National Representation and Local Public Expenditure: A Natural Experiment from Japan*

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Abstract

In Japan's mixed-member electoral system, a candidate who fails to obtain a pluarity of votes in a district may still be elected through a party list, giving her district two representatives instead of one. Extending the regression discontinuity design, I construct a sample of districts in which the assignment of an additional representative is as if random. I find that having an additional representative on average increases municipal expenditure by 1.8%. Within marginally winning districts, core municipalities of the second representative gain, but so do core municipalities of the first representative. This suggests that even in parliamentary systems with strong parties, political competition incentivizes politicians to bring public spending to core supporters in their districts.

Keywords: Political Representation, Public Expenditure, Mixed-Member Electoral System.

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1 Introduction

Does the number of political representatives affect the allocation of public resources? In a representative democracy, the primary means for citizens to affect policies is through their representatives. Therefore, the number of representatives is often considered a proxy of political power possessed by a group of citizens. For example, each state has two senators in the U.S. Senate, regardless of population. Small states therefore have greater representation in the Senate in per-capita terms. Altas et al. (1995) and Lee (1998) find that per-capita federal spending is larger in smaller states. However, it is unclear whether the positive relationship between the number of representatives per capita and public spending is causal. And if so, what is the causal mechanism? In particular, since politicians are motivated or constrained by elections, what roles does electoral incentive have in translating greater political representation into more public spending?

In this paper, I extend the conventional regression discontinuity estimator applied to vote shares to estimate the effects of having an additional representative on local public expenditure in Japan. In Japan's mixed-member electoral system, a candidate who fails to obtain a plurality of votes in a single-winner district may still be elected through a party list, effectively giving her district two representatives instead of one. I find that having an additional representative on average increases total municipal expenditure by 1.8% and discretionary spending on public works by 7.7%. The higher expenditures are attributable to more transfers from the central government.

Moreover, within districts that are gaining representation, municipalities with a large share of supporters for the additional representative gain, but so do municipalities with strong support for the first representative. Because the second representative is likely to compete with the first representative in the following election, the presence of an extra representative weakens the incumbency advantage of the first representative, intensifying electoral competition. This result suggests that political competition incentivizes politicians to bring public spending to core supporters in their districts. I provide some evidence that strongholds for either the first representative or the additional representative have higher voter turnout rates in the following election. This is consistent with politicians delivering electorally motivated spending in order to turn out their core supporters to vote in the future elections.

The main results described above are obtained from a quasi-randomized sample I construct by

extending the conventional regression discontinuity design. I exploit two sources of discontinuity in Japan's electoral system. A candidate who loses in a district may still be elected if her ranking on the party list is good enough. Her ranking on the party list depends on her performance in the district race related to the winner there. A small change in the vote share of either the losing candidate or the winning candidate may alter the ranking of the losing candidate on the party list. This is the first source of discontinuity that I exploit.

The second discontinuity that I exploit comes from the ripple effects of the outcomes of close elections. A candidate who narrowly loses in a close election is likely to have a high ranking on her party list. If due to a small electoral shock the candidate instead wins in the close election, she vacates her position on the party list, allowing another candidate on the same party list to be elected. A close election in one district may therefore create a ripple effect on whether other districts would have an additional representative.

In a conventional regression discontinuity design, two candidates compete for office. Whichever candidate obtains more than 50% of the votes wins. The identification assumption is that in elections where candidates' vote shares are sufficiently close to the 50% threshold, the assignments of winners are as if random because a small random shock could alter them. I generalize this idea by perturbing the observed vote shares slightly to generate a counterfactual allocation of extra representatives to districts. Essentially, I construct a quasi-randomized sample, which consists of districts that may marginally gain or lose an additional representative when subjected to small perturbations to observed vote shares. In this sample, whether a district has an additional representative is as if random.

The natural experiment I analyze in this paper relates to three strands of literature on political representation, electoral competition and distribution of public spending. First, it relates to the literature that examines the empirical relationship between the number of representatives per capita and public spending. In Altas et al. (1995) and Lee (1998), since the number of seats for an electoral district is fixed, cross-sectional variation in the number of representatives per capita is driven by variation in population. But population potentially correlates with a large number of factors affecting public expenditure, creating difficulties for a causal inference. Ansolabehere et al. (2002) adopt a novel difference-in-difference (DID) strategy, using an arguably exogenous Supreme Court decision mandating the one-person-one-vote principle in the apportionment of state legislatures to

eliminate potentially confounding time-invariant heterogeneity. However, a mandated equalization of apportionment may change the power structure in the state legislature. For example, previously underrepresented urban interests may gain seats in the state legislature at the expense of rural interests. In this case, transfers to a local area may change even if its representation as measured by the seat-to-population ratio remains unchanged. In other words, the DID assumption of parallel trends may be violated.

Similar limitations also apply to the DID strategy adopted by Horiuchi and Saito (2003). They use changes in seat-to-population ratio due to the 1994 electoral reform in Japan. In this case, not only was the entire electoral system overhauled, but campaign finance regulations were also reformed to favor parties over individual politicians. For example, public subsidies to parties for campaigns and general administration were introduced, and corporate and labor union contributions to individual politicians were banned. Both the power structure of the legislature and the electoral incentives are likely to change after the electoral reform.

In this paper, I examine the effects of having an extra representative on public spending, holding the population and composition of an electoral district unchanged. The empirical strategy allows me to take power structure in the legislature as given, isolating the effects of effective representation on public spending in local areas. This paper adds to an emerging empirical literature that uses regression discontinuity designs to study political representation and policy outcomes. Albouy (2013) studies the effects of political representation in the majority party in the U.S. Congress on the federal grants received by states. Pattersson-Lidbom (2008) studies the effects of majority control by left-wing parties in Swedish local governments on taxation and government expenditure. Folke (forthcoming) studies the effects of partisan representation in Swedish local governments on local immigration, environmental and tax policies. This paper differs from Pattersson-Lidbom (2008) and Folke (forthcoming) by studying distributive policies by the national government, and differs from Albouy (2013) by focusing on the effects of number of representatives on local public expenditure in a parliamentary country.

Second, this paper relates to the literature on political agency problems. Incumbency advantage is often considered undesirable because it allows politicians to be less responsive to voters (Besley and Burgess, 2002). However, in a political agency model with both moral hazard problems and adverse selection problems, incumbency advantage naturally arises as voters are to some extent able

to select better politicians through previous elections. The challenge is to empirically disentangle the incentive effects of incumbency advantage from the selection effects of incumbency advantage. In this paper, the quasi-randomized assignment of an additional representative to a district constitutes a negative shock to the incumbency advantage of the first representative. When a district is exogenously assigned with a second representative, such shock has no effect on the selection of the first representative. However, the disincentive effect of incumbency advantage for the first representative is weakened because the first representative is likely to compete with another incumbent in the following election. This result suggests that electoral competition is of first order importance in translating greater representation into more public spending.

Third, this paper adds to the literature on electoral rules and public finance. Electing legislators from small, single-winner districts holds politicians individually accountable, which may limit corruption (Persson et al., 2003) and help select better politicians (Besley, 2007). Legislators elected in large electoral districts that use party lists and proportional representation rules represent broad interests rather than narrow, geographically defined interests (Persson and Tabellini, 2000; Milesi-Ferretti et al., 2002). Combining two sets of electoral rules, a mixed-member system is often thought to have the best of both worlds and has been adopted in more than a dozen new and existing democracies (Shugart and Wattenberg, 2001). However, this paper documents a subtlety in the design of a mixed-member electoral system, which makes representatives elected through party lists responsive to narrow, geographically defined interests. In Japan, the supposedly broad representation of representatives elected from party lists is compromised by the linkage between candidates' ranking on the party lists and their performance in their small home districts.

The remainder of the paper is organized as follows. Section 2 provides institutional backgrounds and data description. Section 3 describes my empirical strategy. Section 4 presents the main estimates on the effects of political representation on local public finance. Section 5 discusses the role of political affiliation and legislative bargaining in driving the main results. Section 6 discusses how having an additional representative affects local public expenditure in more heterogeneous districts. Section 7 shows how having an additional representative differentially affects swing and core municipalities within a district. Section 8 concludes.

2 Institutional Background and Data

2.1 Public Finance in Japan

Figure 1 shows, for both Japan and the U.S., the shares of non-defense expenditures by the national government, locally financed expenditures by subnational governments, and expenditures by subnational governments financed by transfers from the national government. Compared to the U.S., subnational governments of Japan account for a relatively high share of total public expenditure. In Japan, 59% of non-defense public expenditures in Fiscal Year (FY) 2007 were spent by subnational governments, as compared to 52.2% in the U.S. Because in both Japan and the U.S., intergovernmental transfers amount to about 10% of total non-defense public expenditure, this means that the national government of Japan transfers a larger share of its revenue to subnational governments. However, subnational governments in Japan have very limited autonomy in generating local tax revenue (Weese, 2012). Prefectural and municipal governments rely on the national government as a major source of revenue.[1] From FY 2002 to FY 2010, total tax revenue of municipal governments on average accounted for 37.2% of total expenditure by municipal governments. Transfers from the national government and the prefectural governments accounted for 33.3% and 4.7%, respectively. Other sources such as debt, user fees and revenue from governmental enterprise made up the rest. Figure 2 shows these shares over the sample period. Because large municipalities are more capable of generating local tax revenue, the median municipality relies even more on transfers from the national government than those averages would suggest. The median share of municipal revenue due to transfers from the national government is between 40% to 50% from FY 2002 to FY 2010. Figure 3 shows the median shares of municipal revenue from various sources over this period.

Transfers from the national government are implemented by a tax sharing system. Several programs distribute funds to municipal governments, including the Local Allocation Tax, National Treasury Disbursements and the Local Transfer Tax. The Local Allocation Tax (LAT) is a formula-based general-purpose grant program that transfers fixed percentages of revenue of several major national taxes to municipal governments. To calculate the LAT transfer, national agencies take

[1] As the immediately subnational administrative divisions, prefectural governments are analogue to state governments in the U.S. Prefectures are further divided into a number of municipalities.

the difference between the cost of providing a basic public services prescribed by law and the fiscal capacity of a municipal government. The National Treasury Disbursements provide mandatory cost sharing of certain public services, the cost of performing responsibilities of the national government entrusted to local governments and support of specific policies. Finally, the Local Transfer Taxes transfer a fixed proportion of revenue of several national taxes, mostly excise taxes, to local governments. Though these programs are more or less formula-based, numerous factors and discretionary adjustments are considered. Anecdotal evidence suggests that the bureaucratic application of transfer formulas is not carried out entirely free of political interventions. For example, politicians in the late the 1990s and early 2000s successfully lobbied the Ministry of Home Affairs to include access to high-speed rail as a basic public service, allowing the use of LAT grants to fund bullet train expansion projects in remote areas (DeWit, 2002).

Given the municipal governments' fiscal reliance on the national government, it is reasonable to use total municipal expenditures to measure the effect of political representation in the national government on local public finance. However, I also study the effect of political representation on transfers from the national governments, the gap between total public expenditure and local tax revenue, and more disaggregate spending measures, although data for these measures are more limited.

2.2 Japan's Mixed-Member Electoral System

From 1947 to 1993, Japan had an electoral system featuring multi-member districts (MMD) and a single, non-transferable vote (SNTV). The nation was divided into more than a hundred median-size districts. Each district elected two to six members to the House of Representatives, the lower house of Japan's parliament, the National Diet, for a term of four years. Candidates in each district with the highest vote count would be elected. The upper house, the House of Councillors, was elected through a similar multi-member district plurality rule, though its members were elected from larger districts for a longer term. Typically, then and now, a majority coalition in the House of Representatives forms the government and elects one of its members as prime minister. The prime minister can dissolve the House of Representatives before its term expires and call for early elections, but not for the House of Councillors. While the House of Councillors retains considerable legislative power, the House of Representatives prevails in disagreements between the two chambers

on important decisions such as passing a budget, ratifying treaties and choosing a candidate for prime minister. Moreover, the lower house can override the upper house's objection on a regular bill by a two-thirds majority. Given the dominant role of the House of Representatives, Japan's constitutional design is referred to as a "one-and-a-half house solution" by Ackerman (2000). I shall focus on the House of Representatives in this paper.

The Liberal Democratic Party (LDP) had been the ruling party since 1955. However, in the 1993 general election, it lost its governing position for the first time. A governing coalition was formed by eight small anti-LDP parties. Led by Prime Minister Morihiro Hosokawa in 1994, the 11-month governing coalition replaced the previous MMD-SNTV system with a mixed system for the lower house.

Under the reform, the House of Representatives was given 500 seats, of which 300 seats were from single-member districts (SMDs) with a first-past-the-post (FPTP) rule, while 200 seats were elected from proportional representation (PR) party lists grouped by 11 regional PR blocks.[2] Under the new system, each voter is given two votes, one for a candidate in her single member district and another for a party list in her PR block. The SMD vote need not be for a candidate from the same party as the PR vote. The boundaries of PR blocks do not cross the boundaries of prefectures, the immediate sub-national level of administrative unit. Conversely, the boundaries of prefectures do not cross the boundaries of SMDs. Hence, a PR block contains one or several prefectures, and a prefecture contains several SMDs. Figure 4 is a map showing how Japan is divided into 11 PR blocks, each filled with different colors. Each PR block consists of one or several prefectures, as delineated by dashed lines. The number of SMDs in each prefecture in the most recent 2012 election is labeled on top. A fixed number of PR seats is allocated to a PR block before each election. Parties propose a party list in each PR block to contest for the PR seats allocated to that block. PR seats in a PR block are allocated to parties in proportion to their PR vote shares in the block. Vote shares outside a PR block have no bearing on the allocation of the PR seats within the PR block.

As in some other mixed-member systems, such as those of Germany and New Zealand, dual candidacy is permitted. A candidate can be on both the SMD ballot and the PR list ballot. If

[2] After the 1996 election, the first after the reform, the number of PR seats was reduced to 180, while the number of SMD seats remained unchanged.

a candidate wins a seat from an SMD, she takes that seat and vacates her position on the party list. If a candidate loses in the SMD race, she can still obtain a PR seat if her ranking on the PR list is favorable relative to the number of PR seats her party won in the regional PR block. In Germany and New Zealand, the allocations of PR seats are used to top up district seats so that the overall shares of seats going to each party at the end would proportionally reflect vote shares of parties nationwide. But in Japan's system, the number of SMD seats (or constituent seats) and the number of PR seats are fixed. The SMD system and the PR system are parallel in the sense that the number of PR seats a party obtains only depends on its performance in the PR vote and the number of SMD seats a party obtains only depends on its candidates' performance in SMD races.

To illustrate, compare Germany and Japan. The Bundestag, the German Federal Diet, consists of 598 members, with half elected from single member districts and the other half from party lists proportionally allocated to parties according to nationwide party vote shares. If a party obtains 50% of party votes nationwide and its nominees win 100 seats in the single member districts under the first-past-the-post rule, the number of PR seats allocated to the party is 199 = 598 / 2 - 100.[3] In Japan, on the other hand, the number of PR seats a party wins is the sum of PR seats won in each PR block, which in turn is determined solely by PR vote shares in each block, independent of the number of SMD seats won or nationwide PR vote shares.[4] The number of PR seats, prefectures and SMDs in each PR block are summarized in Table 1.

While the SMD system and PR system are parallel in that the allocation of PR seats across parties does not depend on the outcomes of SMD races, the two systems are connected in the allocation of intra-party PR seats. A special feature of the party PR lists is that rankings are partially determined ex ante and partially determined ex post. Candidates on the PR lists are ranked by their parties before the election. However, parties can give multiple candidates equal ranks on the ballot. Dual candidates' ex post ranks within a cluster (conditional on ex ante equal rank) are determined by their performance in their own SMD, specifically by their vote share divided by the winning candidate's SMD vote share. The higher is this ratio (hereafter known as

[3] In the case that a party has more members elected from SMDs than its overall seat share implied by the national party vote share, some additional seats known as overhang seats are added to the 598 regular seats to accommodate the crowd-out of PR seats for other parties that would otherwise occur.

[4] The mapping from PR vote share to PR seat share in a PR block follows the D'Hondt method.

the narrowness-of-defeat ratio or simply the narrowness ratio), the higher is a dual candidate's rank within the cluster. For example, suppose all candidates on a party list are dual candidates who lose their SMD races. Amy ranks first on the list, which is fixed ex ante, but Ben, Cameron and David rank equally second. The ex-post ranks of Ben, Cameron and David will be given by their vote shares in the SMD races as compared to the winning candidates from the respective SMDs. If the party of Amy and Ben obtains two seats in the PR block, Amy will get a PR seat regardless of her narrowness ratio, while the candidate among Ben, Cameron and David with the highest narrowness ratio will get the second seat.[5]

If legislators who are defeated in the SMD races but elected through the PR system are motivated to maintain a local base, such a parallel voting system creates variation of *de facto* representation in the lower house across districts. There are several reasons candidates would have incentives to cater to local interests (McKean and Scheiner, 2000). First, dual candidacy provides insurance to candidates for a seat via an alternative route. If a candidate loses the SMD race, she may still be able obtain a seat through the party list. Secondly, the PR list is partially open in that a dual candidate's ranking on the list is partially determined by her performance in the SMD. Third, new formation of parties and changes of party membership are relatively frequent in Japan. The Democratic Party of Japan, which recently lost its majority in the 2012 general election, was founded in 1998. The current third largest party, the Japan Restoration Party with 54 seats, and the sixth largest party, the Tomorrow Party of Japan with nine seats, were both founded in 2012. A local base provides politicians with political capital and puts them in a good bargaining position should change of party affiliations occur. Fourth, it is not uncommon in Japan's political culture that seats are inherited by staffers or children of the incumbents (Taniguchi, 2008). A local base would facilitate such inheritance.

