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## Conference Paper

# Disentangling fiscal effects of local constitutions

Beiträge zur Jahrestagung des Vereins für Socialpolitik 2017: Alternative Geld- und Finanzarchitekturen - Session: Institutions, No. B20-V2

### Provided in Cooperation with:

Verein für Socialpolitik / German Economic Association

*Suggested Citation:* Köppl-Turyna, Monika; Kantorowicz, Jarosław (2017) : Disentangling fiscal effects of local constitutions, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2017: Alternative Geld- und Finanzarchitekturen - Session: Institutions, No. B20-V2, ZBW - Deutsche Zentralbibliothek für Wirtschaftswissenschaften, Leibniz-Informationszentrum Wirtschaft, Kiel, Hamburg

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# Disentangling fiscal effects of local constitutions

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## Abstract

We apply the difference-in-discontinuities design to disentangle the fiscal effects the governance system conditional on electoral systems. We take advantage of a natural experiment, which involves two institutional reforms at the local level in Poland. The first reform introduced two electoral rules, which change along an exogenous population threshold: smaller municipalities use majoritarian elections, larger municipalities use proportional elections. The second reform changed the governance system in Polish municipalities from “parliamentary” to “presidential”. Our results indicate that a change from parliamentary to presidential form led to lower vertical fiscal imbalance predominantly in the jurisdictions with majoritarian elections and to a lesser extent in municipalities governed by proportional elections. This therefore confirms an interaction effect between the forms of government and electoral rules.

*JEL classification:* D72; D78; H72

*Keywords:* electoral rules; vertical fiscal imbalance; constitutions

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## 1. Introduction

Starting with the seminal work of Brennan and Buchanan (1980) and followed by Persson and Tabellini (1999), the question of whether constitutional rules, particularly forms of government, affect fiscal policies has gained vast attention. Nonetheless, the empirical evidence on how presidential and parliamentary regimes shape fiscal outcomes is at best mixed. Persson and Tabellini (2004) demonstrate that forms of government impact budgetary outcomes in a substantial way. They found that, in contrast to parliamentary regimes, presidential systems observe lower government spending by 6% of GDP, smaller

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size of the welfare state by some 2 to 3%, and marginally lower budget deficits. However, in a replication study with slightly different samples and outcome variables, Blume et al. (2009) were not able to find any robust effect of forms of government on fiscal outcomes. One issue that makes it particularly difficult to credibly estimate the effects of different governance regimes is omitted variable bias. Cross-country studies suffer from large unobserved heterogeneity of institutions, which cannot be fully identified. Additionally, since typically time variation of the rules is very limited, researchers deal with relatively small sample sizes (yet even potential panel regressions alleviate the omitted variable problem only slightly).

In the current paper, we remedy the above-mentioned obstacles. We test the effect of forms of government at the local level of a single country. Thus, we deal with large number of observations and we are able to mitigate the problem of omitted variable bias as in a local setting a vast portion of institutional setting is held constant. Furthermore, we explicitly tackle the interaction effects between various constitutional features (Voigt, 2011). We acknowledge that forms of government display their effects in conjunction with other constitutional rules, notably electoral rules. In our empirical analysis, we exploit a unique quasi-experimental setting at the level of Polish municipalities. In 2002, legislators decided to introduce direct elections of municipal mayors, effectively changing a form of government in the municipalities from parliamentary to presidential. At the same time, since 1998 municipal councils in Poland have been elected according to different electoral systems – majoritarian and proportional – depending on a population threshold. Therefore, we are able to estimate the effect of a form of government conditional on electoral systems. Similarly to Grembi et al. (2016), we implement a difference-in-discontinuities design by combining the 2002 reform with discontinues variation generated by two electoral systems in place since 1998. Our preliminary results indicate that majoritarian elections are associated with lower vertical fiscal imbalance as compared to proportional systems. These differences

are, however, more prevalent under the presidential form of government than under the parliamentary regime.

In the next section we present the institutional background and a detailed description of our natural experiment. Section 3 contains a brief literature review and the hypotheses explored in this study. Section 4 describes the dataset and the empirical approach. Section 5 contains description of our results and robustness analysis. Section 6 concludes the work.

## 2. The institutional background

Municipalities (Polish: *gmina*) are the principal units of administrative division in Poland, and constitute the lowest tier of government. There are currently 2,478 municipalities, varying in size between 1,400 and 1.7 million inhabitants. The legislative and controlling body of each *gmina* is the elected municipal council (*rada gminy*) or, in a town, the town council (*rada miasta*). Executive power is, since 2002, held by the directly elected mayor of the municipality. Before 2002, the mayor has been elected indirectly by the council. Next subsections cover the detailed description of the two institutional reforms which are the backbone of the empirical analysis in this paper, i.e. the 1998 electoral reform and the 2002 reform of the form of government.

### 2.1. Municipal council and the 1998 electoral reform

The legislative body of a municipality is the municipal council. The members of the council are elected directly from the candidates representing nation-wide political parties, and local committees. Since the election of October 1998, the electoral law governing the election of the members of the council have differed between the municipalities below and above the 20,000 threshold. In the municipalities up to 20,000 inhabitants, the council members were elected in majoritarian elections. In municipalities with more than 20,000 inhabitants, on the other hand, members of the council were elected through a proportional

election. In the 2014 elections, the population threshold was removed and winner-takes-all system was widely introduced.

In small municipalities, election of the council combined plurality rule with small districts. The electoral law prescribed, that the maximum of five members should be elected from one district. In larger districts, representatives were elected through block voting. As a result, the most popular party might win all seats, and the disproportionality is even higher than for the case of single-member districts (Lijphart, 2012).

In larger municipalities, proportional elections took place, and since 2002 the votes were translated into seats by the d'Hondt method; before 2002, Sainte-Laguë method had been used. Moreover, in the municipalities with the proportional systems, more members are elected from each district than in the municipalities with majoritarian regimes, i.e. five to eight, as stipulated by the law.

It needs to be stressed that in 2002 the size of the council was significantly reduced. This reform coincided with the introduction of direct elections of the mayors (see the next subsection). Before 2002, the council had 24 members in the municipalities with the population size below 20,000 and 28 members in the municipalities above this threshold. After 2002, this numbers were reduced to 15 and 21 members in the municipalities below and above the cut-off, respectively. In the robustness section, we demonstrate that the council size does not shape fiscal outcomes. To this end, we exploit the fact that in years 1990-2002, the size of council was determined by nine different population thresholds.

Another confounding factor are campaign spending limits per mandate as since 2002 they have been changing at the 20,000 threshold from 750 PLN (about 180 EUR) to 1,000 PLN. To tease out the effect of campaign spending, we argue that the expenditure cap is not strictly enforced and, thus, not binding. It is well known practice in Poland that parties, in order to circumvent expenditure limits, engage themselves in so-called "pre-campaigning". It means that politicians start agitation before the official campaign starts,

i.e. when the expenses on campaigning go unreported (Szyszko, 2014). This problem was recognized by the Ombudsman and the National Electoral Commission.

## *2.2. The mayor and the 2002 reform of form of government*

The Law on Self-governance of 1990 stipulated that that the executive power in a municipality is held by the municipal board (*zarząd gminy*), a collegial body, of between four and seven members, elected by absolute majority of the council members.<sup>3</sup> The board could also be recalled from office by the council. The mayor, although being a member of the board, had been elected in a separate ballot, in the presence of 2/3 of the council members. The role of a mayor in this system was not seen as a separate administrative body. The competence of the mayor was primarily chairing the board, convening meetings, and setting their dates. Equally important was managing of the daily affairs of the municipality (Marszał, 2006). The mayor could be dismissed by the municipal council in two cases: when the council dismissed the board due to failure to receive the vote of confidence and when the members of the council have applied for the dismissal of chairman of the board.

Until the reform of 2002, the role of the municipal executive branch was weak, and almost entirely dependent on the council. That was, in fact, the intention of the lawmakers: the role of the board was meant to be dependent on the vote of confidence in the council. In such circumstances, the mayor was often forced to conduct his policies as to please the council members, or even offer them personal favors (Kowalik, 2003). Additionally, the fact that the mayor was only a part of a collegial body implied that he was hardly held personally responsible for his decisions. In particular, the mayor held a very weak position against the chairperson of the council, who unlike the mayor was elected in a direct election and reinforced by the decision of the council.

