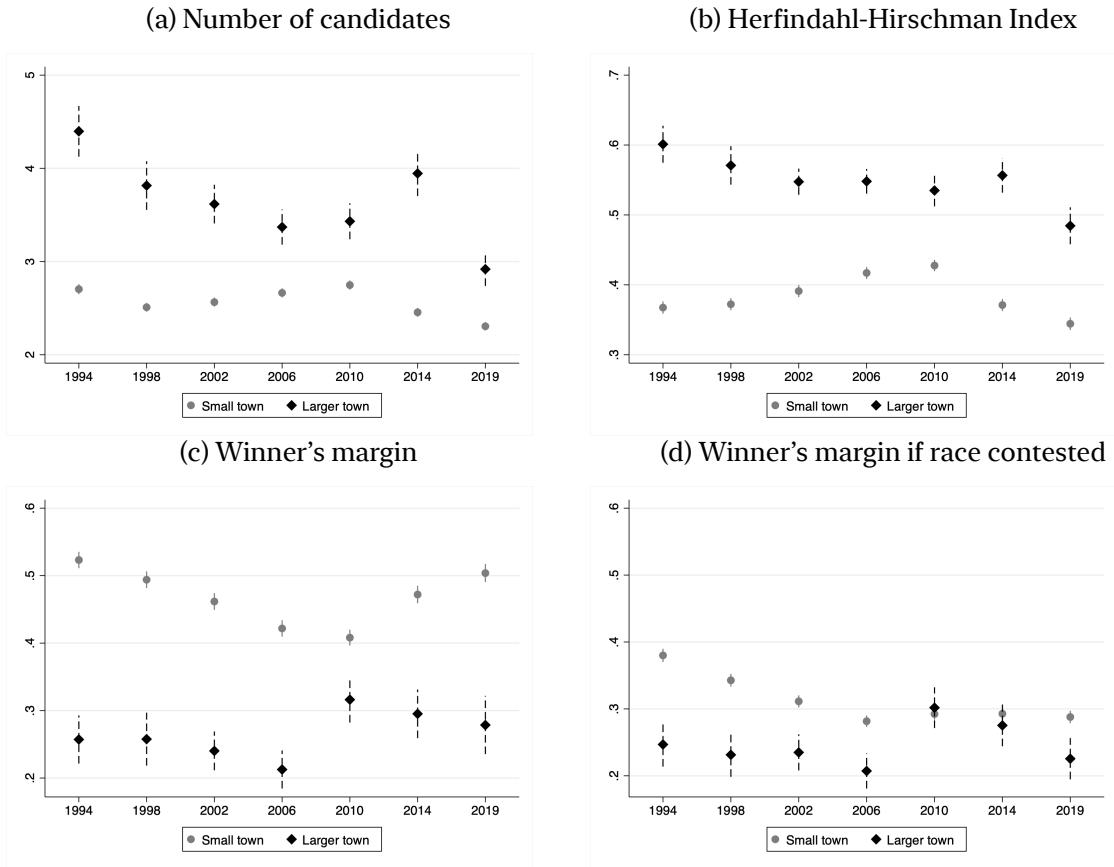
B Additional figures and tables

Figure B.1: Public workers and working age population by municipality type



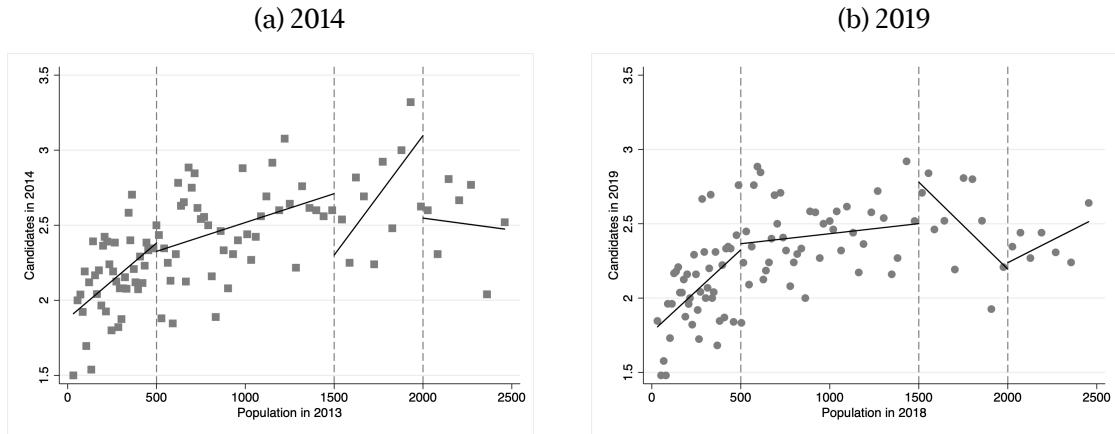
Note: These figure plots the share of public workers and working age population in April 2014 by municipality type. Municipalities are categorized into three groups: county capitals, towns and villages.