2.3 Data

There have been six general elections for the House of Representatives since the electoral reform in 1994. They were held in years 1996, 2000, 2003, 2005, 2009 and 2012. I downloaded election

[5]There is one caveat. After the 1996 general election, the election law was amended such that any candidate who fails to obtain a 10% vote share in the SMD race will be disqualified. Her position on the PR list would be vacated regardless of her narrowness ratio, and her deposition for candidacy would be forfeited. This has been taken into consideration in the implementation of my empirical strategy.

results and party lists from the website go2senkyo.com for all six elections and the website of the Japanese Ministry of Internal Affairs and Communications for the last three. I obtained municipal level voting data from 1996 to 2005 from Asahi Shimbun, one of five major national newspapers in Japan. Municipal election data for 2009 were complied in part from various websites of prefectural election commissions. I mainly used the election data from the website go2senkyo.com, as they were more complete, but verified them with data from the other two sources, finding few discrepancies.

In these elections, among candidates who lost their SMD races but ran again in the next election, 88% of challengers who were not members of the Lower House ran again in the same district, while PR incumbents were 8.6% more likely than non-members to run in the same SMD. This difference is statistically significant, as shown in Table 2 using a linear probability model. A logit model gives a similar result. This suggests that most candidates run in the same district if they run again in the next election, and that PR incumbents are particularly inclined to do so.[6] Fifty-nine percent of candidates contesting for SMD seats have been dual candidates. The percentage has been higher among competitive candidates; 84% of candidates finishing first or second in SMD races have been dual candidates. Moreover, 81% of candidates on the party lists have also been on the ballot of an SMD race, suggesting a preference for being elected to an SMD seat. This is consistent with SMD incumbents having a higher re-election rate than do PR incumbents. While incumbents of PR seats enjoy substantial electoral advantages, incumbents of SMD seats have considerably higher probability of getting re-elected to the lower house. Based on a linear probability model relating re-election probability to incumbent status, controlling for party-election fixed effects, the incumbency advantage of SMD incumbents is about 63% to 157% higher than that of incumbents elected through the party lists. These regression results are shown in columns (1) to (4) of Table 3. Even among incumbents who were elected in close SMD elections, so that the assignment to SMD seats versus PR seats is close to random, SMD incumbents had a higher rate of getting re-elected. This is shown in columns (5) and (6) of Table 3.

Demographic data and basic public finance data were taken from two sources: the Minryoku database and the Ministry of Internal Affairs and Communications. The Minryoku database was compiled by Asahi Shimbun Publications Inc. from various governmental agencies. Municipal public expenditure data and local tax revenue from FY 1997 to FY 2009 were available in the Minryoku

[6]Unsurprisingly, incumbents of SMD seats almost always ran in the same district from which they were elected.

database. More detailed breakdowns of revenue and expenditure of municipal governments from FY 2002 to FY 2010 are available from the Ministry of Internal Affairs and Communications.

3 Empirical Strategy

3.1 Sources of Discontinuities to be Exploited

In light of the above-described electoral rules linking the Majoritarian and the PR system, which are imposed uniformly across parties, there are two sources of discontinuity to be exploited for exogenous variation. The first is close narrowness ratios among ex ante equally ranked dual candidates. To illustrate this, consider the party list of LDP in the general election of 2009 for the PR Block of Kitakanto in Table 4.[7] Pure PR candidate Genichiro Sata occupied the singleton top rank on the list. After Genichiro Sata, 26 candidates were ranked equally second. They were each dual candidates, competing in one SMD within the Kitakanto PR block. On the bottom of the list, two pure PR candidates were ranked 28th and 29th, respectively. Twenty seats were allocated to the PR Block of Kitakanto in 2009. LDP won 25.84% of party votes in this PR block, hence obtaining six seats according to the D'Hondt method. Genichiro Sata took up one PR seat by being on top of the list as a pure PR candidate, leaving five seats for candidates below him. Three dual candidates won in their respective SMDs, hence taking the SMD seats and vacating their positions on the party list. The SMD-losing dual candidates in the second-rank cluster were then ranked according to their narrowness-of-defeat ratio, i.e., their vote share divided by the vote share of the winner in their own district. The five candidates with highest narrowness ratios obtained the remaining PR seats. The narrowness ratio of Tsutomu Sato, who took the last PR seat for LDP in Kitakanto, was 0.781. Yuya Niwa, who had a narrowness ratio of 0.772 and was ranked ex post immediately below Tsutomu Sato, did not get a PR seat. In this case, Tochigi 4, the district of Tsutomu Sato, obtained an additional *de facto* representative through the PR system, while Ibaraki 6, in which Yuya Niwa competed, did not. Notice that, given the number of seats a party obtains, the cut-off narrowness ratio for the party's last PR seat is potentially determined by order statistics of the narrowness ratios from all equally ranked candidates in a PR list cluster, rather than a single number as in the FPTP two-party elections. Determination of the cut off depends on multiple vote

[7] The PR Block of Kitakanto is north of Tokyo Prefecture, and is painted in orange in Figure 4.

counts among candidates whose identities are ex ante uncertain. Therefore, it would be difficult to engage in electoral manipulations just around the cut-off in order to gain the last PR seat and award an SMD an extra *de facto* representative. Endogenous sorting in a small neighborhood of the cut-off is highly unlikely, avoiding the most dangerous pitfall invalidating a traditional regression discontinuity design, particularly in studies examining two candidates contesting under the plurality rule. In the above example, if due to random factors Yuya Niwa had achieved an additional 0.5 percentage point in vote share, he would have obtained the last PR seat at the expense of Tsutomu Sato. Notice that Yuya Niwa actually had a higher vote share than Tsutomu Sato did. The reason he was not able to obtain the last PR seat is that the winner in Yuya Niwa's SMD did better than the winner of Tsutomu Sato's SMD. Had the winner of Yuya Niwa's SMD attained a $\frac{3}{4}$ percentage point lower vote share, or had the winner of Tsutomu Sato's SMD achieved a $\frac{3}{4}$ percentage point higher vote share, Yuya Niwa would have obtained the last PR seat instead of Tsutomu Sato. Thus, the winner of the last PR seat depended on at least four vote counts: Niwa's and Sato's votes and the votes of the winners in their districts. Moreover, the identities of these four vote counts are only relevant conditional on the LDP obtaining six PR seats and having four dual candidates with narrowness ratios higher than Tsutomu Sato did, both of which were uncertain before the election results were revealed.

The second source of discontinuity is close elections in SMD races. A narrow winner in one SMD could potentially change the representation of another district in the same PR block, because of its implications for the intra-party allocation of PR seats. This is because winners of SMD races vacate their positions on the party lists. To see this operating in reality, consider again the LDP's party list in Table 4. The SMD-losing candidate with highest narrowness ratio at 0.976 was Fukushiro Nukaga from district Ibaraki 2. If for random reasons he had obtained an additional 1.2 percentage points in vote share, he would have won the SMD seat and vacated his position on the PR list. The last PR seat would have then gone to Yuya Niwa. In such a scenario, the opponent of Fukushiro Nukaga, who would have lost the SMD race by a narrow margin, would have occupied a high ex post ranking on his party's PR list, potentially kicking out another SMD-losing candidate from that party. The outcome of a narrow election in SMD Ibaraki 2, though perhaps not consequential for its own representation, thus has a ripple effect on the representation of two other districts.

There is another source of discontinuity that can potentially be utilized. Folke (2011) proposes

a method of applying regression discontinuity design in proportional representation systems, exploiting the discontinuous jumps in the mapping of practically continuous vote shares to discrete seat shares. He then applies this method using Swedish municipal elections, which have a pure PR system, to study the effects of party representation on environmental, immigration and tax policies. The benefit of exploiting such discontinuity in Japan's case is that it would provide an extra source of exogenous variation of effective representation due to the marginal change of PR seats obtained by a party, which may lead to the election (or non-election) of SMD-losing dual candidates from the affected parties. One cost, however, is that this strategy would introduce another layer of complexity, as such discontinuity rests on the particulars of the mapping from the PR vote shares to the number of PR seats obtained by each party. More importantly, inter-party re-allocations of PR seats may have wider political and public policy implications than intra-party reallocations of PR seats across districts. As shown in Folke (2011), the assignment of a seat in the municipal legislature to parties with different agendas has large effects on local immigration and environmental policies. Inter-party re-allocations of PR seats may also alter the coalition formation, regional bargaining positions, public policy priorities and so on. Exploiting this discontinuity therefore confounds the distributional consequences of different levels of effective representation, holding the partisan configuration of a legislature fixed. I shall focus instead on the cross-municipality variation of effective representation induced by intra-party assignment of PR seats.

3.2 A Quasi-Randomized Sample of Districts

To motivate how I incorporate the two sources of discontinuity in my empirical work, consider the following thought experiments. Imagine that due to random factors, such as weather on the election day affecting turnout of voters for candidates differentially, the vote shares of the winner and the runner-up candidate in a particular SMD are perturbed. In particular, suppose I transfer an amount ϵ of vote share from one candidate to the other. This may or may not affect the outcome of the perturbed SMD race. If under this counter-factual vote share profile, the allocation of representatives to districts via the PR system does not change, nothing happens. However, if a district having exactly one additional representative through the PR system loses it in the counter-factual, the district is tagged as randomly assigned to the treatment of having two effective representatives. If a district having no additional *de facto* representative through the PR system

gains one in the counter-factual, the district is tagged as randomly assigned to the control group of having a single representative. The counter-factual vote shares may result in changes in district representation due to either or both of the above-mentioned sources of discontinuity. To construct a sample of districts with quasi-randomly assigned treatment status, I carry out the concrete version of the above thought experiments on each SMD in each election, perturbing one SMD election at a time and holding everything else constant. This generates a set of treatment districts (i.e., districts having exactly one PR representative who would lose it in the counter-factual) and a set of control districts (i.e., districts having no PR representative who would gain one in the counter-factual). A district may qualify for treatment status under multiple perturbations to different elections, but such districts are not double counted in the quasi-randomization sample.

I focus on the margin of having zero or one PR representative, so that districts in the quasi-randomized sample have identical and exactly one treatment status out of two, regardless of which thought experiment generates the treatment status. This avoids complexity arising from situations such as a district having a treatment status at the 0–1 margin but a control status at the 1–2 margin. Moreover, it is so rare that a district could gain or potentially gain two PR representatives that precise estimation at margins other than zero-one is difficult. Furthermore, it should be noted that a given perturbation does not always generate treatment and control districts in pair. It is possible that a vote share perturbation generates a treated district but not a control district, and vice versa, because a dual candidate may gain or lose a seat to a pure PR candidate.

In the regression discontinuity (RD) design of Lee et al. (2004), who study U.S. House elections, the authors suggest a non-parametric estimate using close elections with a margin of victory of less than 4% in the two-party vote share. In those elections, election outcomes are considered to be as if random. Since vote share transfers of up to 2% between the two candidates are sufficient to alter the outcomes in these elections, I similarly use 2% perturbations of vote shares to construct the quasi-randomized sample, i.e. $\epsilon = 0.02$. Table 5 shows how many SMDs have additional representatives after each election, in both the full sample and the quasi-randomized sample.

To check whether the constructed sample has close to random assignments of treatment status (i.e., having a PR representative or not), I examine the correlations between treatment status and a list of demographic and political variables. This list includes municipal population growth rate, area of the municipality, population density, number of SMD candidates, total vote share of the top

two SMD candidates, whether the SMD elected a LDP candidate and whether the SMD elected a candidate of the Democratic Party of Japan (DPJ), which was the main opposition party for most of the sample period. Results are reported in Table 6. None but the dummy variable indicating a DPJ winner are found to be significantly correlated with the treatment status of a municipality at a 10% level.

4 Additional Representation and Local Public Finance

4.1 Municipal Public Expenditure

To estimate the effect of having an additional *de facto* representative through the PR system on public expenditure, my main specification is

$$log(y_{it}) = \alpha + \delta PR_{it} + X'_{it}\beta + \mu_i + \pi_t + \epsilon_{it} \tag{1}$$

where y_{it} is the public expenditure per capita for municipality i in fiscal year t; PR_{it} is a dummy variable equal to one if municipality i has one or more SMD-losing but PR-elected representative at time t and zero otherwise; X_{it} is a vector of demographic and economic controls; μ_i is a municipal fixed effect and π_t is a year fixed effect. First, in Table 7, I present coefficient estimates using the full sample of municipalities, except a few large municipalities that span multiple districts, from FY 1997 to FY 2010. It should be noted that municipalities are rarely split into multiple SMDs except when the municipality is very large in population. If time-invariant heterogeneity across municipalities is correlated with having an additional PR representative, but time-varying factors are not, this specification provides consistent estimates through the inclusion of municipal fixed effects. In this sample, municipalities with at least one PR representative have a public expenditure per capita 0.86% higher than comparable municipalities without a PR representative; this result is significant at the 5% level.[8] To control for economies of scale in public goods provision, the cost of providing public goods and the demand for public goods, I include log municipal population, log taxable

[8]For comparison with the later results from the quasi-randomized sample, here PR_{it} is a dummy variable equal to one if municipality i has one or two SMD-losing but PR-elected representatives and zero otherwise. Adding another dummy variable indicating having two extra PR representative does not change the results. As reported in Table A.1, having two extra PR representatives rather than one further increases public expenditure, but its effect is imprecisely estimated due to the small number of districts having two PR representatives.

income per capita and population shares of age groups 0–4, 5–19 and 65+ as control variables. To control for and compare the traditionally estimated effect of mal-apportionment, I include the log voting population of the SMD the municipality belongs to. The estimates of the main representation effect are robust to the inclusion of these controls. Here, as in later estimations, standard errors are robust to two-way clustering on municipality and on PR block–House term. This allows for time series correlation within municipalities and cross-municipality correlation within a PR-block in a House term. There may be cross-municipality correlation within a PR block–House term because some municipalities share the same representatives or the elections of PR representatives are correlated within a PR block.[9]

One potential concern about these estimates is that there is some unobserved time-varying factor that correlates with both the public expenditure in a district and the probability that the district has a PR representative. For example, recognizing that a PR representative could bring in more public spending, a district with temporarily high demand for public spending may vote strategically for the runner-up to increase its chance of having a PR representative. If the high demand for public spending, say due to a natural disaster, would be partially fulfilled even in the absence of a PR representative, the estimated effect of having a PR representative on public expenditure would be biased upward. On the other hand, if a district's SMD representative is very successful at bringing in pork barrel spending and is rewarded electorally by voters, the narrowness ratio of the runner-up would be low and the district may not have a PR representative. If there is persistence in how much pork barrel spending an SMD representative brings, having a PR representative would be negatively correlated with the persistent unobserved component of municipal spending. Using the full sample, the estimated effect of having a PR representative on expenditure would be biased downward. To address such concerns, I estimate the effect of having a PR representative on public expenditure using the quasi-randomized sample described in the previous section. Notice that, even if voters are strategic as described above, this sample still provides a consistent estimate as long as voters are not able to coordinate precisely to gain a PR representative by foreseeing small electoral shocks. There are reasons to believe that voters are not that sophisticated. A district typically has more than 300 thousand eligible voters. It is extremely difficult for voters to coordinate precisely

[9]One-way clustering, either on municipality or PR block–House term, results in smaller standard errors for most estimates reported in this paper.

to ensure that their SMD-losing candidate is sorted into one side of the cut-off for the PR seat in the face of small electoral shocks. Polling and forecasting prior to elections are not very extensive in Japan. For example, the Democratic Party of Japan was surprised by its own success in the 2009 general election. Had it listed two more names on its party list in the Kinki PR block, it could have obtained two more PR seats.