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<sup>3</sup>The board members could be elected also among the candidates outside of the municipal council.

As a result of the weak role of the board, lack of accountability, and frequent competence clashes between the mayor and the council, and the chairperson of the council in particular, the cabinet in power in the years 2001 to 2005 has decided to again rethink the form of local government. The intention was to introduce direct elections of the mayor, who would from now on constitute a separate, legitimate, one-person executive body of a municipality and equip him or her with additional competences (Stepień, 2015). Some additional competences of the mayor has strengthen his *de iure* position against the council, but the biggest change can be observed in the *de facto* role of the mayor.

Mayor's new competences included e.g., management of local property, and in particular issuance of debt, without a necessity of any consent by the council. Mayor is also equipped with the right of initiative, and in fact 90% of initiatives come from the mayor's office (Stepień, 2015). Moreover, the mayor can no longer be directly recalled from office by the council, but only through a popular referendum. These new competences, as well as a strong public mandate combined with individual responsibility have lead to increasing role of mayors as leaders of local communities. The balance of powers between the council and the mayor has been completely remade: the role of the mayor is in reality much stronger than the one stipulated in the legal provisions. Some scholars claim, that the mayor bears *full* power and that the council's role is only marginal, particularly in a situation where the mayor's party has a majority in the council.

The reform of 2002 followed a programme of four major reforms introduced by the Jerzy Buzek's<sup>4</sup> cabinet, which was in power between 1997 and 2001. Besides the reform of self-governance, the three other reforms were:

1. The reform of public education, which introduced a new type of middle school - *gimanzjum* - which can be compared to the British grammar school.

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<sup>4</sup>Wider known for being the President of the European Parliament between 2009 and 2012

2. The reform of the retirement system, which now resembles the Swedish system i.e. including capital-based pension funds and "automatism".
3. The reform of the public health system, which decentralised the health insurance and introduced public health funds.

Some aspects of these reforms have been widely criticised, which eventually led to a loss of popular support, disbanding the ruling coalition, and the cabinet has been ruling as a minority government in years 2000-2001. The coalition parties have lost the following parliamentary election in 2001, and the reform of 2002 has been introduced by the new cabinet. It can be, therefore stated that these reforms are not connected.

### *2.3. Fiscal competences of the municipalities*

Municipalities in Poland dispose of five major sources of financing: subsidies from the central government, designated subsidies, participation in the centrally collected personal and corporate income taxes, local taxation, and the management of municipal property. Municipalities' degrees of freedom in raising income differs among these diverse categories of financing. For the first three categories, municipalities have virtually no financial independence. Nonetheless, a portion of personal and corporate income taxes received by the municipalities is classified as own revenue<sup>5</sup> as the municipalities are eligible to a certain fraction of these taxes levied at their territory. Thus, indirectly the municipalities can influence the revenue from these taxes by attracting working population and businesses to register within their boundaries or by stimulating local labour markets. The real autonomy the municipality have only over two latter categories, particularly their management of municipal properties. Subsidies and designated subsidies are mostly transferred as formula-based non-earmarked grants: in 2014, 58% of all intergovernmental transfers were subsidies. On the other hand, grants are mostly discretionary – in 2014 almost 42%

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<sup>5</sup>Similarly to the German fiscal equalization system this classification might be misleading.



of all transfers were discretionary grants. Intergovernmental transfers constituted in 2014 on average 57% of municipalities' revenues, with maximum values reaching almost 90% in some cases.

An important aspect of the analysis are the fiscal rules in place. According to Budina et al. (2012) and Blöchliger and Nettley (2015), there are statutory and constitutional fiscal rules imposed on the general government e.g. in relation to the debt level. More specific provisions regarding local finances are stipulated in the Public Finances Act (PFA). In principle, according to this act, municipalities are obliged to run a balanced budget; however, Art. 242 of the PFA allows municipalities to run short-term deficits financed mostly from past budget surpluses and surpluses on current accounts. Municipalities are also allowed to issue bonds and incur debt (Art. 89 of the PFA). However, the newly incurred debt cannot exceed a yearly level of 15% of the revenue (Art. 169 of the PFA) and the overall quota of 60% (Art. 170 of the PFA)<sup>6</sup>.

An additional issue, which we need to deal with, is the change in the vertical fiscal equalization starting in 2004. Between 1998 and 2004, municipalities received 27,6% of the personal income tax and 5% of the corporate income taxes receipts. Starting with fiscal year 2004 these increased to 39,34% and 6,71%, respectively<sup>7</sup>. In order to clearly identify the effect of the reform, we need to clean our data from this effect. We recalculate the counterfactual PIT and CIT tax receipts using the formulas used before 2003.

### **3. Forms of government and fiscal outcomes**

There is an extensive theoretical literature discussing potential fiscal effects of forms of government. This literature, however, is predominantly focused on the institutional setting of the central government. Arguably, a study of local constitutional rules and local fiscal

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<sup>6</sup>These provisions were in force until the end of fiscal year 2013.

<sup>7</sup>Compare Public Finance Act 1998 (Dz.U. 1998 nr 155 poz. 1014) and Public Finance Act 2003 (Dz.U. 2003 nr 15 poz. 148).

outcomes requires some adjustments. Most importantly, from the point of view of the central government the external funds mainly originate from borrowing, whereas in the local setting external income primarily comes from the central government by means of grants and subsidies. For that reason, the fiscal condition of sub-central government units is often assessed by a means vertical fiscal imbalance (share of external income relative to total municipal expenses) or transfer dependency (Eyraud and Lusinyan, 2013).

In the context of Polish municipalities, Heller et al. (2013) argue that the municipalities, which rely too heavily on the external funds in financing spending, are worse-off in comparison to the municipalities with large shares of own income. Large fiscal imbalance means that local politicians instead of stimulating local tax base through local growth and development, focus on pressing central government to extract more resources through intergovernmental grants and subsidies. Moreover, own income – generated from taxes levied on local population – gives more spending flexibility, whereas grants and subsidies frequently come with stringency (a portion of grants and subsidies might be spent only on designated projects). Overall, in the local setting a low vertical fiscal imbalance implies that a municipality is arguably wealthier, more fiscally sustainable and spends more effectively and more in-line with the preferences of local population in contrast to municipality with a large fiscal imbalance.

How do different forms of government affect fiscal imbalance? A long-standing argument in the theoretical literature on forms of government is that the accountability mechanism is stronger in presidential systems. Chain of delegation is shorter in presidential systems than in systems with fused executive and legislative as in the former the executive is directly answerable to voters (Persson and Tabellini, 2003). By introducing direct elections of mayor, voters are able to more easily identify the institutional actors responsible for particular policy choices (Padovano et al., 2003) and potentially punish them for misconduct. Precisely, the main aim of the 2002 reform introducing a direct election of mayor was to

improve the local decision-making process and to concentrate responsibility for local decisions in one body. Arguably, this implies that in the presidential systems the municipalities will be able to adopt policies that are more effective and more responsive to preferences of the electorate than parliamentary regimes.

Furthermore, a directly elected mayor has a municipality-wide constituencies, which gives him incentives to consider a well-being of the entire municipality instead of particular districts (Hallerberg and Marier, 2004). In the new institutional setting, the mayor can therefore focus on stimulating the overall tax base and, thus, enhancing the economic growth of the municipality at large. Based on these theoretical arguments, the following hypothesis is presented:

**Hypothesis 1.** *Vertical fiscal imbalances are lower in the municipalities with presidential systems as compared to municipalities with parliamentary regimes.*

Yet, this hypothesis does not take into account the fact that mayors' policies need to be approved by the council, whose members are elected via different electoral systems depending on a population size. Kantorowicz (2016) shows that the main mechanism, through which electoral systems influence fiscal policy outcomes in the Polish municipalities, is accountability. As majoritarian elections allow for better monitoring and higher accountability of policy-makers, these systems incentivize politicians to increase effort and enhance performance. A good performance of policy-makers, the argument goes, is crucial in stimulating and enlarging local tax base. For instance, through effective policies invigorating local labour markets, policy-makers under the majoritarian regime can increase employment, which translates to higher revenue from PIT. Furthermore, as proportional elections stress the importance of political parties rather than individual legislators, these systems might facilitate penetration of local political markets by national parties (i.e. these operating at the central level). Due to a possible alignment effect, national political parties might provide patronage to their counterparts operating at the local level through,

for instance, increased intergovernmental transfers (Bracco et al., 2015). All in all, it is conjectured that the mayors operating in municipalities with majoritarian elections will be more likely to pursue effective policies as council members elected under these regimes should be like-minded in a sense that they also focus on good governance and performance. Contrary to this, under the proportional regimes council members are to a larger extent involved in inter- and intra-party political games. Furthermore, the council members in the proportional regimes might be more capable to attract the intergovernmental grants obviating the need to stimulate and enlarge local tax base. This discussion leads us to the following hypothesis:

**Hypothesis 2.** *A decrease in fiscal imbalances should be larger in magnitude in the municipalities with majoritarian systems than in the proportional systems after introducing the direct elections of mayors.*

In terms of empirical analysis, we expect that the 2002 reform, which introduced direct elections of mayors, will result in lower vertical fiscal imbalances. However, the decline in vertical fiscal imbalance will be more prominent in the majoritarian electoral systems (municipalities with the population size of less than 20,000 inhabitants) than in proportional electoral systems (municipalities with the population above 20,000 inhabitants). Since two distinct electoral systems could create a discontinuity in vertical fiscal imbalance even before the 2002 reform, we also expect to observe a difference in discontinuities before and after the reform.

#### **4. Data and the empirical approach**

Our sample contains 32,217 observations about Polish municipalities between 1998 and 2010. In 2002, 2,129 municipalities were inhabited by less than 20,000 persons, and therefore majoritarian voting was used there; in 336 municipalities proportional voting rule was

in place<sup>8</sup>. Data have been collected from several sources. Demographic and fiscal variables come from the Local Data Bank of the Polish Statistical Office. Electoral data have been collected from the official electoral records of the Polish National Electoral Commission (short PKW). Since the elections take place in autumn, it is likely that any fiscal effects should be observed only after one year, i.e., our variables related to the direct election of the mayor and the effects of population thresholds are both led by one year, and start in year 2003. Definitions of the variables are presented in Table 16 in the Appendix. Descriptive statistics of the variables are presented in Table 17. The periods before and after the reform are of different lengths, and therefore we have different number of observations. However, for the population bandwidth of 10,000, as described in Table 17, the samples are 4,000 and 8,000 observations, respectively, which is reasonably large. For the bandwidth of 5,000, the sizes are 1,500 and 3,000 observations, respectively. Therefore, we do not see it as a threat to our identification.

Since the assignment of electoral rules is a function of population, with a clear cut-off point at the level of 20,000 inhabitants, a standard way to explore this quasi-experimental set-up is by using a regression-discontinuity (RD) design. Since, we want to analyze how the reform of 2002 could potentially differently affect the municipalities below and above the population threshold, a natural way is to exploit the difference-in-discontinuities design, as proposed by e.g. Grembi et al. (2016). It can be implemented with local linear regression (LLR), nonparametric kernel estimation or a polynomial approach (see Imbens and Lemieux, 2008; Lee and Lemieux, 2010; Calonico et al., 2014, for further details). The LLR basic model is restricted to the observations around the population

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<sup>8</sup>In other years, the number might be slightly different, as some municipalities' changing population cause them to cross the threshold.

cut-off  $p_{it} \in [p_c - h, p_c + h]$ , where  $p_c$  is the cut-off value, and takes the form

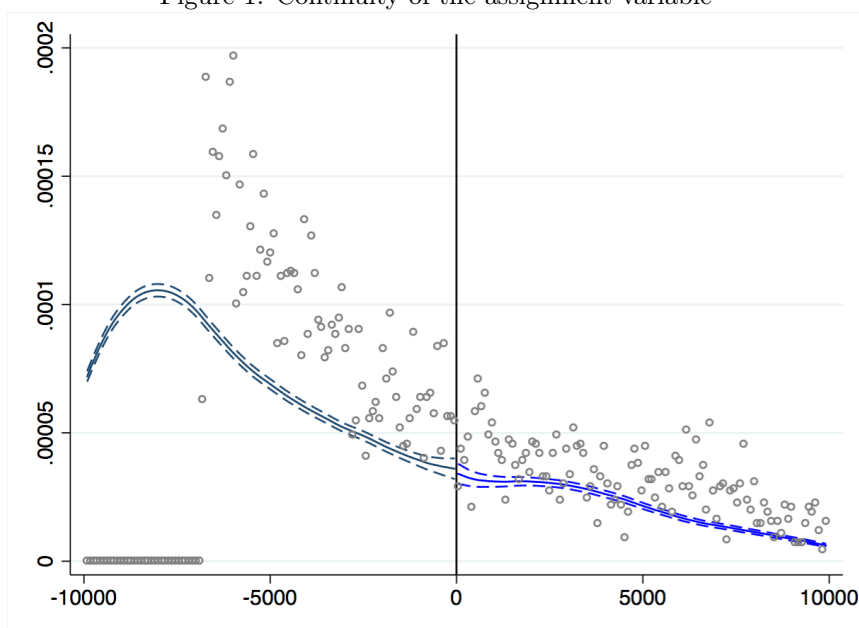
$$y_{it} = \alpha_0 + \alpha_1 \times p_{it} + M_i \times (\gamma_0 + \gamma_1 \times p_{it}) + D_i[\delta_0 + \delta_1 \times p_{it} + \underbrace{M_i(\beta_0 + \beta_1 \times p_{it})}_{\text{D-in-D estimator}}] + \varepsilon_{it}. \quad (1)$$

where  $M_i$  is a dummy variable for municipalities with majoritarian elections,  $D_i$  is the treatment variable - dummy for periods from 2003 onwards, and  $\beta_0$  is the difference-in-discontinuities estimator.  $y_{it}$  denote the outcome variables, i.e. vertical fiscal imbalance. Observations in the local linear regression are furthermore weighted by the distance to the cut-off, which should further reduce any bias. This basic specification can be further augmented by additional covariates that explain the outcome variables, provided these are continuous at the cut-off population size - a common practice in applied RD studies. However, a recent study by Calonico et al. (2016) suggests, that adding additional covariates does not resolve the issue of identification (if the continuity assumption fails), and does not affect the point estimates but only slightly adds to efficiency of estimations. On the other hand, including interaction terms of other covariates with the treatment variable leaves the RD estimator inconsistent - which in practical terms means, that if additional covariates are a channel of transmission through which the treatment works one risks inconsistencies (see Calonico et al., 2016). Given little gain and potentially high risk, we abstain from covariates, and include only time and province fixed effects in the parametric specifications.

Alternatively, one can apply polynomial smoothing at both sides of the cut-off before and after the reform, and compare the size of the discontinuity at the cut-off value. We include the nonparametric estimation as a robustness check.

For the RD design to identify the local treatment effect some assumptions must be met. First, the treatment assignment must be a monotone deterministic function of the assignment variable. This holds in our study, as exogenously determined electoral law fully determines assignment to treatment.

Figure 1: Continuity of the assignment variable



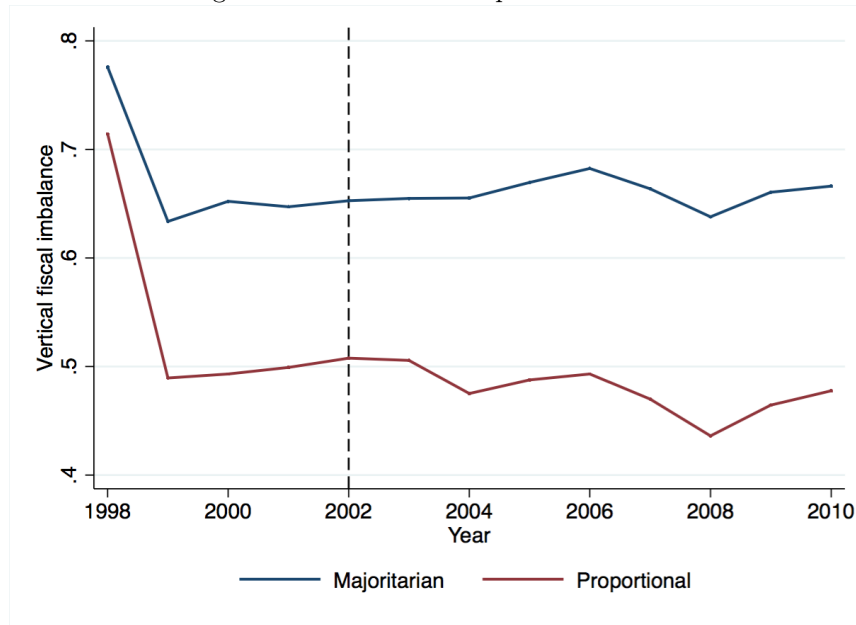
Secondly, identification is possible only if municipalities are not able to manipulate the assignment variable. We need to establish whether manipulation of the running variable is not an issue in our study. The density of the assignment variable is presented in Figure 1. The confidence intervals are evaluated using McCrary (2008) standard errors<sup>9</sup>. Visual inspection of Figure 1 and evaluation of the test statistic suggest that manipulation of the forcing variable is not a problem in our design. The estimated log-difference ( $\theta$ ) in height of the probability distribution equals -0.04 and the p-value of the test equals 0.60, that is we do not reject the null hypothesis that the variable is not sorted.