Figure B.2: Dimensions of mayoral competition over time



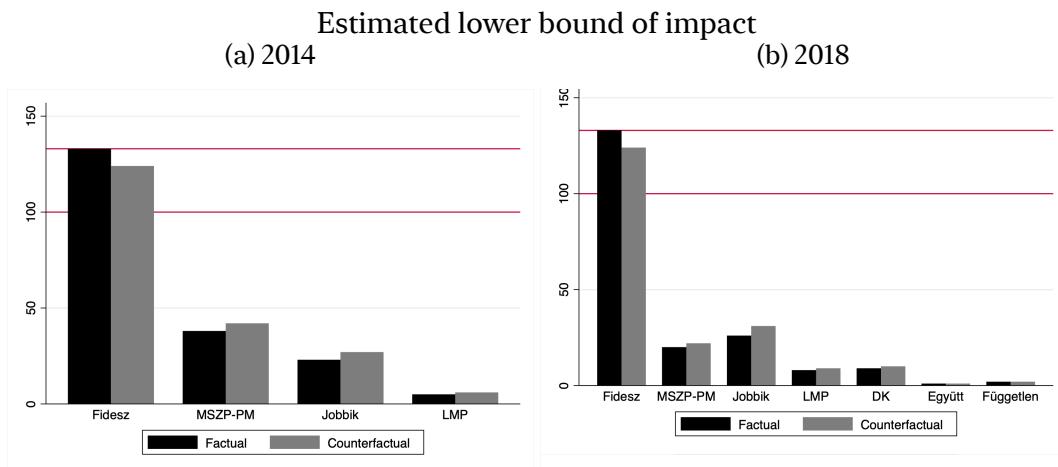
Note: The figure shows four dimensions of mayoral competition from 1994 to 2019. Panel A shows the total number of candidates running. Panel B shows the Herfindahl-Hirschman Index of competition, which is calculated as $HHI = 1 - \sum voteshare_i^2$, where i indexes candidates running in the settlement. 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 D 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 settlements below that threshold.

Figure B.3: Mayoral competition as a function of settlement population



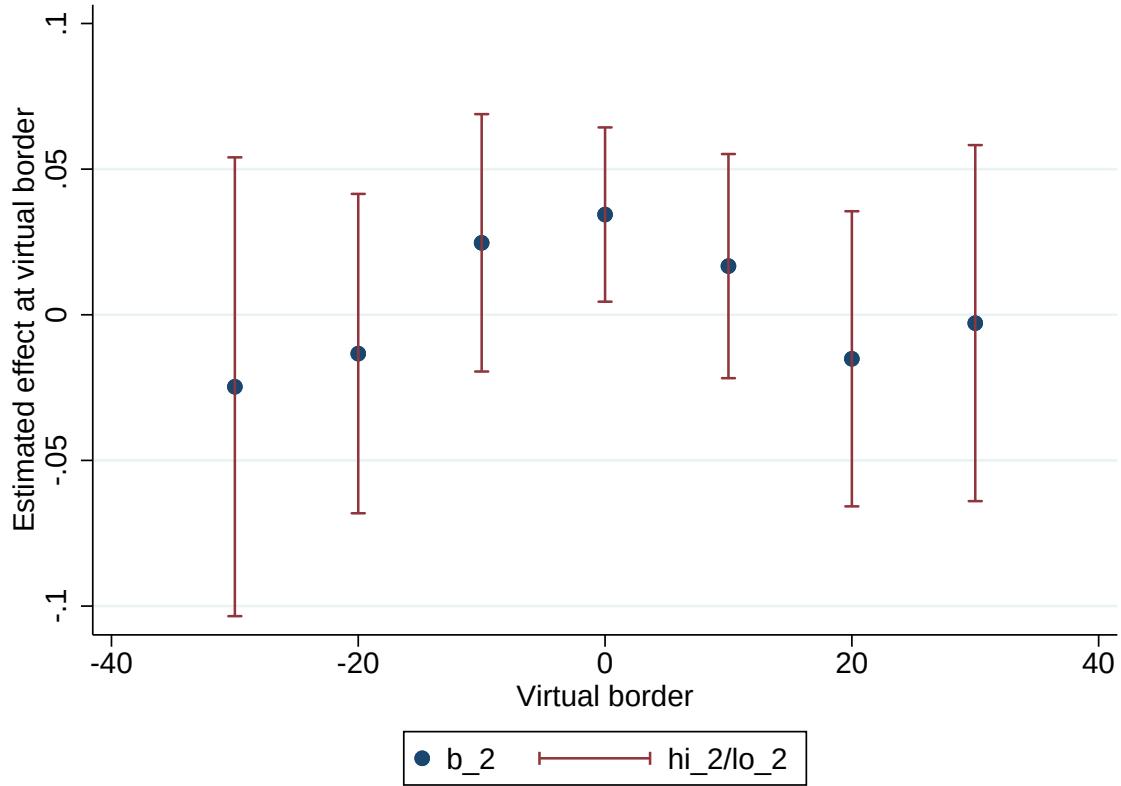
Note: The figures show binned scatterplots of the number of candidates running for mayor as a function of the population in the preceding year in all settlements with at most 2500 inhabitants (80% of all). Mayoral salaries are determined by law as a fixed percentage of a benchmark salary that changes 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).