Compared with the full sample, SMD races in the quasi-randomized sample are more competitive. The average margin of victory is 11.5%, compared to 15.5% in the full sample. However, it should be noted that the most competitive districts are unlikely to be included in the quasi-randomized sample. Eighty-four percent of runners-up are dual candidates, and among these, one third are elected to a PR seat. If two dual candidates, the winner and the runner-up, have roughly equal votes, whoever loses in the SMD race would have a high narrowness ratio and hence would rank high among her ex ante equally ranked peers. Thus, districts that are highly competitive will have a PR representative with a probability close to one regardless of who wins the SMD seat. A small perturbation of vote share would not be sufficient to deprive them of a PR representative. Similarly, very safe districts are excluded from the quasi-randomized sample because they require huge electoral shocks in order to elect one of their candidates through the PR system. Therefore, the quasi-randomized sample contains SMDs with meaningful but not most intensive electoral competition. Inferences based on this sample should be useful for addressing broader issues. For example, the exogenous variation of electoral strength studied in Lee et al. (2004) comes from the closest elections in the past and the incumbency advantages the narrow winners enjoy subsequently. They infer that electoral strength has limited influence on the voting records of legislators compared with a legislator's identity. In this context, voters rather vote to choose represented policies than to pressure representatives to chose their preferred policies. However, it need not apply to districts where elections are less competitive. If polarized districts have more competitive elections, policy moderation there may provoke backlash among an incumbent's base voters, harming their electoral prospects via primary challenges or lower turnout from core supporters. This would be consistent with Gerber and Lewis' (2004) finding that legislators' positions diverge more from the preference of median voters in more heterogeneous districts.

Table 8 reports estimates using the the specification in equation (1), but with the quasi-randomized sample. In the baseline specification with fixed effects but no other controls, municipal-

ities with a PR representative are estimated to have on average 1.82% more public expenditure per capita, which is significant at the 1% level. The magnitude and statistical significance of the main coefficient estimate remain stable with the addition of controls. Notice that in the quasi-randomized sample, controls are not in principle necessary for identification even if they are correlated with public expenditure; although in practice, adding controls might help to reduce noise and can help us assess the robustness of the estimates in the finite sample. In column (6) of Table 8, the voting population of the SMD containing the municipality has a coefficient of -0.2000, significant at the 5% level. It contrasts with the insignificant estimate of -0.0068 from the full sample. The instability of estimates for this coefficient may suggest that the size of the electorate or district population may proxies for other variables, or it may suggest that the size of electorate has a different impacts in different samples.

4.2 Transfers from Central Government

Ideally, one would like to use data on discretionary transfers from the national government to the municipal governments as a dependent variable to confirm the political cause of higher municipal public expenditure. However, I only have categorical expenditure data for a subset of the sample period, and even in this data, discretionary transfers cannot be clearly identified. Moreover, targeted transfers may not be carried out transparently through discretionary items, but rather in a more disguised fashion by tampering with parameters used to determine transfers in various programs. To see if having an additional PR representative affects the total amount of transfers from the national government, I re-estimate Eq. (1) but instead with log per-capita transfers from the national government as the dependent variable. Using the quasi-randomized sample from FY 2002 to FY 2010, I find that having an additional PR representative has a positive effect of 1.7% to 1.9%, depending on specifications. However, these coefficients are imprecisely estimated. Standard errors robust to two-way clustering are about 1.1%, giving most estimates a p-value around 10% if the coefficient is tested against zero. Table 9 reports these results, as well as estimates using the full sample over the period FY 2002 – FY 2010. Results from the full sample are broadly similar, with estimates ranging from 0.87% to 0.93% and marginally significant.

Note that the estimates in Table 9 use only a subset of the time periods available in the original sample, due to data limitations. However, since transfers from prefectural governments

only account for a small share of revenue for municipal governments (see Figure 2), I can use the difference between total local public expenditure and local tax revenue to proxy the amount of transfers from the national government for a longer sample period. This alternative measure is highly correlated ($\rho = 0.951$) with the direct measure of transfers over the period FY 2002 to FY2010, for which I have direct data on transfers from the national government. Estimation results using the alternative measure of transfers over the longer sample period FY 1997 to FY 2012 are reported in Table 10. In the full sample, estimates from various specifications suggest that an extra representative results in a 1.1% to 1.2% increase of transfers, with all estimates significant at the 5% level. In the quasi-randomized sample, the effect is much larger, ranging from 2.1% to 2.6%, again all significant at the 5% level. Therefore, these results provide evidence that the higher public expenditure associated with having a PR representative is due to more transfers from the central government.

4.3 Robustness

To see whether the results are driven by small municipalities, I re-estimate the baseline results in Table 7 and Table 8 with each municipality weighted by their population. Results are shown in Table A.2. Estimates remain significant at conventional levels. In the full sample, the magnitude is slightly higher. With the quasi-randomized sample, the estimated magnitude drops modestly. One possible explanation is that smaller municipalities are easier to target for electorally motivated transfers. From 2003 to 2004, there was a large wave of municipal mergers (see, for example, Weese, 2011). The number of municipalities decreased from more than 3,200 to less than 2,000. While this should not affect the consistency of estimates from the quasi-randomized sample, and while the municipal fixed effects reflect any change of municipal identity, mergers may bias the estimates from the full sample if they are correlated with having a PR representative. For example, there is a trade-off in the number of jurisdictions between economies of scale in public goods provision and heterogeneity of preferences (Alesina and La Farrara, 2000; Weese, 2012). If economic integration after mergers increases public expenditure over time and if political integration increases a district's chance of having a PR representative, the estimated effect of having a PR representative may be biased upward. In estimates reported in the upper panel of Table A.3, I re-estimate the effect of having a PR representative on per capita public expenditure as well as the per capita gap between

public expenditure and local tax revenue using a balanced panel of municipalities that are in the sample for the entire period. In this sample, no municipality is involved in any merger over the sample period. The effects are less precisely estimated, but are quantitatively similar.

In the quasi-randomized sample, a municipality enters the sample following an election in which it received a treatment status or control status for some perturbation and exits if it does not receive a treatment or control status in the next election. One may be concerned that municipalities with infrequent presence in the quasi-randomized sample are considerably different from other municipalities in the randomized sample and that such unobserved characteristics drive the results. For example, suppose that voters are aware that additional representation through the PR system is able to bring in additional funding from the national government, and vote strategically to lower the margin of victory for the SMD winner. This by itself would not invalidate my identification strategy as long as voters are not able to coordinate and precisely control the allocation of vote shares to their candidates. But if municipalities only exercise strategic voting when there is a high demand of public expenditure and such demand is met when a candidate who lost in that SMD is elected through the PR system, the estimated average treatment effect could be largely driven by these municipalities with a high treatment effect. I therefore re-estimate the treatment effect of having a PR representative using a sub-sample of the quasi-randomized sample, including only municipalities present in the sample for at least half of the sample period (i.e. seven years). The estimates shown in the second part of Table A.3 are quantitatively similar to the results in the full sample and remain significant at the 5% level.

In the full sample, local political characteristics may correlate with having a PR representative, hence confounding the estimated causal impact of representation. In the quasi-randomized sample, this is not a concern in principle as long as the vote share perturbations are small enough. To see whether political characteristics are a concern in a finite sample, I include an alternative set of political controls. They include the vote share of the SMD winner, the vote margin difference between the SMD winner and SMD runner-up and the narrowness ratio of the runner-up in the SMD. Results reported in Table A.4 show that the main estimates of interest are robust to the inclusion of these controls in either sample.

4.4 Public Works, Welfare Expenditure and Government Payroll

While having an additional *de facto* representative increases total municipal public expenditure by about 1.8%, it is unclear the extent to which this represents an increase of discretionary spending. The Ministry of Finance classifies spending into three types: discretionary spending, compulsory spending and others. Discretionary expenditures are mainly on public works of infrastructure. Compulsory spending consists of debt service, wages and salaries of government employees, and welfare spending. Nation-wide, public works expenditures account for about 15% of total municipal expenditure. Welfare spending and government payroll account for 15% and 19%, respectively. Table 11 shows the estimated impact of having an additional representative on per-capita municipal expenditure on public works, welfare and payroll, respectively. Estimates from the quasi-randomized sample suggest that an additional representative increases public works spending by as much as 8%, while reducing welfare spending by about 2%. This is consistent with the view that public works in Japan often function as job support programs (Schlesinger, 1999). Municipal governments in Japan have little authority in setting welfare policies. The scope, eligibility criteria and payment standards for welfare are set by the national government in a fairly uniform manner, though with some regional adjustments reflecting variations in the cost of living. Because public works spending provide jobs and economic stimulus in local areas, fewer people would need or be eligible for welfare, which in turn lowers welfare expenditure administrated by the municipal government. Having a PR representative has no significant effect on the payroll of municipal employees. In unreported results, I do not find any significant effect on the numbers of temporary or permanent government employees either. This result suggests that higher expenditure is not driven by patronage spending through government employment. This result is consistent with the fact that, except in the largest cities like Tokyo or Osaka, most candidates for local governments are non-partisan or are affiliated with the Japanese Communist Party, which has little presence in national politics. Therefore, local officials are unlikely to engage in partisan politics by manipulating municipal employments.

5 Partisan Affiliation and Legislative Bargaining

In the legislative bargaining framework of Baron and Ferejohn (1989), representatives join a minimum winning coalition to gain rents. An agenda setter who proposes how to split a fixed pie is able to extract more rents. Members of the majority party often have a better chance to be recognized as agenda setters and, therefore, receive more rents. Albouy (2013) finds evidence supporting this model. He finds that states with a larger portion of their delegates belonging to the majority party of the United States Congress receive a larger amount of federal grants.

In the presence of party discipline, however, it is less clear whether a typical representative is able to receive a larger amount of rents if he or she is affiliated with the majority party or is a member of the governing coalition. The impact of party affiliation on rents depends on the source of party discipline. Since parties are both legislative institutions and electoral institutions, there are two interconnected but conceptually distinct aspects of party discipline, namely legislative party discipline and electoral party discipline (Myerson, 1997). With legislative party discipline, legislators are expected to vote with their party. With electoral party discipline, legislators rely on their party to be elected. For example, in a proportional representation system where voters vote only for parties and parties have full control over the ranking of candidates on a party list, electoral party discipline is extremely strong, as parties decide the electoral fates of candidates.

Diermeier and Feddersen (1998) provide insight on how legislative party discipline can arise in a parliamentary system, even without electoral party discipline. A prominent feature of parliamentary systems is the vote of confidence procedure. A governing coalition can attach a vote of confidence to any legislation so that a failure of passage induces a dissolution of the governing coalition. Since members of the governing coalition have a better chance to be recognized as agenda setters, and therefore to extract more rents, members of the governing coalition have greater continuation value under the current government than non-members do. Thus, they have more incentive to vote with the proposed rent distribution and sustain the current government. Therefore, legislative party discipline arises and, as a consequence, members of the governing coalition are able to extract more rents than in non-parliamentary settings.

On the other hand, if parties have strong control over the electoral fate of representatives, they are able to impose legislative party discipline over their members. In this case, parties or factions

may act in unity, and legislative bargaining is likely to happen between leaders of parties or factions. Intra-party or intra-faction bargaining then decides how much a representative receives in rents. It is unclear in this case whether a typical member of the governing coalition would receive more rents. In the extreme case where party leaders retain all rents, having an extra representative may not increase the public spending in a district.

Though some argue that Japanese politics has become more party-centered since the electoral reform in 1994 (e.g., Rosenbluth et al., 2010), Japanese politics has traditionally been personalistic, in that personal characteristics of candidates and personal votes are much more salient than party platforms in elections. However, legislative party discipline has been strict (Hirano et al., 2011). Only in rare occasions, is the ruling coalition unable to rely on votes from its members to pass legislation. One example in which party discipline failed was the privatization reform of Japan Post in 2005, after which Prime Minister Junichiro Koizumi expelled rebels from his party and called an early election (Nemoto et al., 2008). Japan has a parliamentary system with a vote of confidence procedure. It also has strict campaign finance laws favoring parties over individual politicians. For example, public funds subsidizing political campaigns are available to qualified parties, but not to individual candidates. Individual politicians cannot legally accept campaign contributions from corporations, labor unions, and other organizations. Therefore, it is unclear to what extent the legislative party discipline in Japan can be attributed to the endogenous bargaining cohesion emphasized in Diermeier and Feddersen (1998), or to the presence of electoral institutions advantaging parties.

To see whether having a representative in the governing coalition increases municipal spending, I extend the baseline specifications by adding two dummy variables. One dummy variable equals one if the SMD representative belongs the governing coalition and zero otherwise. Another dummy variable equals one if a municipality has a PR representative belonging to the governing coalition and zero otherwise. Results using the quasi-randomized sample are reported in Table 12. Having an SMD representative in the governing coalition increases per capita municipal expenditure by about 1.5% to 1.9%, which is significant at 10%. Having a PR representative in the governing coalition increases per capita municipal expenditure more than having a non-governing PR representative, by about 0.7% to 1.4%, although the estimates are not always significant at a 10% level. This result is consistent with Albouy's (2013) findings for the U.S. However, even if the PR representative is

not from the governing coalition, having a PR representative still increases per-capita municipal public expenditure by about 1.5%, which suggests that a better chance of having a candidate in the governing coalition is not the main driver of my baseline results.

The above results suggest that representatives are able to share some rents obtained by their parties or factions. In this case, the rents obtained by SMD representatives and by PR representatives should be positively correlated if they are from the same party. Since the bargaining power of a party could change from year to year even within a parliamentary term, I test the above prediction by comparing the party-year fixed effects of SMD representatives and party-year fixed effects of PR representatives. In particular, I estimate the following specification using the quasi-randomized sample:

$$log(y_{it}) = \alpha + \delta_{pt}^{SMD} + \delta_{pt}^{PR} + X_{it}'\beta + \mu_i + \pi_t + \epsilon_{it} \tag{2}$$

where y_{it} is the public expenditure per capita for municipality i in fiscal year t; δ_{pt}^{SMD} is a party-year fixed effect for municipality i with an SMD representative from party p in fiscal year t; δ_{pt}^{PR} is a party-year fixed effect for municipality i with a PR representative from party p in fiscal year t, which is equal to zero if municipality i does not have a PR representative; X_{it} is a vector of demographic and economic controls included in column (6) of Table 8; μ_i is a municipal fixed effect and π_t is a year fixed effect. The specification is estimated using dummy variables indicating party-year of the SMD representative and the PR representative (if any).

Figure 5 plots the party-year fixed effects of PR representatives δ_{pt}^{PR} against the party-year fixed effects of SMD representatives δ_{pt}^{SMD}. In this figure, I limit my attention to the two major parties, the Liberal Democratic Party (LDP) and the Democratic Party of Japan (DPJ), because the other parties have small numbers of SMD representatives and PR representatives in a particular year. The estimated party-year fixed effects δ_{pt}^{PR} and δ_{pt}^{SMD} are positively correlated. This suggests that, even where party discipline prompts legislators to vote along the party line, an extra representative is able to provide greater public expenditure by sharing rents obtained by his or her party.

6 Within-District Heterogeneity

In the classical Hotelling–Downs paradigm (Hotelling, 1929; Downs, 1957), the platforms of two candidates competing for office converge at the position most preferred by the median voter in a

one-dimensional policy space. With a multi-dimensional policy space, however, policy convergence is less warranted (Krasa and Polborn, 2012). Empirical observation often suggests non-convergence of policy choices by politicians. Using detail referendum voting records in Los Angeles County to measure voter preferences, Gerber and Lewis (2004) find that, in more heterogeneous districts, the voting records of legislators are more distant from the positions preferred by the median voters. In other words, electoral competition is a weaker force for heterogeneous districts in driving convergence in policy choices. Lee et al. (2004) find that the electoral strength of members of the U.S. House of Representatives explains little of the variation in their voting records. These findings suggest that voters affect policies primarily by electing representatives with fixed preferences, rather than by using elections to pressure representatives to adopt their preferred positions. In such a citizen–candidate framework (Osborne and Slivinski, 1996; Besley and Coate, 1997), some segments of voters have preferences that are more aligned with the preference of their representatives than other voters, and hence there voters are better represented. Overall, this literature suggests that within-district heterogeneity affects how a district is represented.

In the natural experiment I study here, if a district has a PR representative, the PR representative would be from a party different from that of the SMD representative. This is because parties do not nominate more than one candidate to compete for an SMD seat. The losing candidate and winning candidate are necessarily from two different parties.[10] This fact has two implications. First, when the runner-up of an SMD race is elected to a PR seat, voters with preferences closer to the runner-up than to the SMD winner are better represented. The gain in the effective preference representation from having a PR representative is potentially larger for heterogeneous districts. To estimate whether within-district heterogeneity affects the impact of PR representation on municipal spending, I proxy for within-district heterogeneity using the within-district standard deviations across municipalities of the municipal demographic controls used in the main estimations (i.e., population, income and age profile), as well as the share of local tax revenue in total municipal public expenditure. I then normalize these measures of within-district heterogeneity to have mean zero and standard deviation of one, and interact them with the dummy variable for having a PR representative or not. The use of cross-municipality differences to measure within-district heterogeneity is justified on two grounds. First, it may not be feasible for legislators to target groups within a

[10] Candidates may also run as independents for an SMD seat.

municipality, while it may be feasible to target municipalities in this case, within-district cross-municipality heterogeneity is first order important. Second, in the presence of Tiebout sorting, within-district, cross-municipality differences are positively correlated with district heterogeneity in preferences.