Finally, in absence of treatment, the outcome variable has to evolve continuously with the assignment variable in the neighborhood of the threshold. In other words, confounded treatment should be excluded. If other factors create discontinuities in this relationship, a clear identification of the local treatment effect is not possible. One potential distortion

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<sup>9</sup>Implemented in Stata with DCdensity.ado

Figure 2: Trends in the dependent variable



to our set-up could come from the discontinuity in the council size at some population thresholds. We address this issue in the robustness section.

Regarding standard assumptions of any difference-in-differences model, we need to test the parallel trends assumption, that is, whether vertical fiscal imbalance has evolved parallelly in the two groups of municipalities before the reform of 2002. Mean values of VFI between the two groups of municipalities between 1998 and 2010 are depicted in Figure 2.

Formally, we can take a closer look at the development of the dependent variable with a simple test. We regress the vertical fiscal imbalance on time dummies and their interaction with the treatment variable. Ideally, the interaction terms before the reform of 2002 should be insignificant. We can read from Table 1 that this is the case in our dataset.



Table 1: Parallel trends

	VFI
Majoritarian Election=1	0.07*** (6.22)
Year== 1999=1	-0.02*** (-3.05)
Year== 2000=1	-0.01** (-2.19)
Year== 2001=1	-0.00 (-0.42)
Majoritarian Election=1 × Year== 1999=1	-0.01 (-1.36)
Majoritarian Election=1 × Year== 2000=1	-0.00 (-0.38)
Majoritarian Election=1 × Year== 2001=1	-0.01* (-1.91)
Constant	0.53*** (52.97)
Observations	2499

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

Table 2: Main results, vertical fiscal imbalance: local linear regression (linear weights), bandwidth=10,000 (Columns 1 and 2) and 5,000 (Columns 3 and 4) with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	-0.01*** (-2.74)	-0.00 (-1.43)	-0.01** (-2.21)	-0.00 (-0.39)
Majoritarian Election=1	0.02 (0.75)	-0.01 (-0.30)	0.02 (0.90)	0.00 (0.16)
Majoritarian Election=1 × Population in 1,000	0.01 (1.51)	-0.00 (-0.77)	0.02** (2.31)	-0.00 (-0.49)
Direct Mayor=1	0.00 (0.14)	0.01 (0.52)	-0.00 (-0.10)	0.01 (0.74)
Direct Mayor=1 × Population in 1,000	-0.00 (-0.53)	-0.00 (-1.57)	0.00 (0.08)	-0.01 (-0.96)
Majoritarian Election=1 × Direct Mayor=1	-0.08*** (-4.45)	-0.04*** (-2.68)	-0.10*** (-3.90)	-0.04* (-1.89)
Majoritarian Election=1 × Direct Mayor=1 × Population in 1,000	-0.01** (-2.36)	-0.00 (-0.35)	-0.02*** (-2.66)	-0.00 (-0.06)
Constant	0.56*** (31.59)	0.49*** (25.58)	0.57*** (27.37)	0.50*** (21.06)
Observations	8010	8010	3230	3230
Time effects	NO	YES	NO	YES
Fixed effects	NO	YES	NO	YES
Marg. Effect Direct at Maj=1		-0.057 (-7.51)		-0.085 (-6.02)
Marg. Effect Direct at Maj=0		0.006 (0.28)		-0.002 (-0.10)

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

## 5. Results

### 5.1. Main results

As presented in Table 2, vertical fiscal imbalances of the municipalities have been affected by the 2002 reform. We can see that the discontinuity in the vertical fiscal imbalance

at the 20,000 population threshold could not be observed before the reform of the governance system. Neither is the direct election of the mayor responsible for changes in the fiscal imbalances. An interaction of the two effects is, however, highly significant across all specifications. Smaller communes with majoritarian elections and directly elected mayors have lower fiscal imbalances than those with the proportional electoral system. The size of the effect is about eight percentage points independent of the bandwidth; it reduces to around four percentage points if we consider time- and province fixed effects. Given that the average vertical fiscal imbalance equals around 57 percent, reduction by 14% constitutes an effect of large economic significance.

Table 3 shows the non-parametric estimations with higher order polynomials. The difference in discontinuities between and after the 2002 reform suggests further confirmation that the drop in fiscal imbalance was larger in majoritarian systems than in the proportional regime after the introduction of the 2002 reform. Visual inspection of data present in Figure 3 further confirms that the discontinuity in the vertical fiscal imbalances is associated with the period after the 2002 reform.

Table 3: Main results, vertical fiscal imbalance: local polynomial smoothing, triangular kernel,  $q = 1, \dots, 4$  bandwidth=CCT

	Discontinuity at $D = 0$ <sup>a</sup>	Discontinuity at $D = 1$ <sup>a</sup>
$q = 1$	0.052 (1.60)	0.102*** (3.44)
$q = 2$	0.057** (1.97)	0.105*** (3.91)
$q = 3$	0.041 (1.05)	0.071* (1.94)
$q = 4$	0.041 (1.07)	0.056 (1.37)

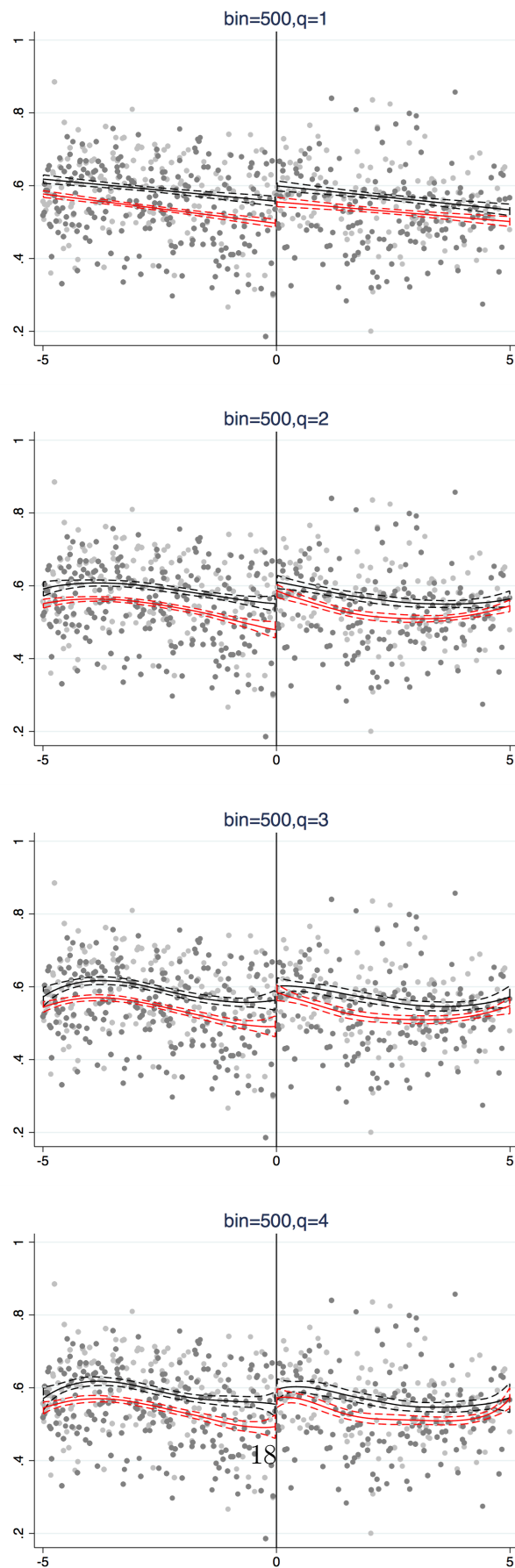
<sup>a</sup> Robust z-statistics of Calonico et al. (2014) in parentheses.