Figure B.4: Back-of-the-envelope calculation on the impact of Public Work on the election result in 2014 and 2018



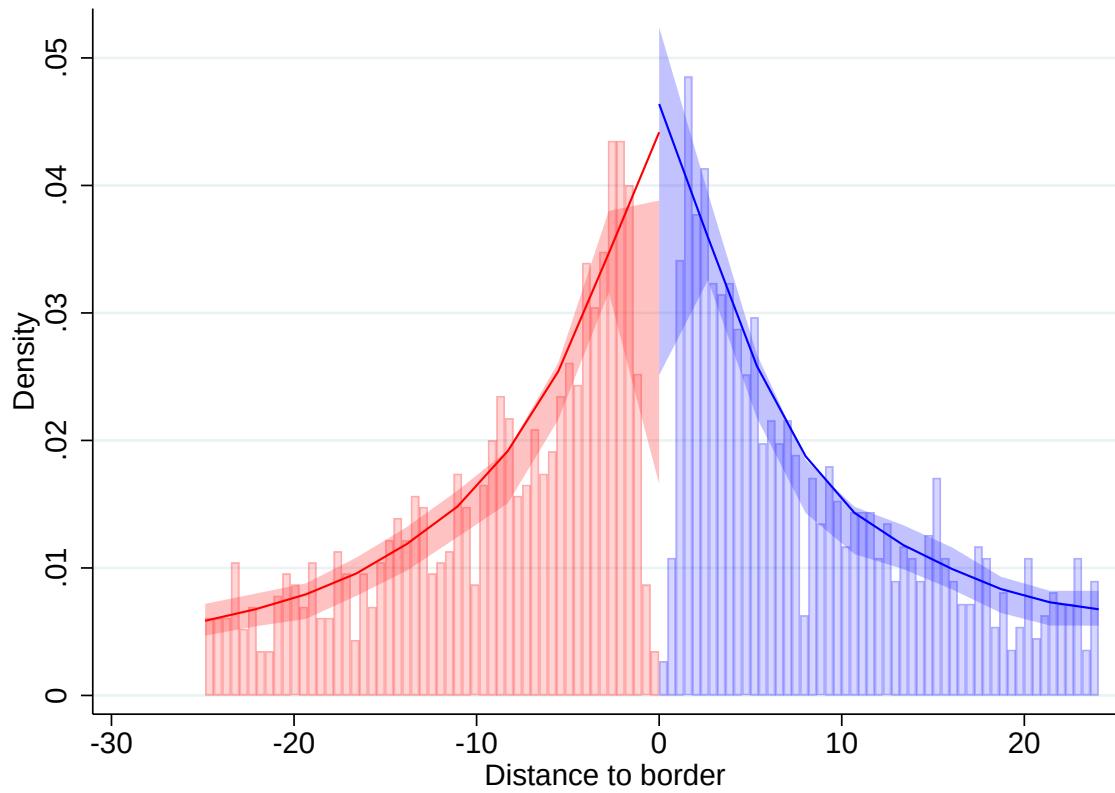
Note: The figures show back of the envelope calculations on the impact of public work on the election outcomes in 2014 and 2018. The horizontal line at 100 represents the majority threshold in parliament; the second horizontal line at 133 represents the supermajority threshold. We used First Differenced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

Figure B.5: 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 B.6: Distribution of distance to the disadvantaged border



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

Table B.2: The effect of Fidesz vote share in Parliamentary elections on public work share

	Total PW share		Long-term PW in non-disadv. regions	
	(1)	(2)	(3)	(4)
Fidesz vote share × Post	0.0239** (0.00408)	0.0162** (0.00625)	0.00954* (0.00425)	0.0147* (0.00681)
Municipality & month FE	Yes	Yes	Yes	Yes
Controls		Yes		Yes
Subregion-time FE		Yes		Yes
<i>N</i>	50336	50032	18576	18464

Notes: This table reports