I find that the effect of having a PR representative on municipal expenditure is larger in districts that are more heterogeneous among the municipalities they contain. As reported in Table 13, measures of within-district heterogeneity, except for per-capita income, have small and insignificant direct effects on per-capita municipal expenditure. However, their interactions with the treatment dummy for PR representation are always positive, and all but the interactions with log income per capita and the share of local tax revenue in expenditure are significant at 1%, where the interaction with the share of local tax revenue, is significant at 10%. Moreover, the magnitudes of these interactions are large. For example, the treatment effect almost doubles in districts that are one standard deviation higher than the national average in the heterogeneity measure for the share of population aged 65 years or more. In unreported results, when the treatment dummy of having a PR representative is interacted with these municipal control variables, the interaction terms have small coefficients and are never significant. Thus, these results are not mechanically driven by any heterogeneous treatment effect along these demographic variables.

However, it is unlikely that representatives distribute public spending to their constituents purely according to their own preferences, ignoring their electoral situation. The second implication of the partisan difference between the SMD and PR representatives is that having a PR representative weakens the incumbency advantage of the SMD representative in the following election. Incumbents enjoy electoral advantages over challengers for reasons such as better name recognition among voters and access to pork barrel spending as an electoral instrument. When the challenger to an SMD incumbent is a PR representative, the SMD incumbent no longer has these advantages and hence is subject to greater electoral competition. Using the quasi-randomized sample and a linear probability model, I estimate the effects of the runners-up's election to a PR seat on the electoral performance of both SMD winners and runners-up in the following election. I find that when a runner-up in an SMD race is elected to a PR seat, she is about 50% more likely to run again in the following election, 70% more likely to be elected to an SMD seat and 50% more likely to be elected to any seat. These effects are significant at 1%. On the other hand, the winner of

the SMD race is about 6% less likely to run again in the following election and about 15% less likely to be re-elected to an SMD seat. These effects are marginally significant at 10%. Reported in Table 14, these findings suggest that being a PR representative gives a runner-up incumbency advantage, which intensifies the electoral competition between the SMD winner and the runner-up.

The analysis above suggests that having a PR representative might change the electoral incentives of candidates and might differentially affect municipalities within a district. In the following section, I examine the differential impacts of having a PR representative according to the municipalities' level of electoral support for the two representatives.

7 Targeting: Swing versus Core

In empirical studies measuring representation as the ratio between the number of representatives and the size of the electorate, an implicit assumption is that the quantity of representatives is first-order important. However, the results in the last section suggest that the quality of representation is at least as important. Since parties do not nominate more than one candidate in an SMD race, a PR-elected candidate will be from a party other than that of the SMD winner. Voters who preferred for the PR-elected candidate in the SMD race generally have interests different from those who voted for the SMD winner. A candidate losing the SMD race but elected through the party list affords her supporters representation in the legislature. The additional representation brings higher spending to the district, the more so in more heterogeneous districts. In other words, representation matters, but how much it matters may depend on how heterogeneous the district is.

However, voters' interests are likely both economic and ideological. Ideological affinity with a representative does not necessarily imply favorable treatments in the distributive policies decided by an office-seeking politician, specially for policies regarding tactical (pork barrel) spending. Theoretical arguments have been made on both sides about whether politicians will allocate tactical spending to swing voters or to their core supporters (e.g., Lindbeck and Weibull, 1993; Cox and McCubbins, 1986). In a general framework, Dixit and Londregan (1996) model how two parties compete for vote shares by promising pork barrel spending to groups with different partisan affinity. When the two parties are symmetric in their ability to deliver pork spending to different groups, the parties will target groups containing a large share of swing voters (i.e., voters with weak pre-

disposition toward a particular party). However, when parties are more efficient in delivering pork spending to their core supporters, perhaps due to their better understanding of what kind of public goods their core supporters want, spending is tilted toward groups with a large number of core supporters for the respective party. Existing evidence tends to support the notation that spending is targeted toward swing voters. For example, Arulampalam et al. (2009) find that Indian states that were both swing and aligned with the central government received more grants. Dahlberg and Johansson (2002) find that the central government of Sweden is more likely to provide temporary grants to municipalities with a large fraction of swing voters.

In order to examine whether the core supporters of an incumbent legislator receive more targeted transfers, I measure the swingness of a municipality by the vote share difference between the SMD winner and the runner-up in that municipality in the last election. While politicians may want in principle to target swing voters in a municipality overwhelmingly voting for one candidate, the non-partisan politics at the local level make such targeting difficult to carry out in practice. I will focus on the quasi-randomized sample. In this sample, the PR-elected candidates are almost always the runners-up, making the vote share margins in municipalities comparable between the treatment group and control group. In the eight cases where the PR-elected candidates was not the runners-up, most were closely third. Dropping these observations has little effect on the estimates. I extend the baseline specification to include a quadratic polynomial of this municipal vote share margin and its interaction with the dummy variable for PR representation as follows:

$$log(y_{it}) = \alpha + \left(\lambda_1 MM_{it} + \lambda_2 MM_{it}^2\right) + PR_{it} \times \left(\delta_0 + \delta_1 MM_{it} + \delta_2 MM_{it}^2\right) + X_{it}'\beta + \mu_i + \pi_t + \epsilon_{it} \quad (3)$$

where as before y_{it} is public expenditure per capita for municipality i in fiscal year t; PR_{it} is a dummy variable equal to one if municipality i has an SMD-losing but PR-elected representative at time t and zero otherwise; X_{it} is a vector of controls; μ_i is a municipal fixed effect; π_t is a year fixed effect; and MM_{it} is the difference of vote share between the SMD winner and runner-up in the municipality in the last election (hereafter municipal margin). Unlike the victory margin in the whole district, this municipal margin can be positive or negative. A negative municipal margin indicates a stronghold for the runner-up. If spending is targeted to swing voters, I expect $\lambda_2 < 0$ and $\lambda_2 + \delta_2 < 0$. On the other hand, if spendings are targeted to core supporters, I

expect $\lambda_1 MM_{it} + \lambda_2 MM_{it}^2$ to be monotonically increasing over the theoretical support of MM_{it}, i.e. $[-1, 1]$. Moreover, the quadratic function of MM_{it} when a municipality has a PR representative should have a U-shape, i.e.,

$$\lambda_2 + \delta_2 > 0$$
$$-1 < -\frac{\lambda_1 + \delta_1}{\lambda_2 + \delta_2} < 1$$

In order to make sure that the municipal vote share margin is not capturing a nonlinear effect of the district-wise margin of victory for the SMD winner, I include a quadratic polynomial of the district-wide margin in one specification. In another specification, I control for both the vote share of the SMD winner and that of the SMD runner-up, in case the victory margin is inadequate for measuring the electoral safety of the nominal representative. As reported in the Table 15, none of these controls is significant in predicting municipal expenditures. In the first three columns of Table 15, I first report results of regressions restricting all coefficients of quadratic terms to zero. In municipalities with no PR representative, the municipal margin has positive but small and insignificant effects on municipal expenditure. Having a PR representative has little impact on the effects of the municipal margin. In the last three columns of Table 15, the regression results suggest no apparent nonlinear relationship between municipal margin and municipal expenditure when there is no PR representative. However, when having a PR representative, there is a significant quadratic relationship between municipal margin and municipal expenditure. This result suggests that municipalities that vote heavily for either the SMD winner or the runner-up have more spending. In municipalities where the SMD winner and runner-up obtain equal vote shares, having a PR representative increases municipal expenditure by 1%. However, in municipalities where the runner-up outperforms the winner by 10 percentage points, having a PR representative increases expenditure by 2.3%.

In the top-left panel of Figure 6, I plot the fitted quadratic relationship between municipal margin and municipal expenditure, for the cases in which the municipality does and does not have a PR representative. Controls and fixed effects are set to zero for this graph. The kernel density of the municipal margin is in the background. Moreover, I set the dependent variable to be transfers from the central government or public works expenditure, respectively, both in log per capita terms.

The specifications are otherwise the same as in Eq. (2) and column (4) of Table 15. Alternative choices of controls as listed in Table 15 have little impact on the relationship between municipal margin and the dependent variable. The regression results are plotted in the middle and right graphs on the top row of Figure 6. The patterns across these three graphs are similar. Having a PR representative increases spending and transfers in the municipalities where the runner-up did well. To examine whether this result is due to a misspecification of quadratic polynomial, I replace the quadratic polynomial with a cubic spline with internal knots at the 25th, 50th, and 75th percentiles of the municipal margin. The regression results for municipal expenditure, transfers and public works spending (all in log per capita terms) respectively are plotted in the bottom row of Figure 6. The cubic results confirm the bipolar effects of having a PR representative.

Interestingly, having a PR representative increases spending not only in municipalities where the PR representative had strong support, but also in municipalities where the SMD winner had a large lead. In other words, the presence of a PR representative shifts distributive politics toward core targeting. Without a PR representative, core targeting is mild, but the presence of a PR representative intensifies core targeting. This result suggests that incumbents do not provide pork simply to carry out promises made when they ran for election; rather, they distribute pork in reaction to their electoral situation.

My interpretation is that politicians distribute pork barrel spending to mobilize voters. Maybe except in Drazen and Eslava (2012), models of distributives politics tend to abstract from the turnout decisions of voters. Taking voter turnout as given, politicians distribute pork barrel spending to groups containing a large fraction of swing voters because the spending could switch a large number of votes. If the two candidates are symmetric and both able to credibly promise an allocation of spending, this vote-buying incentive favors swing groups in distributive politics (Dixit and Londregan, 1996). However, only incumbent politicians may affect the allocation of pork barrel spending and turnout decisions of voters may depend on the allocation of spending as voting is costly. In Japan's setting, when there is only one incumbent, the vote-buying incentive would induce him to distribute benefit toward municipalities with a lot of swing voters, while the voter mobilization or turnout-buying incentive would induce him to distribute benefits toward municipalities with a lot of supporters. Combining these effects, a sole incumbent favors neither swing municipalities nor core municipalities. Hence, as shown in the data, the correlation between the incumbent's vote

share in a municipality and that municipality's public expenditure is positive but weak statistically and in magnitude. From Figure 6, when there is no PR representative, swing municipalities have spending levels similar to municipalities that voted strongly for the SMD winner.

However, when there are two incumbents who are able to distribute pork, the mobilization incentive dominates. This could happen due to an inference problem for voters to assign credit to politicians bringing in spending. Incumbents may target swing municipalities and their core municipalities. When there are two incumbents, voters in swing municipalities may have difficulties to identify the contribution of each incumbent to the increase of public spending. Thus, the electoral return from distributing pork toward core municipalities becomes higher relative to the benefit of distributing toward swing municipalities.

Some additional empirical evidence supports such interpretation. I estimate a specification similar to that in Eq. (3) but with the turnout rate in the next election as the dependent variable. The municipal turnout rate is estimated by using a municipality's total number of valid votes cast divided by the voting age population. When there are two incumbents, the turnout rates in the next election are higher, particularly in municipalities that strongly favor either the SMD winner or the runner-up. The quadratic relationship is plotted in Figure 7. A cubic spline similar to those used in Figure 6 also confirms a bipolar impact of having a PR representative on turnout. However, possibly due to a smaller sample size and measurement errors in the turnout rate, the relationship between turnout rate and a representative's strength of support in a municipality is less precisely estimated.

When there are two incumbents, strongholds of either incumbent benefit from greater local public expenditure. I argue that the intensified electoral competition provides greater incentive for politicians to bring more public spending to their core constituents. However, an alternative explanation is that electoral competition induces the majority party or the governing coalition to distribute more public spending to their core constituents. The governing coalition does so to protect their SMD seats in districts they win or to contest for the SMD seats in districts they lose. Because in some districts, the candidates from the governing coalition are the SMD winners while in other districts, the candidates from the governing coalition are runners-up, distributing more public spending to governing coalition's strongholds may drive a bipolar relationship between the margin of vote share between SMD winners and runner-up, as found previously.

To assess this possibility, I replace the municipal margin of vote share between the SMD winner and runner-up with the municipal margin of vote shares between the candidate from the governing coalition with the highest vote share in the district and the candidate from an opposition party with the highest votes share in the district. Then, I re-run the regressions shown in Figure 6. If the bipolar relationship found in Figure 6 is driven by the governing coalition, there should not be a bipolar relationship between this new municipal margin and public spending. In particular, having an additional representative should only benefit municipalities where the governing coalition has strong support. The new set of regression results is plotted in Figure 8 in a way similar to Figure 6. As shown in the top left plot of Figure 8, there is a similar bipolar relationship between the new municipal margin and the total municipal expenditure when there are two incumbents. Not only the strongholds of the governing coalition, which are located on the right side of the plot, benefit from having an additional representative, so do the strongholds of the opposition parties, which are located on the left side of the plot. Similar relationships are found when the dependent variable is transfers from the central government or infrastructure spending, and when the polynomial fit is quadratic or cubic spline.

The analysis above supports that electoral competition incentivizes individual politicians in the quasi-randomized sample to bring in more public resources to their core constituents. However, this is not to say parties do not react to electoral situations. The analysis in this section may not be best suitable for an analysis of electoral competition among parties. From the perspective of parties, they concern about the number of SMD seats they win and the vote shares they have in the PR ballots. However, the most competitive SMD races are not likely to be included in the quasi-randomized sample. This is because the dual candidates who narrowly lose in SMD races are likely to rank very high on her party lists. A small vote share shock may be insufficient to take away the PR seat of a losing candidate, or if it changes the result of a SMD race, whoever loses in the SMD race would have a high rank on her party list, assuring her district two representatives. Moreover, the competition among parties for PR votes in the (larger) PR blocks may not be well captured in the analysis in this section. As illustrated in Persson and Tabellini (2000) and Milesi-Ferretti et al (2002), geographically targeted spending may be less effective as an instrument for electoral competition when the electoral system is based on the principle of proportional representation rather than winner-take-all.

The analysis in this section adds to the literature of distributive politics by highlighting the important distributional implications of whether the electoral competition is among individual politicians or among parties. As summarized in Golden and Min (2013), theories are ambiguous about whether swing voters or core voters would be targeted in distributive politics and empirical evidence is mixed. In the influential works of Lindbeck and Weibull (1987), Cox and McCubbins (1986), and Dixit and Londregan (1996), parties and / or candidates are assumed to be able to make credible commitments about their proposal distribution of spending or transfers, and there is no agency problem between parties / candidates and voters. The analysis in the section suggests that, when the primary actors in the electoral competition are individual incumbents, it may not be appropriate to abstract from the commitment problems and agency problems for the analysis of distributive politics.

8 Concluding Remarks

The empirical results in this paper suggest that political representation affects the allocation of public expenditure. Having an additional incumbent legislator with electoral interests in the district increases local public expenditure, in particular discretionary spending on public works. Heterogeneous districts benefit more from this extra representation. Having a second representative elected to the legislature intensifies subsequent electoral competition; nevertheless, this heightened competition does not generate policy convergence, at least not in distributive policies toward local governments. Instead, core supporters of both representatives in the district receive a higher amount of transfers from the central government. Turnout-buying may partially explain why swing voters are not targeted, despite contrary theoretical arguments favoring targeting of swing voters. To obtain votes, politicians can either attract votes from other candidates or they can turn out voters likely to vote for them. The latter motive favors targeting core supporters in tactical spending.

Partisan representation affects programmatic redistributions over the median term. In the U.S., Levitt and Snyder (1995) find that federal outlays are higher in districts with a large number of Democratic voters, especially for programs that were initiated when the Democratic Party had a large majority in Congress 10 to 15 years before the outlays and that are currently administrated based on pre-established formulas. Brender and Drazen (2013) find that replacement of political

leaders affects the composition of public expenditures in the medium term, but not in the short term. This paper adds to the literature by providing evidence that having extra representation could also provide short-term discretionary spending benefit to voters with strong partisan or ideological affinity with the added representative. This result suggests that the heterogeneity of an electoral district is important for distributive policies, which has policy implications for redistricting and the design of electoral systems.

Moreover, this paper documents a subtlety in Japan's mixed-member electoral system that makes representatives elected through party lists responsive to geographically narrow interests. A large literature debates the relative merits of two electoral systems: a Majoritarian system, such as in the U.S., and a Proportional Representation system, as is common in Europe. Recent studies emphasize the positive implications of the electoral system for public finance. Notably, Melesi-Ferretti et al. (2002) argue that, relative to a PR system, a Majoritarian system tends to spend more on goods and services *vis-à-vis* transfers. The rationale is that spending in goods and purchases is easier to target toward geographic areas, while transfers better target socio-economic groups. A middle ground may seem to be a mixed Majoritarian–PR system, which is often thought to have the best of two worlds and has been adopted by a number of new and existing democracies in the recent decades, such as Taiwan and New Zealand. In this paper, I show that an electoral feature - how PR representatives are ranked on their party lists - compromises the supposedly broad representation by PR representatives in a mixed system.