<sup>b</sup> z-test value  $H_0 : dif = 0$  in parentheses

## 5.2. Channels of transmission

Now that we have established that the combination of the presidential system of governance and majoritarian elections is associated with lower vertical fiscal imbalances, an

Figure 3: Discontinuities in the VFI before (black) and after (red) the reform



interesting question remains, as for the channel of transmission responsible for this change. In the following subsections we identify some channels conjectured to be responsible for the effect. These can be grouped into effects associated with the "numerator", i.e., broadening the tax base and a corresponding increase in tax receipts, and effects of access to grants and subsidies from the central government, and the "denominator", that is the effects on the expenditures of municipalities.

### 5.2.1. Tax base

Table 4: Real income from shared taxes per capita (logarithm): local linear regression (linear weights), bandwidth=10,000 (Columns 1 and 2) and 5,000 (Columns 3 and 4) with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	0.05*** (4.06)	0.04*** (4.02)	0.08*** (3.56)	0.05** (2.58)
Majoritarian Election=1	0.20*** (3.37)	0.08 (1.57)	0.25*** (3.59)	0.07 (1.09)
Majoritarian Election=1 × Population in 1,000	-0.01 (-1.08)	-0.02 (-1.33)	-0.04 (-1.58)	-0.04* (-1.71)
Direct Mayor=1	0.41*** (10.80)	0.72*** (25.16)	0.42*** (8.28)	0.71*** (16.95)
Direct Mayor=1 × Population in 1,000	0.00 (0.46)	0.00 (0.63)	0.00 (0.02)	0.01 (0.39)
Majoritarian Election=1 × Direct Mayor=1	0.07 (1.21)	0.07* (1.86)	0.09 (1.11)	0.07 (1.30)
Majoritarian Election=1 × Direct Mayor=1 × Population in 1,000	0.01 (0.94)	0.01 (0.96)	0.03 (0.96)	0.01 (0.56)
Constant	4.29*** (79.73)	4.23*** (75.50)	4.25*** (67.30)	4.18*** (60.14)
Observations	8010	8010	3230	3230
Time effects	NO	YES	NO	YES
Fixed effects	NO	YES	NO	YES
Marg. Effect Direct at Maj=1		0.734 (14.91)		0.701 (8.57)
Marg. Effect Direct at Maj=0		0.663 (8.43)		0.628 (5.03)

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

Looking at the results presented in Tables 4 to 10, we conclude that the potential channel of transmission is an increase in the tax receipts of personal income taxation revenue shares. Whereas across all specifications, a (geometric) average increase in the real income from the personal income tax by about 156% (considering the coefficient 0.94 in Column 2). An additional effect for municipalities with majoritarian elections equals

Table 5: Real income from personal income tax per capita (logarithm): local linear regression (linear weights), bandwidth=10,000 (Columns 1 and 2) and 5,000 (Columns 3 and 4) with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	0.04*** (3.83)	0.04*** (3.87)	0.07*** (3.41)	0.05** (2.46)
Majoritarian Election=1	0.15*** (2.65)	0.08 (1.58)	0.19*** (2.79)	0.06 (1.05)
Majoritarian Election=1 × Population in 1,000	-0.01 (-1.02)	-0.01 (-1.07)	-0.05** (-1.98)	-0.04* (-1.70)
Direct Mayor=1	0.57*** (14.43)	0.94*** (32.25)	0.58*** (10.98)	0.92*** (22.11)
Direct Mayor=1 × Population in 1,000	0.01 (0.63)	0.01 (0.72)	0.00 (0.25)	0.01 (0.55)
Majoritarian Election=1 × Direct Mayor=1	0.11* (1.90)	0.06* (1.66)	0.15* (1.81)	0.07 (1.25)
Majoritarian Election=1 × Direct Mayor=1 × Population in 1,000	0.01 (1.22)	0.01 (0.88)	0.04 (1.35)	0.01 (0.54)
Constant	4.67*** (90.92)	4.66*** (87.55)	4.62*** (76.96)	4.61*** (69.95)
Observations	8122	8122	3255	3255
Time effects	NO	YES	NO	YES
Fixed effects	NO	YES	NO	YES
Marg. Effect Direct at Maj=1		0.978 (13.78)		0.956 (8.97)
Marg. Effect Direct at Maj=0		0.916 (17.68)		0.886 (12.41)

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

between 7% and 16%, depending on the specification. As the interaction coefficient on net migration is insignificant, it seems that the change takes place at the intensive rather than the extensive margin - increasing the receipts from current inhabitants rather than focusing on stimulating inflow migration.

Effects on receipts from the corporate income taxation do not explain the observed differences (Table 6). Neither do receipts from other sources, including property taxation (Table 7), which are significant in the pooled model, but turn insignificant if we include time- and province effects. The effect also cannot be explained by potential changes in the expenditure levels of municipalities after 2002 (Table 9).

### 5.2.2. Grants and subsidies

Tables 11 and 12 show the results of regressing receipts from subsidies and grants on the institutional variables. As mentioned before, whereas subsidies are entirely formula-

Table 6: Real income from corporate income tax per capita (logarithm): local linear regression (linear weights), bandwidth=10,000 (Columns 1 and 2) and 5,000 (Columns 3 and 4) with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	0.15*** (4.24)	0.10*** (3.06)	0.18*** (2.96)	0.08 (1.39)
Majoritarian Election=1	0.28 (1.55)	0.14 (0.80)	0.32 (1.53)	0.08 (0.38)
Majoritarian Election=1 × Population in 1,000	-0.05 (-1.30)	-0.00 (-0.07)	-0.08 (-0.96)	0.02 (0.25)
Direct Mayor=1	0.72*** (5.64)	0.78*** (6.27)	0.76*** (4.65)	0.72*** (4.52)
Direct Mayor=1 × Population in 1,000	-0.02 (-0.53)	-0.01 (-0.18)	-0.04 (-0.72)	-0.01 (-0.11)
Majoritarian Election=1 × Direct Mayor=1	0.26 (1.64)	0.21 (1.40)	0.21 (1.03)	0.18 (0.89)
Majoritarian Election=1 × Direct Mayor=1 × Population in 1,000	0.04 (1.08)	0.02 (0.57)	0.05 (0.67)	-0.01 (-0.15)
Constant	1.22*** (7.43)	1.57*** (8.26)	1.16*** (6.08)	1.58*** (6.55)
Observations	8010	8010	3230	3230
Time effects	NO	YES	NO	YES
Fixed effects	NO	YES	NO	YES
Marg. Effect Direct at Maj=1		1.013 (3.48)		0.922 (2.38)
Marg. Effect Direct at Maj=0		0.801 (3.35)		0.742 (2.45)

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

based, grants contain a significant discretionary component. Table 11 shows that the interaction between direct election of the mayor and majoritarian election does not explain the differences in the assignment of subsidies - a result consistent with the non-discretionary character of subsidies.

On the other hand, Table 12 indicates that municipalities with majoritarian electoral system receive less grants after the 2002 reform. The unconditional effect of the reform equals 0.2, which corresponds to a change of about 22% in the size of grants from the central government. The conditional effect of majoritarian elections reduces the increase by about 8 percentage points.