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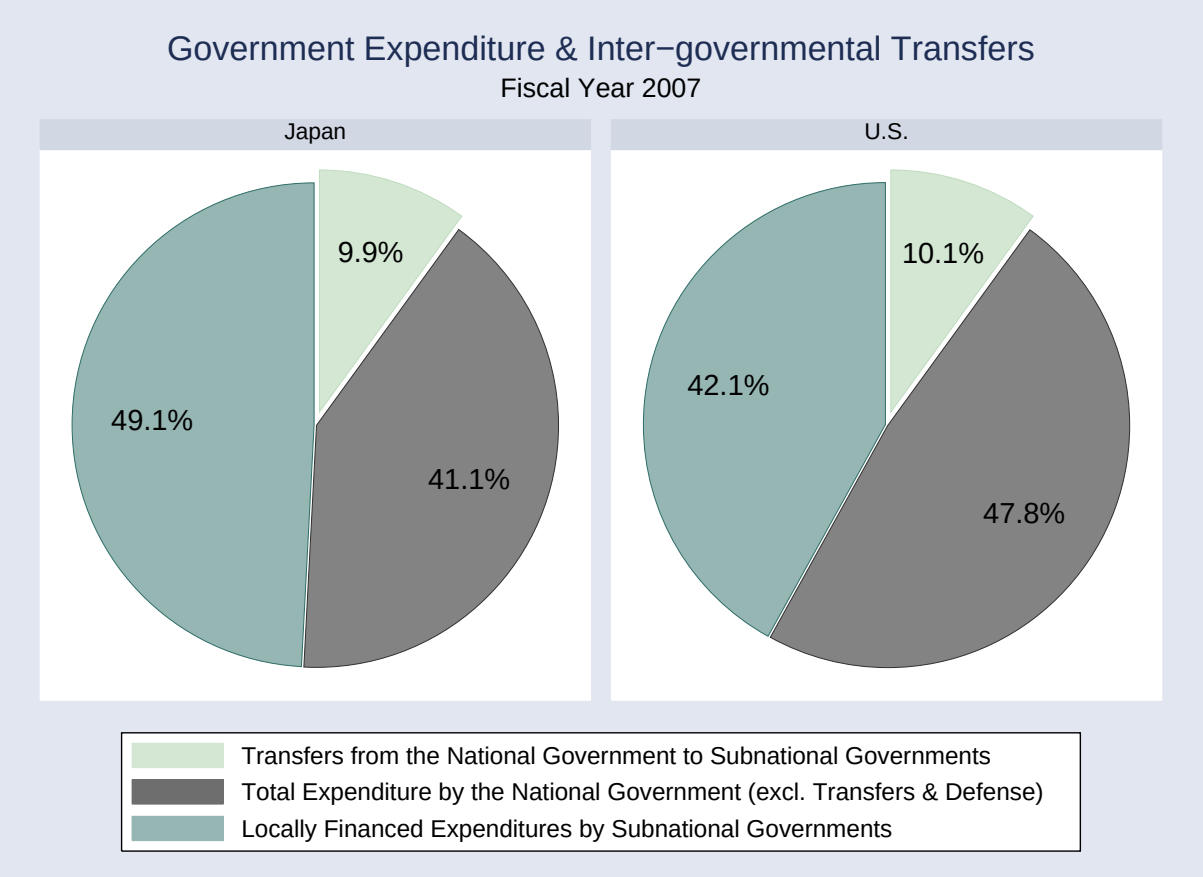
Figure 1: Public Expenditure by National and Subnational Governments in Japan and U.S.



Notes: Defense expenditures are excluded for both Japan and the U.S. Total expenditures by subnational governments are equal to locally financed expenditure plus transfers from the national government.

Figure 2: Average Revenue Sources of Municipal Governments

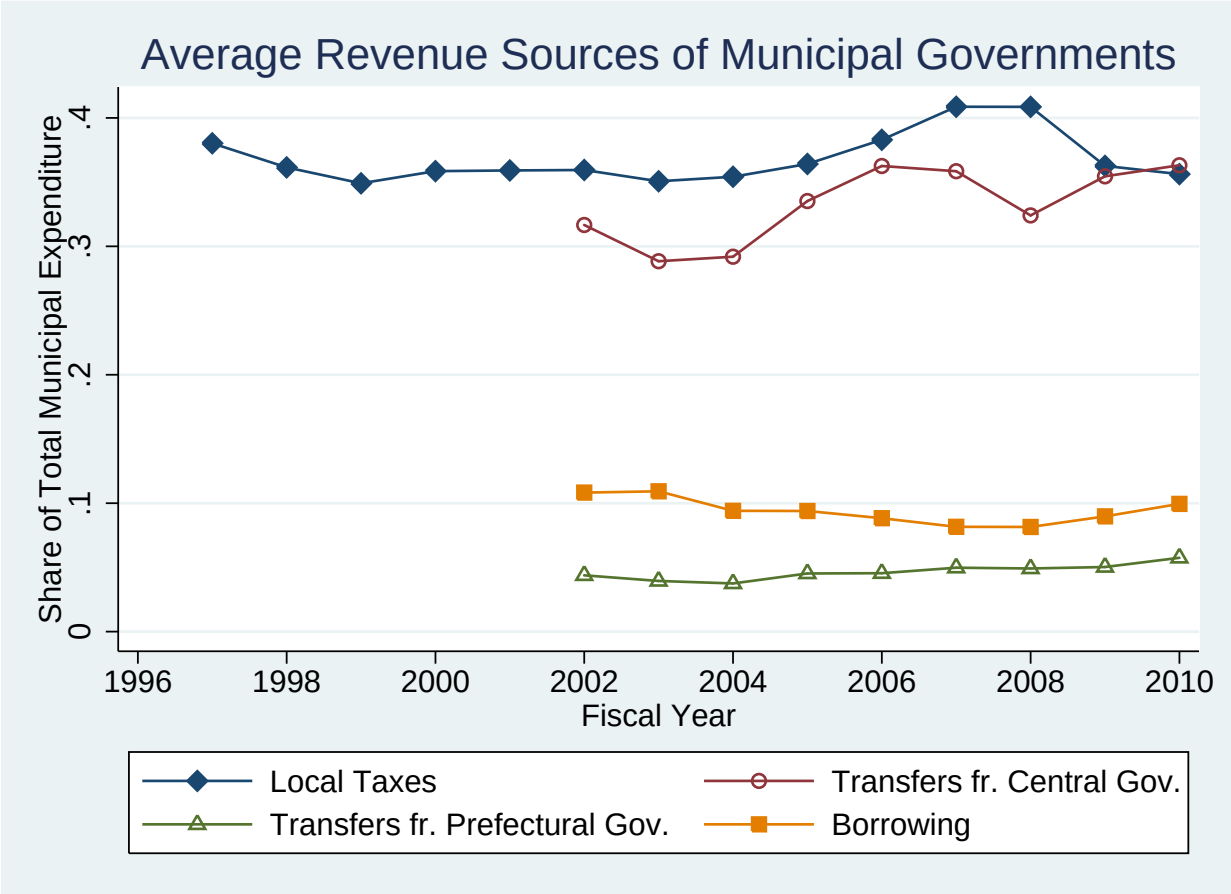


Figure 3: Median Revenue Sources of Municipal Governments

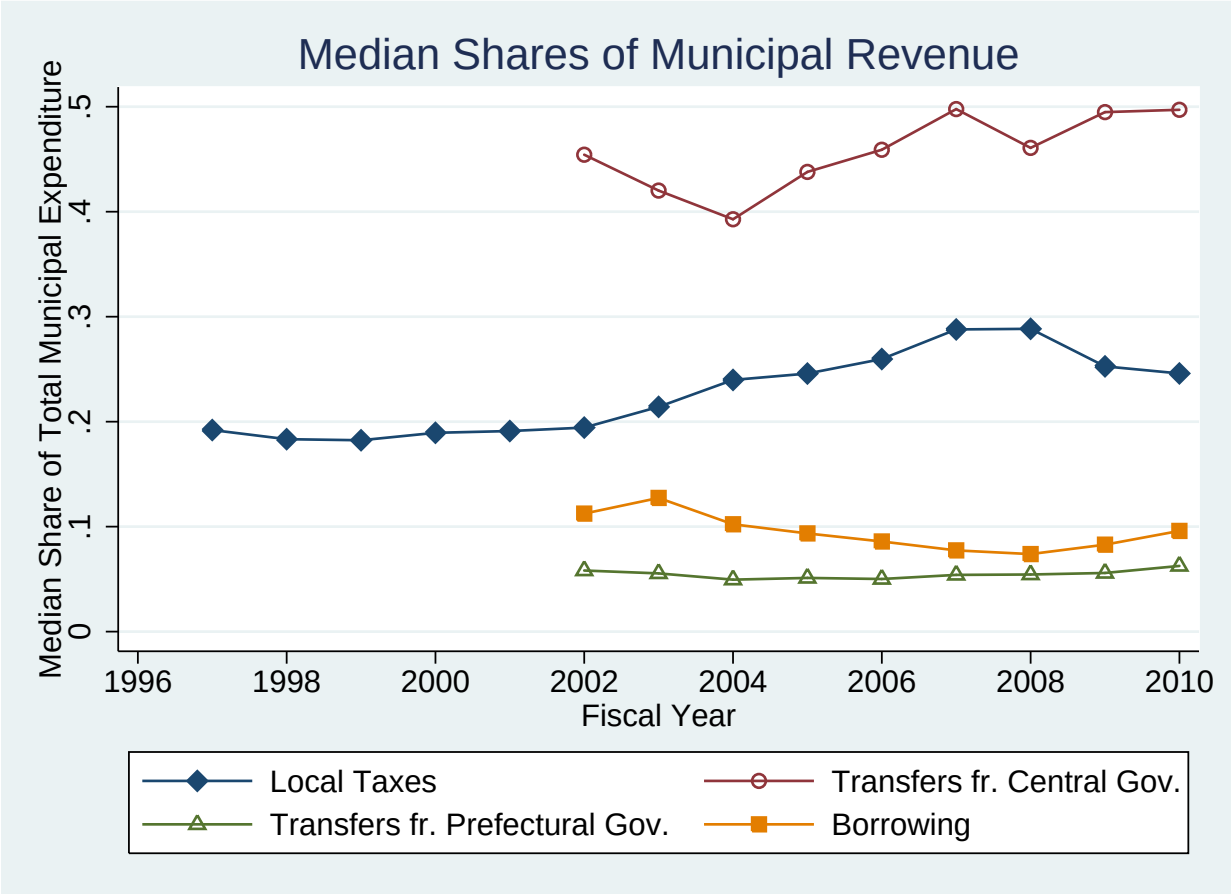
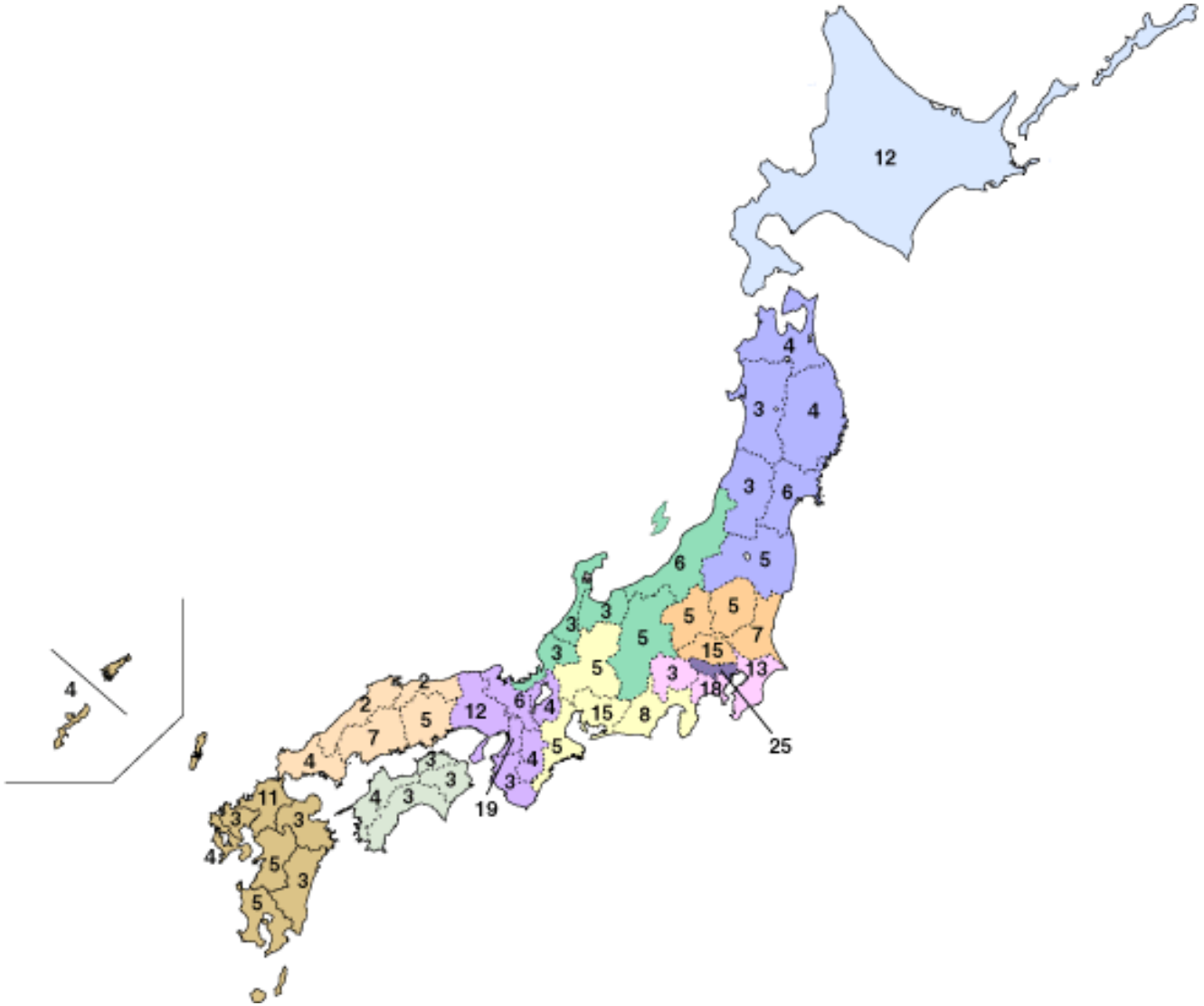
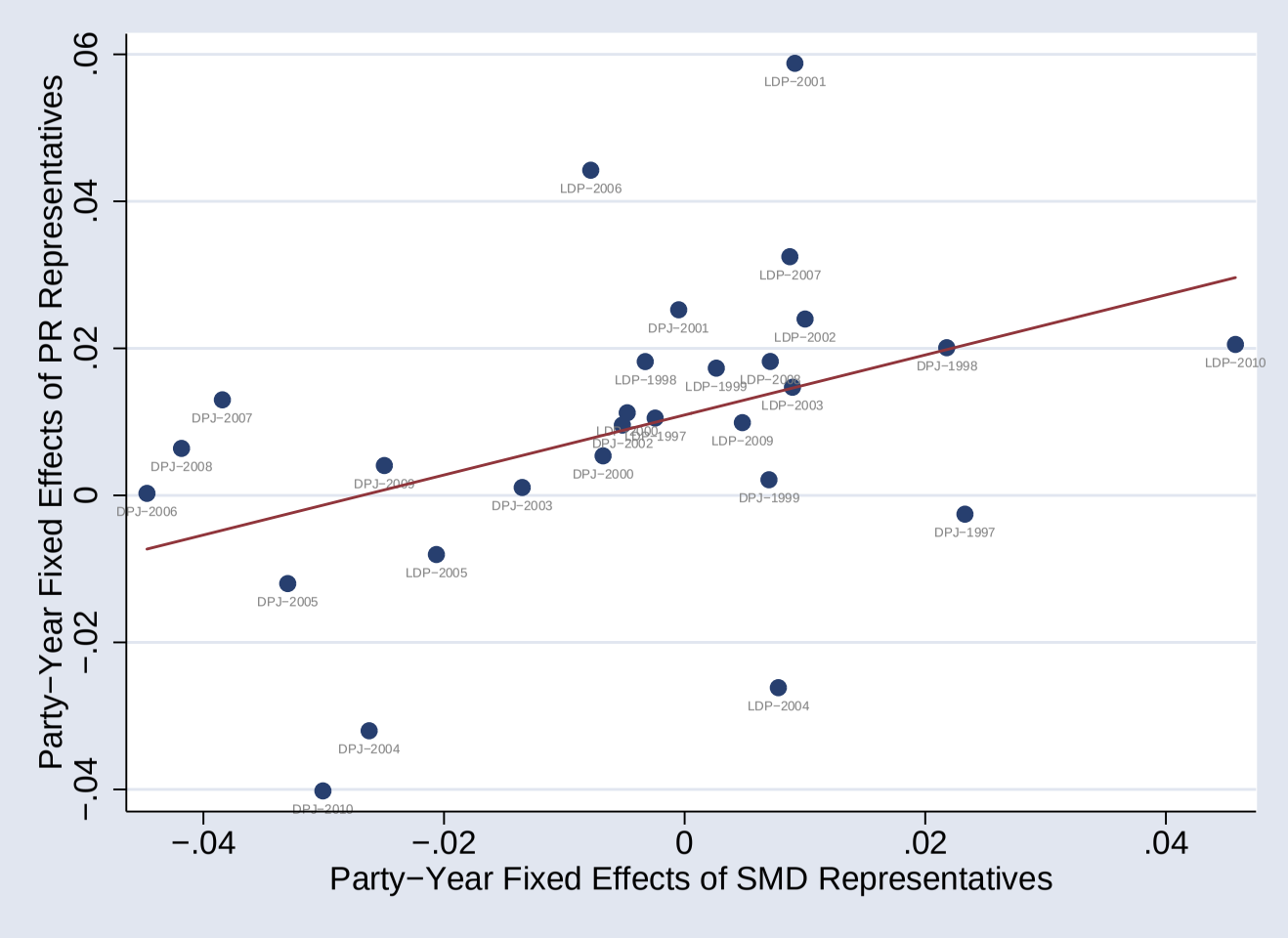


Figure 4: The Division of PR Blocks and the Number of SMDs in Each Prefecture



Different PR Blocks are color-coded. Numbers indicate the number of SMDs in a prefecture.
Source: Japanese Ministry of Internal Affairs and Communication, as of 2012.

Figure 5: Party-Year Fixed Effects of SMD Representatives and PR Representatives on Municipal Expenditure

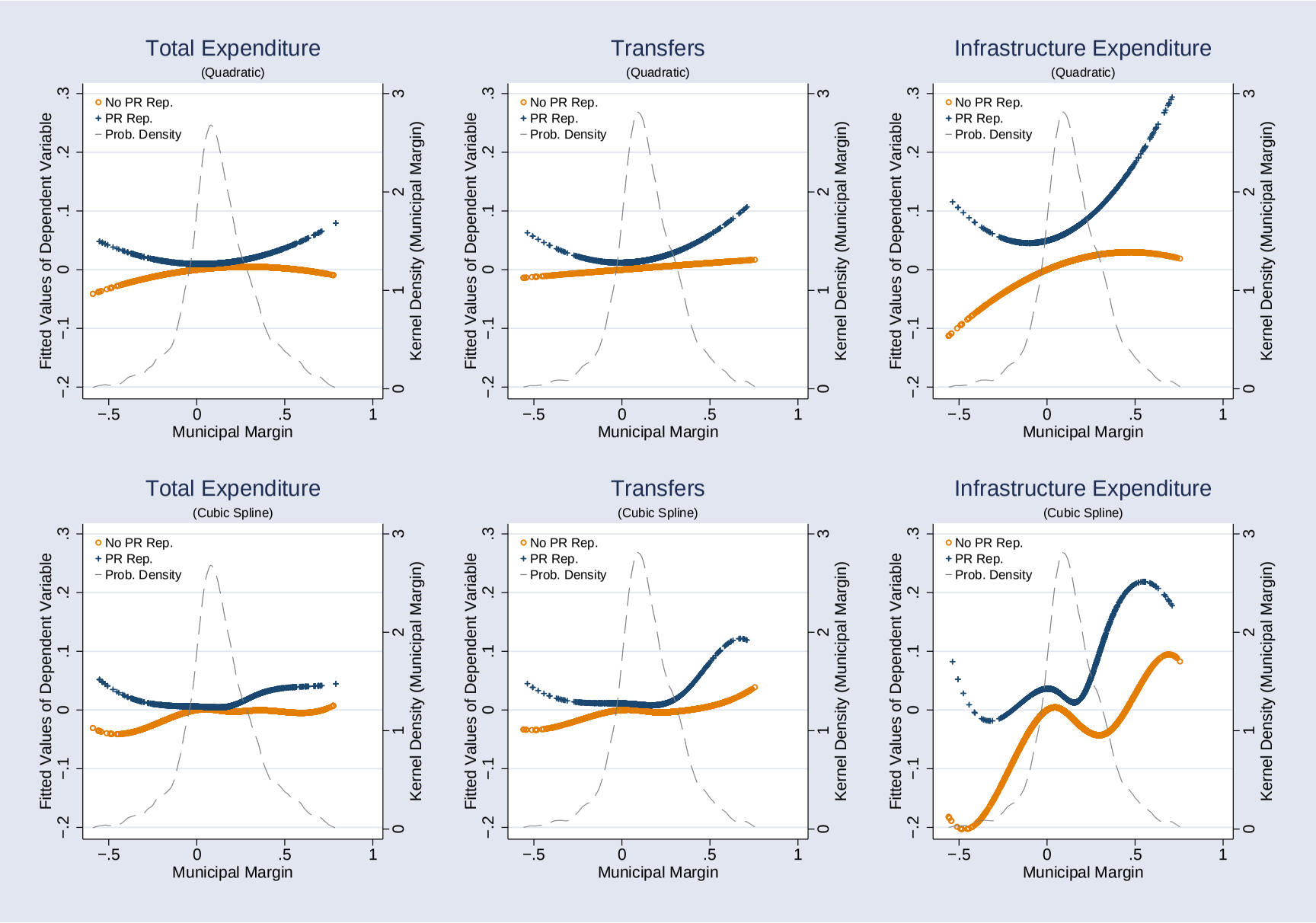


The above graph plots the party-year fixed effects of PR representatives against the party-year fixed effects of SMD representatives. Party-year fixed effects are estimated from the following specification using the quasi-randomized sample described in Section 3:

$$log(y_{it}) = \alpha + \delta_{pt}^{SMD} + \delta_{pt}^{PR} + X_{it}'\beta + \mu_i + \pi_t + \epsilon_{it} \tag{2}$$

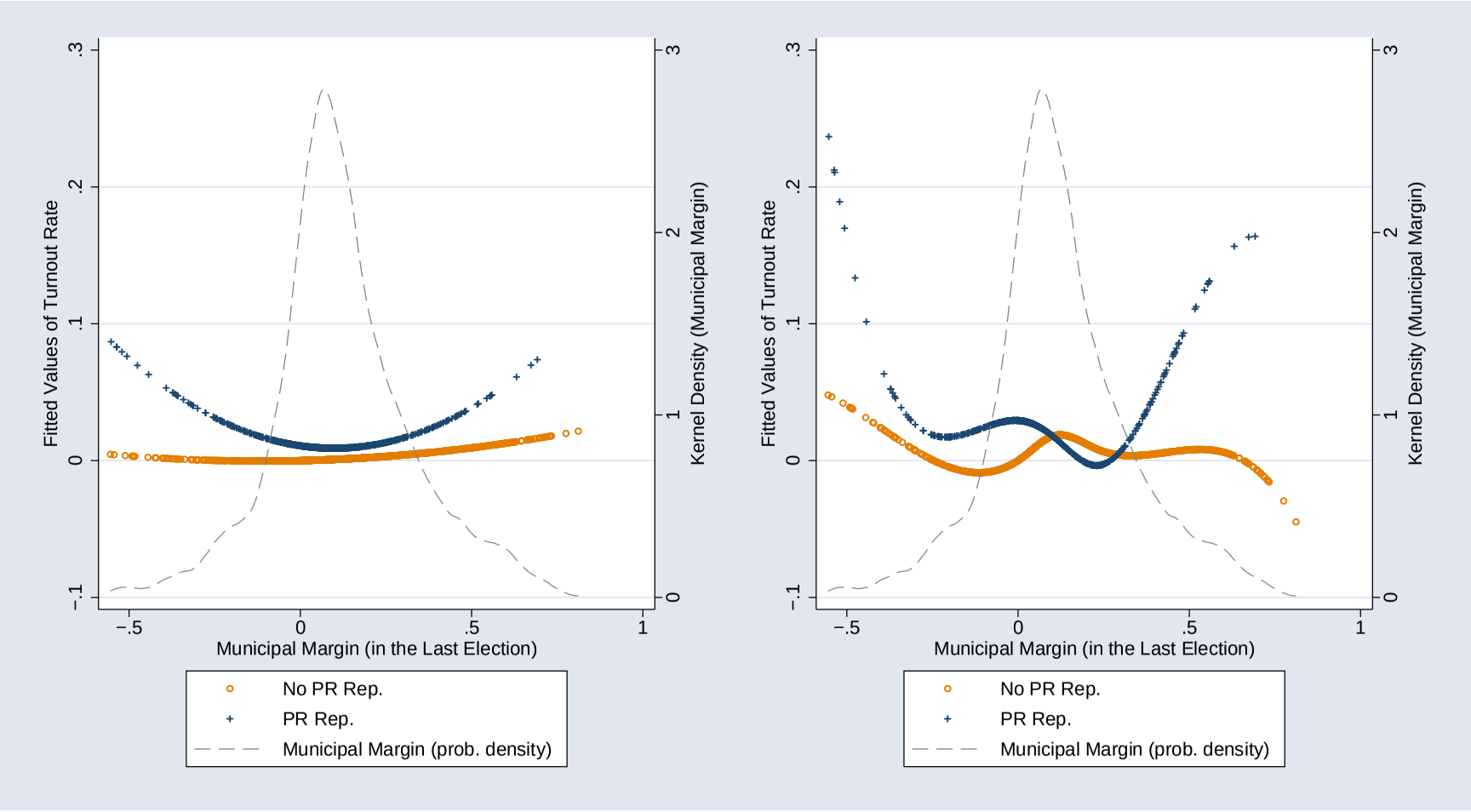
where y_{it} is the public expenditure per capita for municipality i in fiscal year t; δ_{pt}^{SMD} is a party-year fixed effect for municipality i with an SMD representative from party p in fiscal year t; δ_{pt}^{PR} is a party-year fixed effect for municipality i with a PR representative from party p in fiscal year t, which is equal to zero if municipality i does not have a PR representative; X_{it} is a vector of demographic and economic controls included in column (6) of Table 8; μ_i is a municipal fixed effect and π_t is a year fixed effect. The specification is estimated using dummy variables indicating party-year of SMD representative and PR representative (if any).

Figure 6: Municipal Margin of Vote Shares, PR Representation, and Expenditures and Transfers



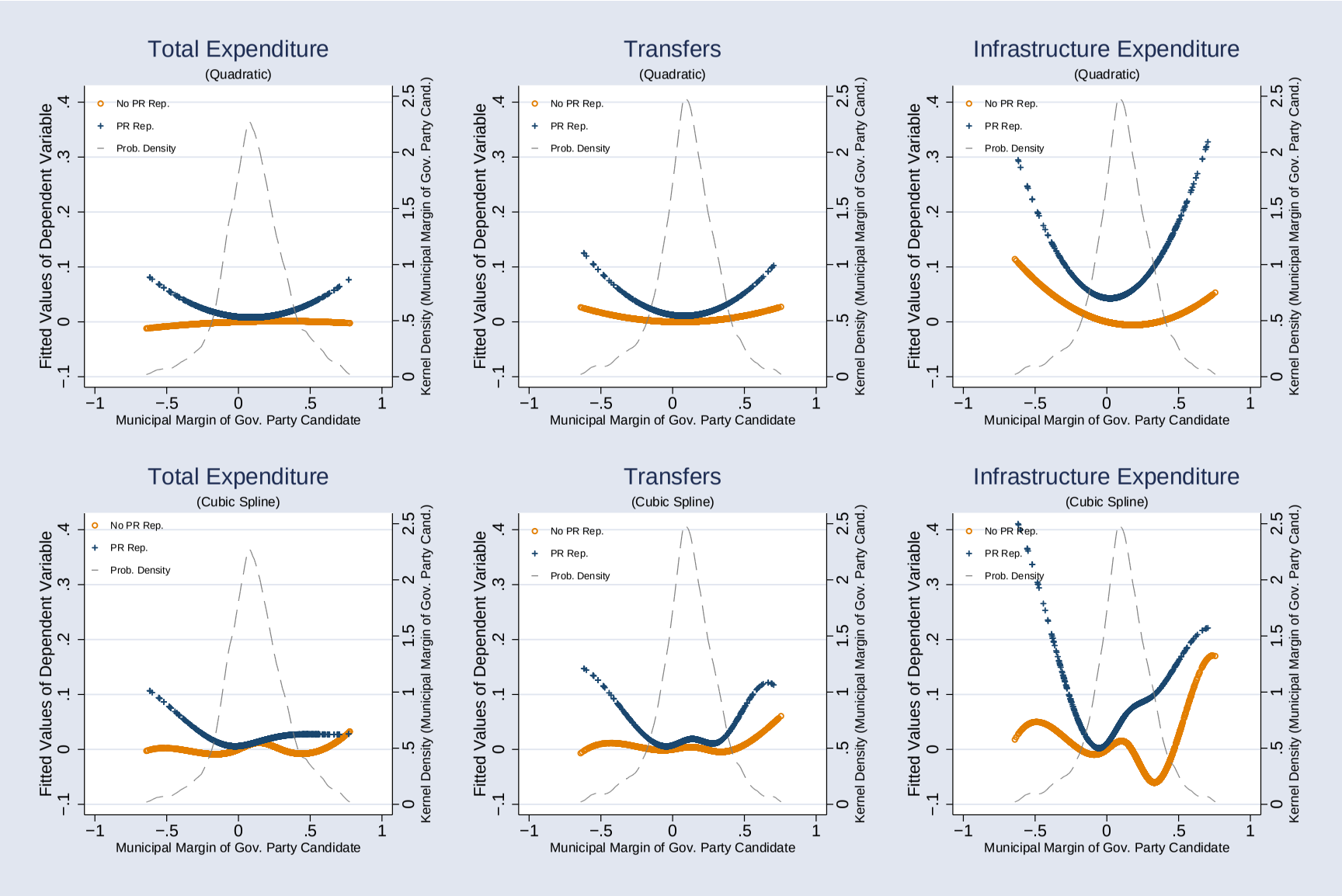
The dependent variables are total municipal expenditure (left column); amount of transfers from the national government (middle column); and municipal expenditure on public works (right column). All are in log per capita terms. The upper row plots the fitted values of the dependent variable against a quadratic polynomial of the municipal margin of vote shares between the SMD winner and runner-up (Municipal Margin). The lower row plots the fitted values of the dependent variables against a cubic spline of Municipal Margin with 3 internal knots at the 25th, 50th, and 75th percentiles. The dashed lines plot the kernel density of Municipal Margin. All regressions use the quasi-randomized sample and include municipality and year fixed effects. Explanatory variables other than the polynomial or spline of Municipal Margin are all set to zero.

Figure 7: Municipal Margin of Vote Shares, PR Representation and Turnout Rate in the Next Election



The dependent variable is the turnout rate of the municipality in the following election. The left graph plots the fitted values of the turnout rate in the next election against a quadratic polynomial of the municipal margin of vote shares between the SMD winner and runner-up (Municipal Margin). The right graph plots the fitted values of the turnout rate in the next election against a cubic spline of Municipal Margin with 3 internal knots at the 25th, 50th, and 75th percentiles. The dashed lines plot the kernel density of Municipal Margin. All regressions use the quasi-randomized sample and include municipality and election fixed effects. Explanatory variables other than the polynomial or spline of Municipal Margin are all set to zero.

Figure 8: Municipal Vote Share Margin of Governing Party Candidate over Opposition Party Candidate, PR Representation, and Expenditures and Transfers



The dependent variables are total municipal expenditure (left column); amount of transfers from the national government (middle column); and municipal expenditure on public works (right column). All are in log per capita terms. The upper row plots the fitted values of the dependent variable against a quadratic polynomial of the municipal vote shares margin between the governing party candidate with the highest vote share in the district and the opposition party candidate with highest vote share in the district (Municipal Margin of Gov. Party Candidate or MMG). The lower row plots the fitted values of the dependent variables against a cubic spline of MMG with 3 internal knots at the 25th, 50th, and 75th percentiles. The dashed lines plot the kernel density of MMG. All regressions use the quasi-randomized sample and include municipality and year fixed effects. Explanatory variables other than the polynomial or spline of MMG are all set to zero.