### 5.3. Robustness analysis

Falsification tests presented in Tables 13 and 14 show that no discontinuity is observed at the counterfactual thresholds of 19,000 and 21,000 inhabitants further confirming that

Table 7: Real own income from property tax per capita (logarithm): local linear regression (linear weights), bandwidth=10,000 (Columns 1 and 2) and 5,000 (Columns 3 and 4) with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	0.05*** (3.08)	0.02 (1.31)	0.07** (2.55)	0.01 (0.37)
Majoritarian Election=1	0.05 (0.62)	0.07 (0.95)	0.04 (0.43)	0.03 (0.39)
Majoritarian Election=1 × Population in 1,000	-0.04* (-1.82)	0.01 (0.46)	-0.06* (-1.92)	0.02 (0.64)
Direct Mayor=1	0.48*** (10.43)	0.36*** (9.68)	0.50*** (7.83)	0.34*** (6.60)
Direct Mayor=1 × Population in 1,000	-0.01 (-0.44)	0.01 (0.68)	-0.02 (-0.72)	0.01 (0.50)
Majoritarian Election=1 × Direct Mayor=1	0.16*** (2.73)	0.06 (1.29)	0.21** (7.50)	0.08 (1.23)
Majoritarian Election=1 × Direct Mayor=1 × Population in 1,000	0.02* (1.66)	-0.00 (-0.20)	0.07** (2.08)	-0.00 (-0.03)
Constant	5.01*** (72.60)	5.60*** (66.99)	4.98*** (61.49)	5.54*** (54.38)
Observations	8122	8122	3255	3255
Time effects	NO	YES	NO	YES
Fixed effects	NO	YES	NO	YES
Marg. Effect Direct at Maj=1		0.388 (4.42)		0.381 (2.96)
Marg. Effect Direct at Maj=0		0.329 (5.37)		0.297 (3.78)

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

the results are credible. Furthermore, to exclude the possibility that differences in vertical fiscal imbalance are driven by the council size in Table 15 we report the effect for population cut-offs of 4,000 (demarcating the council size of 15 and 18 members), 7,000 (demarcating the council size of 18 and 20 members, 10,000 (demarcating the council size of 20 and 22 members) and 15,000 inhabitants (demarcating the council size of 22 and 24 members). Discontinuity was found was at none of these population thresholds.

Figure 4 and the upper left panel present sensitivity of the main result with respect to bandwidth selection and bin selection for the non-parametric regressions. We can observe that the main conclusions remain unaffected. Further panels of Figure 5 show sensitivity of the transmission depend variables to the choice of bandwidth, and confirm stability of the results. The main channel of transimission, depicted in Figure 6 is also stable across the choice of bandwidths between 1,000 and 9,000 inhabitants, showing significant interaction

Table 8: Real own income from other sources per capita (logarithm): local linear regression (linear weights), bandwidth=10,000 (Columns 1 and 2) and 5,000 (Columns 3 and 4) with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	0.03** (1.98)	0.01 (0.80)	0.02 (0.98)	-0.01 (-0.42)
Majoritarian Election=1	-0.14* (-1.83)	0.04 (0.69)	-0.23** (-2.42)	-0.01 (-0.07)
Majoritarian Election=1 × Population in 1,000	-0.03** (-2.00)	0.01 (0.57)	-0.07** (-2.48)	0.03 (1.07)
Direct Mayor=1	0.29*** (6.56)	0.39*** (9.92)	0.29*** (4.98)	0.37*** (7.29)
Direct Mayor=1 × Population in 1,000	-0.00 (-0.16)	0.00 (0.19)	-0.00 (-0.21)	0.00 (0.18)
Majoritarian Election=1 × Direct Mayor=1	0.30*** (4.56)	0.04 (0.73)	0.39*** (4.26)	0.05 (0.67)
Majoritarian Election=1 × Direct Mayor=1 × Population in 1,000	0.04*** (2.84)	0.01 (0.50)	0.10*** (3.17)	0.00 (0.17)
Constant	5.43*** (90.16)	5.77*** (84.80)	5.44*** (78.47)	5.76*** (71.42)
Observations	7966	7966	3217	3217
Time effects	NO	YES	NO	YES
Fixed effects	NO	YES	NO	YES
Marg. Effect Direct at Maj=1		0.395 (6.71)		0.386 (4.05)
Marg. Effect Direct at Maj=0		0.360 (3.55)		0.341 (2.32)

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

between the majoritarian electoral system and the direct election of the mayor.



Figure 4: Discontinuities in the VFI before (black) and after (red) the reform: robustness

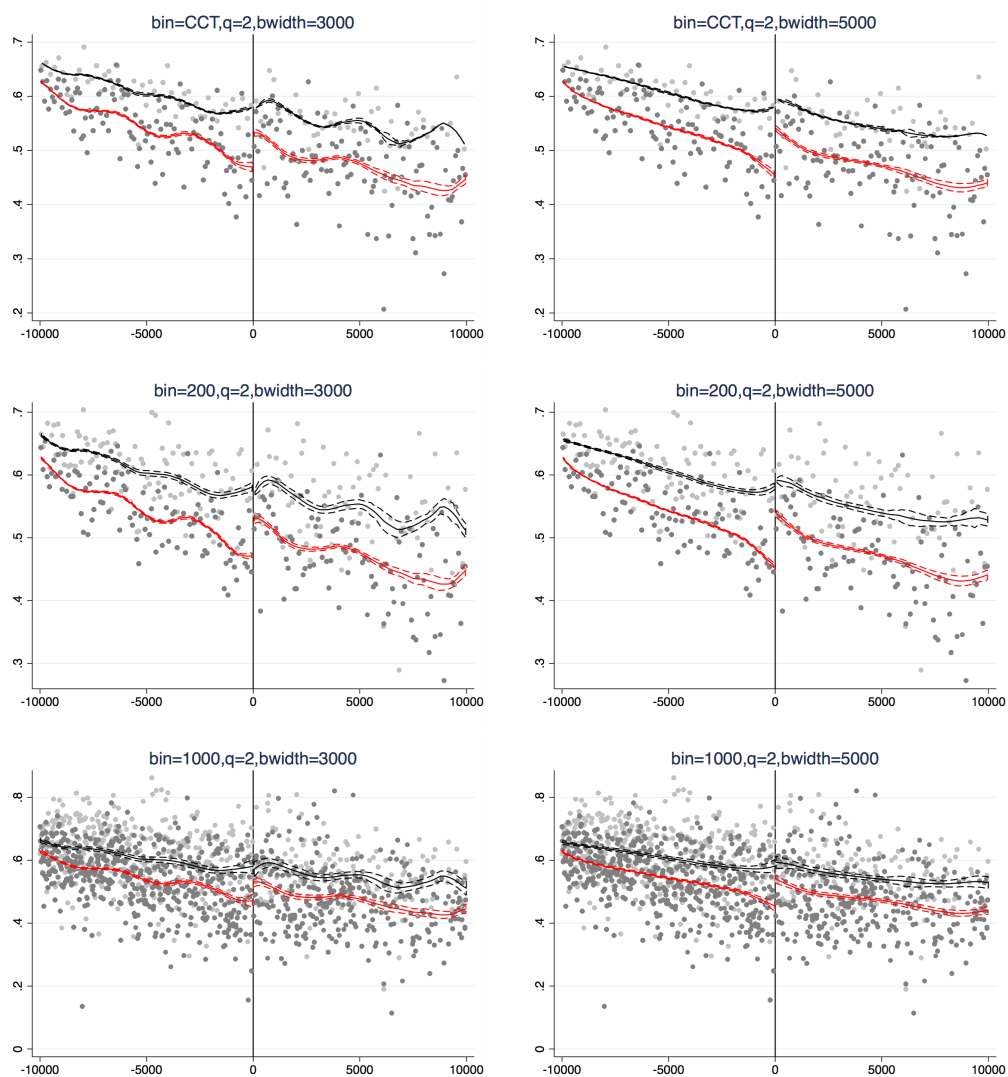


Table 9: Real total expenditure per capita (logarithm): local linear regression (linear weights), bandwidth=10,000 (Columns 1 and 2) and 5,000 (Columns 3 and 4) with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	0.01 (1.55)	0.01* (1.94)	0.00 (0.49)	0.01 (0.80)
Majoritarian Election=1	0.03 (1.42)	0.03 (1.48)	0.02 (0.74)	0.01 (0.52)
Majoritarian Election=1 × Population in 1,000	-0.01 (-1.60)	-0.02** (-2.27)	-0.01 (-0.74)	-0.01 (-1.37)
Direct Mayor=1	0.35*** (17.47)	0.59*** (31.93)	0.34*** (13.90)	0.59*** (26.12)
Direct Mayor=1 × Population in 1,000	-0.00 (-0.48)	-0.01* (-1.73)	0.00 (0.29)	-0.01 (-1.05)
Majoritarian Election=1 × Direct Mayor=1	0.02 (0.72)	-0.01 (-0.70)	0.04 (1.17)	-0.01 (-0.36)
Majoritarian Election=1 × Direct Mayor=1 × Population in 1,000	0.00 (0.84)	0.01 (1.46)	0.01 (0.49)	0.01 (1.00)
Constant	6.65*** (328.76)	6.70*** (269.94)	6.66*** (315.56)	6.69*** (241.14)
Observations	8122	8122	3255	3255
Time effects	NO	YES	NO	YES
Fixed effects	NO	YES	NO	YES
Marg. Effect Direct at Maj=1		0.580 (18.60)		0.571 (13.70)
Marg. Effect Direct at Maj=0		0.594 (13.02)		0.580 (9.92)