Table 1: Division of Proportional Representation Blocks

		# PR Seats			# SMDs	
PR Block	# Prefectures	1996	2000	2003 - 2012	Before 2002	After 2002
Chugoku	5	13	11	11	21	20
Hokkaido	1	9	8	8	13	12
Hokurikushinetsu	5	13	11	11	20	20
Kinki	6	33	30	29	47	48
Kitakanto	4	21	20	20	31	32
Kyushu	8	23	21	21	38	38
Minamikanto	3	23	21	22	32	34
Shikoku	4	7	6	6	13	13
Tohoku	6	16	14	14	26	25
Tokai	4	23	21	21	34	33
Tokyo	1	19	17	17	25	25
Total	47	200	180	180	300	300

Table 2: Probability of an SMD-Losing Candidate Running in the Same SMD in the Next Election

Dependent Variable: =1 if the Candidate Runs Again in the Same SMD; 0 otherwise	OLS		Logit	
	(1)	(2)	(3)	(4)
Being a PR Incumbent	0.0862***	0.0696***	0.1147***	0.0978***
	(0.0147)	(0.0151)	(0.0271)	(0.0273)
Losing Margin in the Last SMD Election		-0.1415***		-0.1271***
		(0.0468)		(0.0446)
Constant	0.8801***	0.9145***		
	(0.0111)	(0.0140)		
# Observations	1215	1215	1215	1215

The sample consists of SMD-losing candidates who run again as an SMD candidate in the next election;

PR Incumbent is a dummy variable equal to one if the candidate running again is an incumbent of a PR seat; and zero otherwise;

Losing Margin is the difference of vote share between the SMD winner and the SMD-losing candidate in the last election;

Standard errors are in parentheses;

Standard errors of the OLS estimates are heteroskedasticity robust;

Estimates from the logit models are average marginal effects;

Standard errors of the logit estimates are calculated using the Delta Method;

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 3: Electoral Advantages of PR Incumbents and SMD Incumbents

	Dependent Variable: =1 if Elected to ... ; 0 otherwise					
	Elected to an SMD Seat	Elected to Any Seat	Elected to Any Seat	Elected to Any Seat	Elected to Any Seat	Elected to an SMD Seat
	(1)	(2)	(3)	(4)	(5)	(6)
SMD Incumbent	0.2851***	0.1634***	0.2073***	0.2513***	0.0890***	0.0890**
	(0.0204)	(0.0162)	(0.0188)	(0.0199)	(0.0026)	(0.0388)
Incumbent	0.1292***	0.2598***	0.1792***	0.1506***		
	(0.0170)	(0.0180)	(0.0255)	(0.0234)		
Constant	0.1541***	0.3460***	0.3740***	0.2561***	0.5777***	0.4649***
	(0.0058)	(0.0084)	(0.0113)	(0.0067)	(0.0015)	(0.0239)
Fixed Effects	Party–Election	Party–Election	Party–Election	Party–Election	Party–Election	Party–Election
Clustering	SMD–Election	Block–Election	Block–Election	Block–Election	Block–Election	SMD–Election
Sample	SMD Candidates (incl. Dual)	PR Candidates (incl. Dual)	Dual Candidates Only	All Candidates	Incumbents who were dual candidates in close SMD elections	
R-Squared	0.5471	0.4092	0.4433	0.5702	0.0647	0.6330
# Obs.	5647	4432	3507	5647	356	343

Incumbent is a dummy variable equal to one if the candidate is an incumbent; zero otherwise;

SMD Incumbent is a dummy variable equal to one if the candidate is an SMD incumbent; zero otherwise;

For Column (5) and (6), the sample consists of incumbents who were dual candidates in the last election, and who were either a winner or a runner-up in SMD elections with margin of victory less than 4%.

Standard errors robust to clustering are in parentheses.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 4: Party List of LDP for the PR Block of Kitakanto in the General Election of 2009

Rank ex ante	Candidate	Narrowness ratio	Rank ex post	Seat won	SMD (dual)	V. Share in SMD	Winner's v. share
1	Genichiro Sata	-	1	PR	-	-	-
2	Yuko Obuchi	-	-	SMD	Gunma 5	0.710	0.710
2	Toshimitsu Motegi	-	-	SMD	Tochigi 5	0.517	0.517
2	Hiroshi Kajiyama	-	-	SMD	Ibaraki 4	0.507	0.507
2	Fukushiro Nukaga	0.976	2	PR	Ibaraki 2	0.479	0.491
2	Keiko Nagaoka	0.812	3	PR	Ibaraki 7	0.301	0.370
2	Yoshitaka Shindo	0.801	4	PR	Saitama 2	0.401	0.500
2	Masahiko Shibayama	0.797	5	PR	Saitama 8	0.391	0.491
2	Tsutomu Sato	0.781	6	PR	Tochigi 4	0.402	0.515
2	Yuya Niwa	0.772	7	-	Ibaraki 6	0.420	0.543
2	Yasuaki Yamaguchi	0.770	8	-	Saitama 10	0.425	0.551
2	Hajime Funada	0.765	9	-	Tochigi 1	0.413	0.540
2	Taku Otsuka	0.728	10	-	Saitama 9	0.412	0.567
2	Toshio Kojima	0.715	11	-	Saitama 12	0.409	0.572
2	Yoshio Tanaka	0.711	12	-	Saitama 15	0.371	0.521
2	Yasuhiro Hanashi	0.702	13	-	Ibaraki 3	0.401	0.571
2	Shinako Tsuchiya	0.701	14	-	Saitama 13	0.361	0.515
2	Takashi Mitsubayashi	0.687	15	-	Saitama 14	0.393	0.572
2	Hideki Makihara	0.650	16	-	Saitama 5	0.385	0.592
2	Hayakawa Chuko	0.618	17	-	Saitama 4	0.335	0.542
2	Hiroshi Imai	0.617	18	-	Saitama 3	0.371	0.600
2	Norihiko Akagi	0.612	19	-	Ibaraki 1	0.350	0.571
2	Hideaki Okabe	0.594	20	-	Ibaraki 5	0.364	0.613
2	Koya Nishikawa	0.567	21	-	Tochigi 2	0.357	0.629
2	Zenjiro Kaneko	0.476	22	-	Saitama 1	0.290	0.609
2	Kazuyuki Nakane	0.453	23	-	Saitama 6	0.306	0.676
2	Etsuji Arai	0.363	24	-	Saitama 11	0.256	0.707
28	Masayoshi Namiki	-	25	-	-	-	-
29	Matsuo Otaka	-	26	-	-	-	-

Kitakanto is an area north of the Tokyo prefecture.

SMDs are named with its prefecture followed by the district number in the prefecture.

For example, Gunma 5 is District 5 of Gunma Prefecture;

In the general election of 2009, LDP won 25.84% of party votes in the PR Block of Kitakanto.

Therefore, 6 out of 20 seats in the PR block were allocated to LDP.

Moreover, 3 dual candidates won in their SMDs, thereby vacating their positions on the party list.

The last column is the vote share of the winner in the SMD the dual candidate is contesting.

Table 5: Distribution of SMDs with PR-elected Representatives

	Full Sample Number of SMDs by Election					
Number of Additional PR Representatives	1996	2000	2003	2005	2009	2012
0 (without dual candidate)	12	5	3	0	0	2
0 (with dual candidate)	212	220	182	186	206	183
1	70	69	111	111	91	105
2	6	6	4	3	3	10
Total	300	300	300	300	300	300

	Quasi-Randomized Sample Number of SMDs by Election					
Treatment Status	1996	2000	2003	2005	2009	2012
One Additional PR Representative	24	24	57	37	32	37
No Additional PR Representative	54	69	66	80	69	70
Total	78	93	123	117	101	107

Table 6: Quasi-Randomization Check: Whether Treatment Status Correlates with Observables

	Univariate Explanatory Variable: =1 if having an PR Representative; 0 otherwise			
Dependent Variable	Coefficient	S.E.	p-value	# Obs.
Municipal Level:				
Population (log)	-0.0053	0.1018	0.9584	10208
Taxable Income per capita (log)	-0.0201	0.0233	0.3889	10156
Population Share of Age 0 to 4	0.0006	0.0006	0.2957	10208
Population Share of Age 5 to 19	0.0004	0.0023	0.8558	10208
Population Share of Age 65 +	0.0007	0.0056	0.8965	10208
Area (log)	0.0310	0.1068	0.7714	9251
Population Density (log)	-0.0483	0.1739	0.7813	9251
Population Growth Rate	-0.0004	0.0013	0.7645	9336
District Level:				
Size of District Electorate (log)	-0.0153	0.0184	0.4067	512
Number of SMD Candidates	-0.0299	0.0851	0.7254	619
Total Vote Share of Top 2 SMD Candidates	0.0043	0.0100	0.6640	619
LDP Candidate won	-0.0332	0.0422	0.4313	619
DPJ Candidate won	-0.0714*	0.0395	0.0710	619
Voter Turnout Rate	0.0034	0.0063	0.5899	512
SMD Winner in Governing Coalition	-0.0542	0.0424	0.2014	619

LDP Candidate equals to 1 if the SMD seat is won by a LDP candidate; 0 otherwise;

DPJ Candidate equals to 1 if the SMD seat is won by a DPJ candidate; 0 otherwise;

The sample is the quasi-randomized sample constructed with 2% vote share perturbations.

Standard errors in parentheses are robust to clustering two-way on municipality and on SMD–House term.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 7: Additional Representation and Local Public Expenditure Per Capita (Full Sample)

	Dependent Variable: Municipal Public Expenditure per capita (log)					
	(1) Coeff. / (S.E.)	(2) Coeff. / (S.E.)	(3) Coeff. / (S.E.)	(4) Coeff. / (S.E.)	(5) Coeff. / (S.E.)	(6) Coeff. / (S.E.)
PR Representative	0.0085***	0.0085***	0.0080**	0.0082**	0.0087***	0.0073**
	(0.0033)	(0.0032)	(0.0034)	(0.0032)	(0.0032)	(0.0030)
Population (log)		0.0211				0.0911
		(0.0593)				(0.0554)
Taxable Income per capita (log)			0.1503***			0.1942***
			(0.0513)			(0.0476)
Age 0 to 4 / Population				-1.2553**		-1.1071**
				(0.5185)		(0.5036)
Age 5 to 19 / Population				0.0584		0.1413
				(0.3401)		(0.3457)
Age 65 + / Population				1.1511***		1.5540***
				(0.2478)		(0.2741)
Size of District Electorate (log)					-0.0124	-0.0068
					(0.0463)	(0.0464)
Fixed Effects	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year
Weighted	No	No	No	No	No	No
R-squared	0.9596	0.9596	0.9601	0.96	0.9596	0.9608
# Obs.	34906	34906	34717	34906	34838	34649

PR Representative is a dummy variable equal to one if the municipality has at least one PR representative and zero otherwise;

Standard errors in parentheses are robust to clustering two-way on municipality and on PR block–House term;

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 8: Additional Representation and Local Public Expenditure per capita (Quasi-randomized Sample with 2% Perturbations)

	Dependent Variable: Municipal Public Expenditure per capita (log)					
	(1) Coeff. / (S.E.)	(2) Coeff. / (S.E.)	(3) Coeff. / (S.E.)	(4) Coeff. / (S.E.)	(5) Coeff. / (S.E.)	(6) Coeff. / (S.E.)
PR Representative	0.0182***	0.0178**	0.0155**	0.0184***	0.0210***	0.0182***
	(0.0066)	(0.0070)	(0.0063)	(0.0068)	(0.0062)	(0.0060)
Population (log)		-0.1860				-0.0513
		(0.1223)				(0.1039)
Taxable Income per capita (log)			0.2912***			0.2866***
			(0.0814)			(0.0603)
Age 0 to 4 / Population				-2.0947**		-1.4602*
				(0.9088)		(0.8786)
Age 5 to 19 / Population				0.6212		0.9935**
				(0.4195)		(0.4699)
Age 65 + / Population				0.9743**		1.3175***
				(0.3910)		(0.3831)
Size of District Electorate (log)					-0.1914***	-0.2000***
					(0.0579)	(0.0733)
Fixed Effects	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year
Weighted	No	No	No	No	No	No
R-squared	0.9717	0.9722	0.9732	0.972	0.972	0.9739
# Obs.	10208	10208	10156	10208	10184	10132

PR Representative is a dummy variable equal to one if the municipality has a PR representative and zero otherwise;
Standard errors in parentheses are robust to clustering two-way on municipality and on PR block–House term;
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 9: Additional Representation and Transfers from National Government to Municipal Governments

Dependent Variable: Transfers from National Government to Municipal Governments (log per capita)

	Full Sample (FY 2002 - FY 2010)					
	(1) Coeff. / (S.E.)	(2) Coeff. / (S.E.)	(3) Coeff. / (S.E.)	(4) Coeff. / (S.E.)	(5) Coeff. / (S.E.)	(6) Coeff. / (S.E.)
PR Representative	0.0091**	0.0092**	0.0093**	0.0093**	0.0088**	0.0087*
	(0.0044)	(0.0043)	(0.0044)	(0.0044)	(0.0044)	(0.0045)
R-squared	0.9788	0.9789	0.9788	0.9792	0.9788	0.9793
# Obs.	17367	17367	17216	17367	17299	17148

	Quasi-randomized Sample (FY 2002 - FY 2010)					
	(1) Coeff. / (S.E.)	(2) Coeff. / (S.E.)	(3) Coeff. / (S.E.)	(4) Coeff. / (S.E.)	(5) Coeff. / (S.E.)	(6) Coeff. / (S.E.)
PR Representative	0.0175	0.0173	0.0177	0.0187	0.0174	0.0185
	(0.0107)	(0.0106)	(0.0108)	(0.0118)	(0.0109)	(0.0119)
R-squared	0.9857	0.9857	0.9857	0.9858	0.9857	0.9858
# Obs.	5956	5956	5912	5956	5932	5888

Control Variables:	(1)	(2)	(3)	(4)	(5)	(6)
Population (log)		Y				Y
Taxable Income per capita (log)			Y			Y
Age 0 to 4 / Population				Y		Y
Age 5 to 19 / Population				Y		Y
Age 65+ / Population				Y		Y
Size of District Electorate (log)					Y	Y

PR Representative is a dummy variable equal to one if the municipality has at least one PR representative and zero otherwise;

Standard errors in parentheses are robust to clustering two-way on municipality and on PR block–House term;

Municipal and year fixed effects are included.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 10: Additional Representation and Gap Between Per-Capita Local Public Expenditure and Local Tax Revenue

Dependent Variable: Municipal Public Expenditure minus Local Tax Revenue (log per capita)

	Full Sample (FY 1997 - FY 2010)					
	(1) Coeff. / (S.E.)	(2) Coeff. / (S.E.)	(3) Coeff. / (S.E.)	(4) Coeff. / (S.E.)	(5) Coeff. / (S.E.)	(6) Coeff. / (S.E.)
PR Representative	0.0121***	0.0118***	0.0122***	0.0117***	0.0120***	0.0109***
	(0.0043)	(0.0042)	(0.0045)	(0.0041)	(0.0042)	(0.0040)
R-squared	0.9622	0.9623	0.9623	0.9628	0.9622	0.9632
# Obs.	34906	34906	34717	34906	34838	34649

	Quasi-randomized Sample (FY 1997 - FY 2010)					
	(1) Coeff. / (S.E.)	(2) Coeff. / (S.E.)	(3) Coeff. / (S.E.)	(4) Coeff. / (S.E.)	(5) Coeff. / (S.E.)	(6) Coeff. / (S.E.)
PR Representative	0.0230***	0.0226***	0.0208**	0.0229***	0.0256***	0.0232***
	(0.0083)	(0.0085)	(0.0082)	(0.0086)	(0.0082)	(0.0083)
R-squared	0.9747	0.9748	0.9752	0.975	0.9749	0.9758
# Obs.	10208	10208	10156	10208	10184	10132

Control Variables:	(1)	(2)	(3)	(4)	(5)	(6)
Population (log)		Y				Y
Taxable Income per capita (log)			Y			Y
Age 0 to 4 / Population				Y		Y
Age 5 to 19 / Population				Y		Y
Age 65+ / Population				Y		Y
Size of District Electorate (log)					Y	Y

PR Representative is a dummy variable equal to one if the municipality has at least one PR representative and zero otherwise;

Standard errors in parentheses are robust to clustering two-way on municipality and on PR block–House term;

Municipal and year fixed effects are included.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 11: Additional Representation and Expenditures on Public Works, Welfare and Government Payroll

Full Sample

Dependent Variable:	Infrastructure		Welfare		Payroll	
(expenditure on:)	(1)	(2)	(3)	(4)	(5)	(6)
PR Representative	0.0251*	0.0244*	-0.0075	-0.0067	0.0014	0.0011
	(0.0140)	(0.0129)	(0.0053)	(0.0051)	(0.0024)	(0.0023)
# Obs.	17368	17149	17368	17149	17368	17149

Qusai-Randomized Sample

Dependent Variable:	Infrastructure		Welfare		Payroll	
(expenditure on:)	(1)	(2)	(3)	(4)	(5)	(6)
PR Representative	0.0770**	0.0751**	-0.0219**	-0.0192*	0.0057	0.0053
	(0.0336)	(0.0332)	(0.0105)	(0.0101)	(0.0062)	(0.0054)
# Obs.	5956	5888	5956	5888	5956	5888

Controls:	(1)	(2)	(3)	(4)	(5)	(6)
Population (log)		Y		Y		Y
Taxable Income per capita (log)		Y		Y		Y
Age 0 to 4 / Population		Y		Y		Y
Age 5 to 19 / Population		Y		Y		Y
Age 65 + / Population		Y		Y		Y
Size of District Electorate (log)		Y		Y		Y