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

Table 10: Net migration: local linear regression (linear weights), bandwidth=10,000 (Columns 1 and 2) and 5,000 (Columns 3 and 4) with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	-0.03* (-1.93)	-0.02 (-1.06)	-0.03 (-1.02)	-0.05* (-1.72)
Majoritarian Election=1	-0.02 (-0.25)	-0.05 (-0.64)	-0.00 (-0.04)	-0.12 (-1.16)
Majoritarian Election=1 × Population in 1,000	0.02 (1.04)	-0.00 (-0.07)	0.02 (0.73)	0.02 (0.76)
Direct Mayor=1	-0.03 (-0.36)	0.10 (1.35)	-0.07 (-0.85)	0.06 (0.69)
Direct Mayor=1 × Population in 1,000	0.01 (0.53)	-0.00 (-0.17)	0.04 (1.40)	0.03 (1.14)
Majoritarian Election=1 × Direct Mayor=1	0.10 (0.97)	0.05 (0.53)	0.21* (1.68)	0.16 (1.26)
Majoritarian Election=1 × Direct Mayor=1 × Population in 1,000	-0.02 (-0.75)	-0.01 (-0.42)	-0.02 (-0.35)	-0.01 (-0.34)
Constant	0.06 (0.85)	0.05 (0.47)	0.06 (0.68)	0.10 (0.71)
Observations	8060	8060	3235	3235
Time effects	NO	YES	NO	YES
Fixed effects	NO	YES	NO	YES
Marg. Effect Direct at Maj=1		0.195 (0.97)		0.148 (1.03)
Marg. Effect Direct at Maj=0		0.144 (0.72)		-0.010 (-0.03)

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

Table 11: Subsidies from the central government per capita (logarithm): local linear regression (linear weights), bandwidth=10,000 (Columns 1 and 2) and 5,000 (Columns 3 and 4) with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	0.01 (1.12)	0.02* (1.71)	0.01 (0.35)	0.03 (1.49)
Majoritarian Election=1	0.03 (0.57)	0.03 (0.57)	0.02 (0.21)	0.04 (0.57)
Majoritarian Election=1 × Population in 1,000	-0.01 (-1.06)	-0.02** (-2.13)	-0.01 (-0.50)	-0.04* (-1.84)
Direct Mayor=1	0.64*** (13.17)	0.94*** (22.51)	0.63*** (10.20)	0.93*** (16.99)
Direct Mayor=1 × Population in 1,000	-0.01 (-1.02)	-0.02** (-2.24)	-0.01 (-0.30)	-0.03 (-1.57)
Majoritarian Election=1 × Direct Mayor=1	-0.11* (-1.68)	-0.08 (-1.60)	-0.14 (-1.62)	-0.10 (-1.42)
Majoritarian Election=1 × Direct Mayor=1 × Population in 1,000	-0.01 (-0.49)	0.01 (1.15)	-0.03 (-1.34)	0.02 (0.82)
Constant	4.42*** (90.93)	4.44*** (74.72)	4.43*** (74.24)	4.42*** (55.56)
Observations	8122	8122	3255	3255
Time effects	NO	YES	NO	YES
Fixed effects	NO	YES	NO	YES
Marg. Effect Direct at Maj=1		0.899 (13.31)		0.884 (8.58)
Marg. Effect Direct at Maj=0		0.978 (9.47)		0.980 (6.78)

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

Table 12: Grants from the central government per capita (logarithm): local linear regression (linear weights), bandwidth=10,000 (Columns 1 and 2) and 5,000 (Columns 3 and 4) with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	-0.02*** (-2.71)	-0.00 (-0.67)	-0.04*** (-2.94)	-0.01 (-0.71)
Majoritarian Election=1	-0.09*** (-2.60)	-0.01 (-0.25)	-0.12*** (-2.97)	0.00 (0.02)
Majoritarian Election=1 × Population in 1,000	-0.01 (-0.89)	-0.02*** (-2.69)	0.01 (0.48)	-0.01 (-0.76)
Direct Mayor=1	0.18*** (6.36)	0.20*** (8.47)	0.16*** (4.33)	0.21*** (6.62)
Direct Mayor=1 × Population in 1,000	-0.01 (-1.18)	-0.02*** (-2.85)	0.00 (0.31)	-0.02 (-1.46)
Majoritarian Election=1 × Direct Mayor=1	-0.04 (-1.07)	-0.08*** (-2.87)	-0.02 (-0.37)	-0.08* (-1.91)
Majoritarian Election=1 × Direct Mayor=1 × Population in 1,000	-0.00 (-0.26)	0.01 (0.70)	-0.02 (-0.82)	0.00 (0.27)
Constant	5.66*** (176.04)	5.57*** (175.44)	5.69*** (148.83)	5.58*** (138.06)
Observations	8122	8122	3255	3255
Time effects	NO	YES	NO	YES
Fixed effects	NO	YES	NO	YES
Marg. Effect Direct at Maj=1		0.178 (2.71)		0.186 (1.90)
Marg. Effect Direct at Maj=0		0.262 (4.25)		0.262 (2.98)

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

Table 13: Falsification test, cutoff=19000: local linear regression (linear weights), bandwidth=10,000 (Column 1) and 5,000 (Column 2) with time and province fixed effects

	(1)	(2)
Population in 1,000	-0.01*** (-4.10)	-0.01 (-1.63)
Cutoff 19000=1	-0.01 (-0.42)	-0.01 (-0.53)
Cutoff 19000=1 × Population in 1,000	0.01** (2.03)	0.01 (1.52)
Direct Mayor=1	-0.01* (-1.77)	0.00 (0.21)
Direct Mayor=1 × Population in 1,000	-0.00** (-2.13)	0.00 (0.53)
Cutoff 19000=1 × Direct Mayor=1	-0.00 (-0.26)	-0.02 (-1.01)
Cutoff 19000=1 × Direct Mayor=1 × Population in 1,000	0.00 (1.42)	0.00 (0.14)
Constant	0.49*** (28.09)	0.50*** (22.78)
Observations	8355	3397

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

Table 14: Falsification test, cutoff=21000: local linear regression (linear weights), bandwidth=10,000 (Column 1) and 5,000 (Column 2) with time and province fixed effects

	(1)	(2)
Population in 1,000	-0.01*** (-4.68)	-0.01 (-1.55)
Cutoff 21000=1	-0.03 (-1.29)	-0.06** (-2.47)
Cutoff 21000=1 × Population in 1,000	0.01** (1.97)	0.02** (2.41)
Direct Mayor=1	-0.01 (-1.15)	0.01 (0.69)
Direct Mayor=1 × Population in 1,000	-0.00 (-1.39)	0.00 (1.17)
Cutoff 21000=1 × Direct Mayor=1	-0.03 (-1.52)	-0.05* (-1.87)
Cutoff 21000=1 × Direct Mayor=1 × Population in 1,000	0.01 (1.49)	0.01 (1.03)
Constant	0.49*** (31.90)	0.51*** (29.75)
Observations	8355	3397

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

Table 15: Falsification tests, cutoffs=4000,7000,10000,15000: LLR, bandwidth=5000, before the 2002 reform with time and province fixed effects

	(1)	(2)	(3)	(4)
Population in 1,000	-0.00 (-0.48)	-0.00 (-0.72)	-0.00* (-1.80)	-0.00 (-1.17)
Cutoff4=1	-0.04 (-0.58)			
Cutoff4=1 × Population in 1,000	-0.00 (-0.72)			
Cutoff7=1		-0.08* (-1.70)		
Cutoff7=1 × Population in 1,000		-0.01 (-1.38)		
Cutoff10=1			-0.03 (-0.79)	
Cutoff10=1 × Population in 1,000			0.00 (0.03)	
Cutoff15=1				-0.01 (-0.33)
Cutoff15=1 × Population in 1,000				0.00 (0.59)
Constant	0.55*** (10.80)	0.57*** (17.74)	0.54*** (19.16)	0.52*** (16.08)
Observations	6402	8668	6730	2467

Robust standard errors clustered at municipality level; p 0.01 \*\*\* 0.05 \*\* 0.1 \*

Figure 5: Sensitivity of estimates to the choice of bandwidth: Discontinuity before (blue) and after (red) the reform

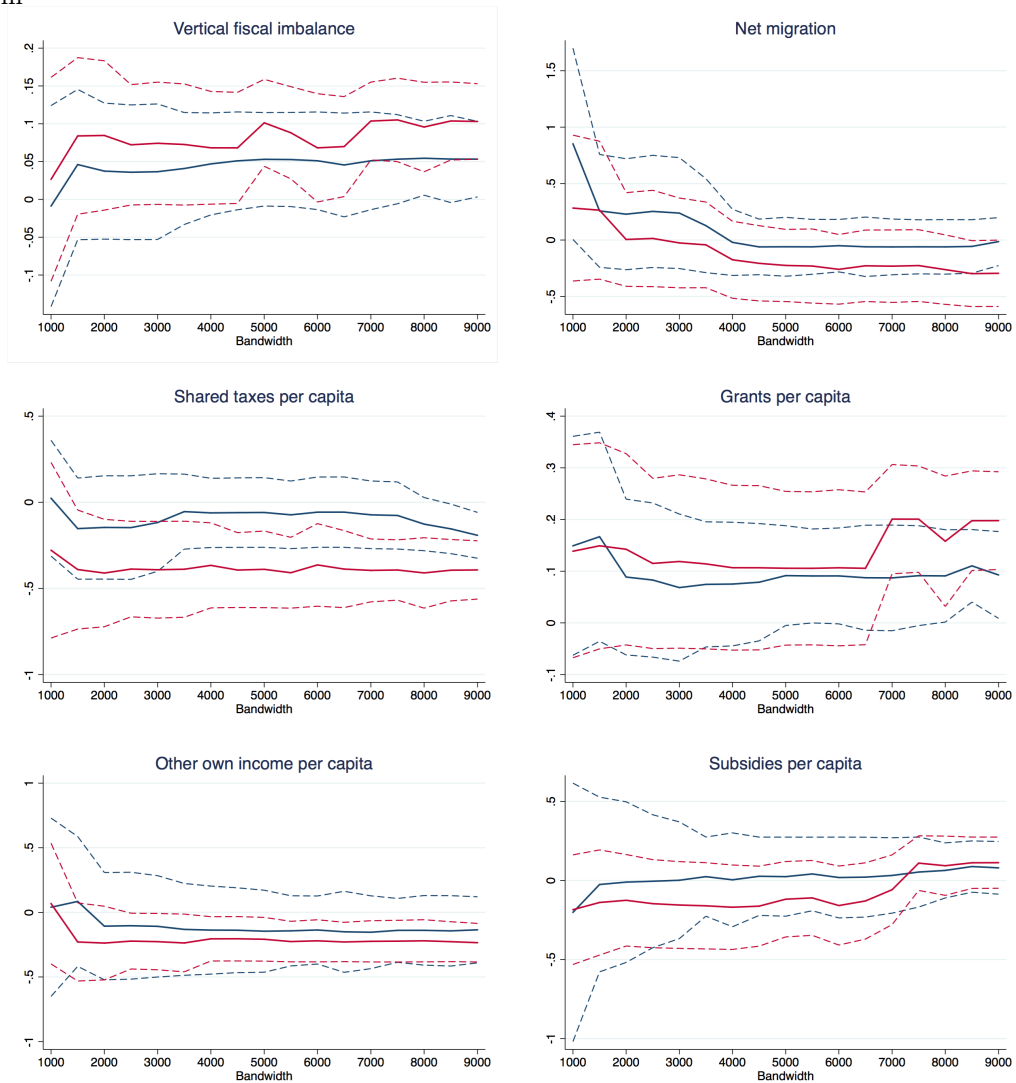
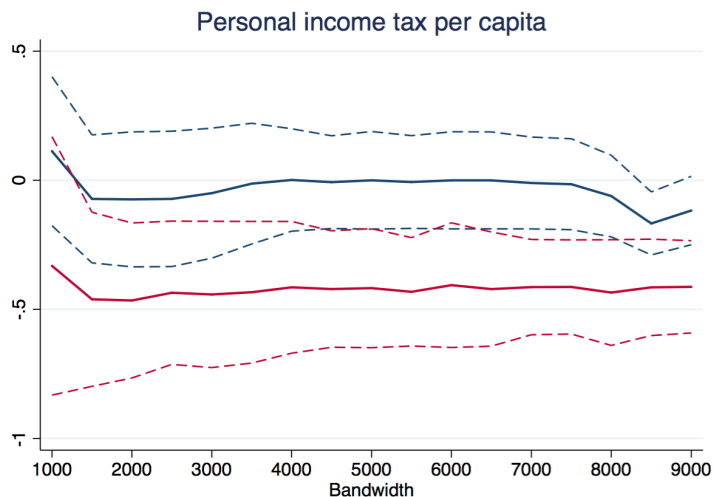


Figure 6: Sensitivity of estimates of the effect on personal income tax receipts to the choice of bandwidth: Discontinuity before (blue) and after (red) the reform



## 6. Conclusions

In this paper, we apply the difference-in-discontinuities design to disentangle the fiscal effects of the governance system conditional on electoral systems. We take advantage of a natural experiment, which involves two institutional reforms implemented in the Polish municipalities. The first reform introduced two electoral rules in 1998, which change along an exogenous population threshold: smaller municipalities use majoritarian elections, larger municipalities use proportional elections. The second reform changed the governance system in Polish municipalities from “parliamentary” to “presidential”, i.e. indirectly appointed executive was replaced by the directly elected mayor. Our results indicate that a change from parliamentary to presidential form led to lower vertical fiscal imbalance predominantly in the jurisdictions with majoritarian elections and to a lesser extent in municipalities governed by proportional elections. These results, therefore, confirm an interaction effect between the forms of government and electoral rules.

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## Appendix

Table 16: Definitions of the variables

Population in 1,000	Population expressed in 1,000 normalized so that 20,000=0 (PKW)
Proportional Election	Equals 1 if normalized population > 0 (PKW)
Direct Mayor	Equals 1 in years 2003 to 2010 (PKW)
VFI	The ratio of own income to overall income (GUS)
Real income from shared taxes	Real (Inflation 1996 = 100) income from corporate and personal income taxes per capita (logarithm) (GUS)
Real other own income	Real (Inflation 1996 = 100) income from taxes other than PIT and CIT per capita (logarithm) (GUS)
Real total expenditure	Real (Inflation 1996 = 100) total expenditure per capita (logarithm) (GUS)
Net migration	Net migration rate as percent of population (GUS)
Subsidies	Real (Inflation 1996 = 100) subsidies from the central government per capita (logarithm) (GUS)
Grants	Real (Inflation 1996 = 100) grants per capita (logarithm) (GUS)

Table 17: Descriptive statistics (municipalities between 10,000 and 30,000 inhabitants)

Variable	Direct election = 1					Direct election = 0				
	Mean	SD	N	Min	Max	Mean	SD	N	Min	Max
Proportional	0.22	0.41	8022	0.00	1.00	0.14	0.35	3786	0.00	1.00
VFI	0.57	0.15	7926	0.11	0.90	0.63	0.14	3748	0.18	0.96
Real income from shared taxes	4.84	0.53	7926	3.07	7.00	4.35	0.41	3748	3.03	6.20
Real total expenditure	7.10	0.25	8022	6.32	8.62	6.67	0.19	3821	6.19	8.18
Net migration	0.16	0.82	7971	-7.58	7.03	0.08	0.53	4057	-2.27	4.56
Real other own income	5.79	0.49	7926	4.29	7.88	5.11	0.79	3643	-0.41	7.58
Grants	5.93	0.33	8022	4.88	6.83	5.66	0.26	3821	3.01	6.59
Subsidies	5.16	0.48	8022	3.24	8.34	4.50	0.41	3821	3.19	6.64