PR Representative is a dummy variable equal to one if the municipality has at least one PR representatives and zero otherwise;
Each cell contains an estimate of the treatment effect from one regression;
In columns (1) and (2), the dependent variable is log per capita municipal expenditure on public works;
In columns (3) and (4), the dependent variable is log per capita municipal welfare spending;
In columns (5) and (6), the dependent variable is log per capita municipal expenditure on government payroll;
Standard errors in parentheses are robust to clustering two-way on municipality and on PR block–House term;
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 12: Representatives in Governing Coalition and Per-Capita Local Public Expenditure
(Quasi-Randomized Sample; FY 1997 - FY 2010)

	Dependent Variable: Municipal Public Expenditure per capita (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
PR Representative	0.0152**	0.0148**	0.0130*	0.0154**	0.0184***	0.0161***
	(0.0068)	(0.0074)	(0.0067)	(0.0070)	(0.0064)	(0.0063)
SMD Rep. in Governing Coalition	0.0181*	0.0192*	0.0188*	0.0178*	0.0147*	0.0154*
	(0.0103)	(0.0112)	(0.0103)	(0.0107)	(0.0084)	(0.0088)
PR Rep. in Governing Coalition	0.0143*	0.0137*	0.0118	0.0137	0.0116	0.0087
	(0.0081)	(0.0083)	(0.0079)	(0.0085)	(0.0073)	(0.0075)
Population (log)		Y				Y
Taxable Income per capita (log)			Y			Y
Age 0 to 4 / Population				Y		Y
Age 5 to 19 / Population				Y		Y
Age 65+ / Population				Y		Y
Size of District Electorate (log)					Y	Y
# Obs.	10208	10208	10156	10208	10184	10132

PR Representative is a dummy variable equal to one if the municipality has a PR representative and zero otherwise;
Standard errors in parentheses are robust to two-way clustering on municipality and on PR block–House term;
Municipal and year fixed effects are included.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 13: Within SMD Heterogeneity and Representation on Local Public Expenditure Per Capita
(Quasi-Randomized Sample; FY 1997 - FY 2010)

	Dependent Variable: Municipal Public Expenditure per capita (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
PR Representative	0.0188***	0.0231***	0.0197***	0.0224***	0.0210***	0.0200***
	(0.0064)	(0.0068)	(0.0060)	(0.0073)	(0.0064)	(0.0068)
PR Representative × Heterogeneity	0.0140**	0.0061	0.0176***	0.0168**	0.0176***	0.0105
	(0.0055)	(0.0061)	(0.0042)	(0.0071)	(0.0053)	(0.0066)
Within SMD Heterogeneity in:						
Population (log)	-0.0098					
	(0.0133)					
Taxable Income per capita (log)		0.0165**				
		(0.0065)				
Age 0 to 4 / Population			-0.0030			
			(0.0056)			
Age 5 to 19 / Population				-0.0043		
				(0.0072)		
Age 65+ / Population					-0.0120	
					(0.0083)	
Municipal Tax Revenue / Municipal Public Expenditure						-0.0095
						(0.0064)
R-squared	0.9718	0.9719	0.9718	0.9717	0.9718	0.9727
# Obs.	10080	10075	10080	10080	10080	9275

PR Representative is a dummy variable equal to one if the municipality has a PR representative and zero otherwise;
Measures of within SMD heterogeneity are the within SMD standard deviations across municipalities in log population, share of population aged 65+ etc;
Measures of within SMD heterogeneity are normalized to have mean zero and standard deviation of one;
Standard errors in parentheses are robust to two-way clustering on municipality and on PR block–House term;
Municipal and year fixed effects are included.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table 14: Candidates' Electoral Performance and Outcomes in the Following Election

SMD Winners

Binary dependent variable indicating the SMD winner's outcome in the next election:	(1)	(2)	(3)	(4)	(5)	(6)
	Run Again		Be Elected to an SMD Seat		Be Elected to Any Seat	
PR Rep.	-0.0464	-0.0545*	-0.0047	-0.0697*	0.0111	-0.0161
	(0.0300)	(0.0314)	(0.0458)	(0.0363)	(0.0455)	(0.0406)
Vote Share		-0.0858		1.2872***		1.5160***
		(0.1889)		(0.2768)		(0.2818)
$log(1+tenure)$		-0.0502**		-0.0390		-0.0538*
		(0.0236)		(0.0282)		(0.0290)
Constant	0.9142***	1.0098***	0.4645***	-0.0911	0.6154***	-0.0477
	(0.0158)	(0.0879)	(0.0285)	(0.1335)	(0.0277)	(0.1374)
Fixed Effects	-	Party-Election	-	Party-Election	-	Party-Election
# Obs.	512	512	512	512	512	512

SMD Runners-up

Binary dependent variable indicating the runner-up's outcome in the next election:	(1)	(2)	(3)	(4)	(5)	(6)
	Run Again		Be Elected to an SMD Seat		Be Elected to Any Seat	
PR Rep.	0.3441***	0.2583***	0.1562***	0.1804***	0.1901***	0.1923***
	(0.0374)	(0.0444)	(0.0420)	(0.0400)	(0.0468)	(0.0463)
Vote Share		1.3843***		1.3878***		1.4894***
		(0.3885)		(0.3294)		(0.3861)
$log(1+tenure)$		-0.0690**		-0.0216		-0.0533*
		(0.0287)		(0.0262)		(0.0302)
Constant	0.5237***	0.0917	0.2633***	-0.2434**	0.3846***	-0.1282
	(0.0268)	(0.1401)	(0.0245)	(0.1157)	(0.0274)	(0.1376)
Fixed Effects	-	Party-Election	-	Party-Election	-	Party-Election
# Obs.	512	512	512	512	512	512

OLS Regressions in this table examine candidates' electoral participation and outcomes in the following general election.

The upper panel presents results for winners of SMD races. The lower panel presents results for runners-up of SMD races.

For both panel, candidates are from districts in the quasi-randomized sample described in Section 3.

In columns (1) & (2), the dependent variable is a dummy variable equal to one if the candidate runs in the next election and zero otherwise.

In columns (3) & (4), the dependent variable is a dummy variable equal to one if the candidate wins an SMD seat in the next election and zero otherwise.

In columns (5) & (6), the dependent variable is a dummy variable equal to one if the candidate wins any seat in the next election and zero otherwise.

In the upper panel, **PR Rep.** is a dummy variable equal to one if the winner's district has a PR representative and zero otherwise.

In the lower panel, **PR Rep.** is a dummy variable equal to one if the runner-up is elected to a PR seat and zero otherwise.

Vote Share is the SMD vote share of the candidate (SMD winners in the upper panel and runner-up in the lower panel). This variable has support between zero and one.

$log(1+tenure)$ is the natural logarithms of one plus the number of terms the candidate has served in the House of Representatives.

Standard errors in the parentheses are robust to clustering on politician. * $p<0.10$; ** $p<0.05$; *** $p<0.01$.

Table 15: Municipal Vote Share Margin between SMD Winner and Runner-up (Quasi-Randomized Sample)

	Dependent Variable: Municipal Public Expenditure per capita (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
PR Representative (PR)	0.0132*	0.0118	0.0128*	0.0096	0.0098	0.0092
	(0.0072)	(0.0074)	(0.0072)	(0.0074)	(0.0079)	(0.0076)
Municipal Margin (MM)	0.0221	0.0380	0.0384	0.0344	0.0436	0.0449
	(0.0235)	(0.0261)	(0.0263)	(0.0282)	(0.0280)	(0.0285)
MM^2				-0.0597	0.0068	-0.0335
				(0.0574)	(0.0664)	(0.0642)
$PR \times MM$	-0.0018	-0.0060	-0.0072	-0.0392	-0.0435	-0.0449
	(0.0271)	(0.0272)	(0.0274)	(0.0319)	(0.0313)	(0.0336)
$PR \times MM^2$				0.1775**	0.1544*	0.1839**
				(0.0870)	(0.0855)	(0.0901)
District-wide Margin (DM)		-0.0524			0.0516	
		(0.0425)			(0.0977)	
DM^2					-0.3248	
					(0.2244)	
Vote Share of SMD Winner (VS_w)			-0.0949			-0.1025
			(0.0589)			(0.0623)
Vote Share of SMD Runner-up (VS_r)			0.0097			0.0045
			(0.0665)			(0.0717)
Fixed Effects	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year
Weighted	No	No	No	No	No	No
R-squared	0.9744	0.9744	0.9745	0.9745	0.9746	0.9745
# Obs.	8137	8137	8137	8137	8125	8137

PR Representative is a dummy variable equal to one if the municipality has a PR representatives and zero otherwise;

Municipal Margin (MM) is the difference of vote share between the SMD winner and the SMD runner-up in the municipality;

District-wise Margin (DM) is the difference of vote share between the SMD winner and the SMD runner-up in the whole single-member district;

Vote Share of SMD Winner (VS_w) is the vote share of the SMD winner in the whole single-member district;

Vote Share of SMD Runner-up (VS_r) is the vote share of the SMD runner-up in the whole single-member district;

Standard errors in parentheses are robust to clustering two-way on municipality and on PR block–House term;

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table A.1: Additional Representation and Local Public Expenditure Per Capita (Full Sample)

	Dependent Variable: Municipal Public Expenditure per capita (log)					
	(1) Coeff. / (S.E.)	(2) Coeff. / (S.E.)	(3) Coeff. / (S.E.)	(4) Coeff. / (S.E.)	(5) Coeff. / (S.E.)	(6) Coeff. / (S.E.)
Any PR Representative	0.0084**	0.0084**	0.0078**	0.0082**	0.0086***	0.0071**
	(0.0033)	(0.0033)	(0.0034)	(0.0033)	(0.0032)	(0.0030)
Two PR Representatives	0.0063	0.0063	0.0101	0.0029	0.0065	0.0070
	(0.0140)	(0.0140)	(0.0154)	(0.0115)	(0.0139)	(0.0125)
Population (log)		0.0211				0.0912
		(0.0593)				(0.0554)
Taxable Income per capita (log)			0.1505***			0.1943***
			(0.0513)			(0.0476)
Age 0 to 4 / Population				-1.2547**		-1.1052**
				(0.5191)		(0.5046)
Age 5 to 19 / Population				0.0572		0.1384
				(0.3394)		(0.3449)
Age 65 + / Population				1.1507***		1.5533***
				(0.2472)		(0.2734)
Size of District Electorate (log)					-0.0126	-0.0070
					(0.0461)	(0.0464)
Fixed Effects	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year	Municipal Fiscal Year
Weighted	No	No	No	No	No	No
R-squared	0.9596	0.9596	0.9601	0.9600	0.9596	0.9608
# Obs.	34906	34906	34717	34906	34838	34649

Any PR Representative is a dummy variable equal to one if the municipality has at least one PR representatives and zero otherwise;

Two PR Representative is a dummy variable equal to one if the municipality has two PR representatives and zero otherwise;

Standard errors in parentheses are robust to clustering two-way on municipality and on PR block–House term;

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table A.2: Additional Representation and Local Public Expenditure Per Capita (Population Weighted)

Dependent Variable: Municipal Public Expenditure per capita (log)

	Full Sample (FY 1997 - FY 2010)					
	(1) Coeff. / (S.E.)	(2) Coeff. / (S.E.)	(3) Coeff. / (S.E.)	(4) Coeff. / (S.E.)	(5) Coeff. / (S.E.)	(6) Coeff. / (S.E.)
PR Representative	0.0102***	0.0100***	0.0097***	0.0091**	0.0103***	0.0081**
	(0.0037)	(0.0036)	(0.0038)	(0.0036)	(0.0037)	(0.0034)
R-squared	0.9315	0.9316	0.9325	0.9327	0.9315	0.9345
# Obs.	34906	34906	34717	34906	34838	34649
	Quasi-randomized Sample (FY 1997 - FY 2010)					
	(1) Coeff. / (S.E.)	(2) Coeff. / (S.E.)	(3) Coeff. / (S.E.)	(4) Coeff. / (S.E.)	(5) Coeff. / (S.E.)	(6) Coeff. / (S.E.)
PR Representative	0.0130**	0.0135**	0.0125*	0.0131**	0.0131**	0.0124**
	(0.0064)	(0.0066)	(0.0066)	(0.0064)	(0.0064)	(0.0063)
R-squared	0.9557	0.9559	0.9576	0.9562	0.9561	0.9584
# Obs.	10208	10208	10156	10208	10184	10132
Control Variables:	(1)	(2)	(3)	(4)	(5)	(6)
Population (log)		Y				Y
Taxable Income per capita (log)			Y			Y
Age 0 to 4 / Population				Y		Y
Age 5 to 19 / Population				Y		Y
Age 65+ / Population				Y		Y
Size of District Electorate (log)					Y	Y
Population Weighted	Y	Y	Y	Y	Y	Y

PR Representative is a dummy variable equal to one if the municipality has at least one PR representative and zero otherwise;

Standard errors in parentheses are robust to clustering two-way on municipality and on PR block–House term;

Municipal and year fixed effects are included;

Each observation is weighted by the municipal population in the year.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table A.3: Balanced Full Sample and A Sub-Sample of Municipalities with Long History in the Quasi-Randomized Sample

Balanced Panel of the Full Sample

Dependent Variable:	(1)	(2)	(3)	(4)	(5)	(6)
Public Expenditure (log per capita)	0.0073*	0.0072*	0.0063	0.0073*	0.0078*	0.0060
	(0.0043)	(0.0042)	(0.0044)	(0.0041)	(0.0040)	(0.0037)
Expenditure minus Local Tax Revenue (log per capita)	0.0122**	0.0118**	0.0117**	0.0123**	0.0124**	0.0107**
	(0.0058)	(0.0056)	(0.0059)	(0.0054)	(0.0056)	(0.0051)
# Obs.	19943	19943	19941	19943	19913	19911

A Sub-Sample of the Quasi-Randomized Sample:
Municipalities in the Qusai-Randomized Sample for at least Half of the Sample Period

Dependent Variable:	(1)	(2)	(3)	(4)	(5)	(6)
Public Expenditure (log per capita)	0.0188**	0.0180**	0.0180**	0.0193**	0.0216***	0.0209***
	(0.0081)	(0.0084)	(0.0072)	(0.0084)	(0.0077)	(0.0072)
Expenditure minus Local Tax Revenue (log per capita)	0.0259**	0.0253**	0.0253***	0.0264**	0.0282***	0.0281***
	(0.0101)	(0.0102)	(0.0095)	(0.0107)	(0.0099)	(0.0101)
# Obs.	3706	3706	3701	3706	3705	3700

Controls:	(1)	(2)	(3)	(4)	(5)	(6)
Population (log)		Y				Y
Taxable Income per capita (log)			Y			Y
Age 0 to 4 / Population				Y		Y
Age 5 to 19 / Population				Y		Y
Age 65 + / Population				Y		Y
Size of District Electorate (log)					Y	Y

PR Representative is a dummy variable equal to one if the municipality has at least one PR representative and zero otherwise;
Standard errors in parentheses are robust to two-way clustering on municipality and on PR block–House term;
Each cell contains an estimate of treatment effect from one regression. Different columns represent specifications with different controls;
Municipal and year fixed effects are included in each regression.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Table A.4: Additional Representation and Local Public Expenditure per capita (Robustness Check with Electoral Controls)

Full Sample

	LHS: Municipal Public Expenditure per capita (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
A PR Representative	0.0089***	0.0086***	0.0087***	0.0087***	0.0088***	0.0089***
	(0.0032)	(0.0032)	(0.0032)	(0.0032)	(0.0032)	(0.0032)
Vote Share of SMD Winner	0.0115			0.0374	0.0231	0.0475
	(0.0207)			(0.0424)	(0.0348)	(0.0427)
Victory Margin of SMD Winner		0.0013		-0.0193		-0.0559
		(0.0115)		(0.0236)		(0.0448)
Narrowness Ratio of SMD Runner-up			-0.0013		0.0066	-0.0223
			(0.0077)		(0.0131)	(0.0246)
# Obs	34906	34906	34906	34906	34906	34906

Quasi-Randomized Sample

	LHS: Municipal Public Expenditure per capita (log)					
	(1)	(2)	(3)	(4)	(5)	(6)
PR Representative	0.0180***	0.0181***	0.0180***	0.0185***	0.0182***	0.0183***
	(0.0067)	(0.0068)	(0.0068)	(0.0067)	(0.0067)	(0.0067)
Vote Share of SMD Winner	-0.0239			-0.0471	-0.0317	-0.0583
	(0.0466)			(0.0761)	(0.0658)	(0.0802)
Victory Margin of SMD Winner		-0.0043		0.0197		0.0917
		(0.0278)		(0.0462)		(0.1079)
Narrowness Ratio of SMD Runner-up			0.0048		-0.0047	0.0446
			(0.0184)		(0.0261)	(0.0601)
# Obs	10208	10208	10208	10208	10208	10208

PR Representative is a dummy variable equal to one if the municipality has at least one PR representative and zero otherwise;
Standard errors in parentheses are robust to two-way clustering on municipality and on PR block–House term;
Municipal and year fixed effects are included.
* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.