Why Geographically-Targeted Spending Under Closed-List Proportional Representation Favors Marginal Districts*

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Abstract

Research on geographically-targeted spending under closed-list proportional representation (CLPR) is characterized by debate over whether ruling parties target core supporters or swing voters. We show that when CLPR is used in multiple districts and separate competitions are conducted in each, parties can reverse the formula through which votes are converted into seats to calculate how many additional votes they need to capture an additional seat. This enables parties to *rank* districts according to how close they are to winning an additional seat. We then show that under divisor-based formulae, parties will find they need *fewer* additional votes to capture another seat in districts where they captured *fewer* seats ('marginal districts'). We posit that in these systems, ruling parties will steer geographically-targeted spending toward marginal PR districts and we present evidence of this from Japan.

Keywords: electoral systems; geographically-targeted spending; closed-list proportional representation; divisor-based formula; marginal districts

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The question of whether governing parties use geographically-targeted spending to increase their chances of staying in office has captivated scholars of comparative politics (Rickard, 2018, 2012; Funk and Gathmann, 2013; Tavits, 2009; Golden and Picci, 2008; Ashworth and Bueno de Mesquita, 2006; Crisp and Desposato, 2004; Stratmann and Baur, 2002; Lancaster and Patterson, 1990; Ward and John, 1999; Ames, 1995). A consensus that governing parties elected under closed-list proportional representation (CLPR) are among the least likely to use geographically-targeted spending has given way to a recognition that they do, but debate over how they do. Whereas some studies posit that CLPR encourages governing parties to lavish spending on 'core supporters' (McGillivray, 2004; Tavits, 2009; Rickard, 2018), others suggest the bias will be in direction of 'swing voters' (Helland and Sorensen, 2009; Latner and McGann, 2005; Dahlberg and Johansson, 2002).

We offer a new theory for how governing parties elected under CLPR will use geographically-targeted spending to increase the number of seats won in the next election. We expect our theory to hold when at least a portion of legislators are elected under CLPR, more than one PR district is used, and votes cast in each district are used to apportion seats in those districts. These conditions are not overly restrictive: of the 47 countries using CLPR to elect members of their Lower Houses today, 16 (34%) satisfy these conditions.[1] Under these conditions, we posit that ruling parties will reverse the formula used to convert votes into seats to calculate, for each PR district, the number of additional votes needed to capture an additional seat. We then show that reversing divisor-based (or highest-averages) formulae reveals an *inverse* relationship between the number of additional votes a party needs in a district and the number of seats it has captured there: namely, parties need *fewer* extra votes to capture an additional seat in districts where they captured *fewer* seats (we call these 'marginal districts'). Because extra votes in a party's marginal PR districts are more valuable, meaning more likely to translate into an additional seat, we expect that ruling parties will prioritize boosting their vote totals in marginal PR districts and will find geographically-targeted spending useful to this end.

After elucidating the theory, we test it using the case of Japan's House of Representatives (HoR). Like 19 other countries around the world today, Japan's HoR uses CLPR within the

[1] Bormann and Golder (2013) identify 77 countries using list proportional representation or a mixed-member electoral system. We used David Lublin's Election Passport, the ACE Electoral Knowledge Network, and election guides and codes pertaining to 13 countries to code 47 of these as CLPR, of which 28 use multiple districts and 16 use the votes cast in each district to apportion seats in that district.

context of a mixed-member electoral system. Adopted in 1994, Japan's mixed-member system is 'mixed-member majoritarian' (MMM), which is distinct from 'mixed-member proportional' (MMP) in that the total number of seats a party wins is the sum of those it wins in both tiers. Japan's MMM system consists of a tier comprising first-past-the-post in single seat districts (SSDs), from which 289 legislators currently enter the HoR, and a tier comprising CLPR in 11 regional blocs, from which 176 legislators do so. Importantly, the competition in each PR bloc is distinct from those in the other blocs, meaning that votes cast for parties in a given bloc are used to apportion seats in that bloc, which is done via D'Hondt. Consistent with our expectations, we find that Japanese municipalities that ended up in a PR bloc that was marginal for the largest ruling party in the six HoR elections held between 1996 and 2012 received larger per capita allocations of 'national treasury disbursements' (NTD), a transfer awarded at the discretion of central government bureaucrats, after these elections.

1 The Debate

Early work concluded that ruling parties in majoritarian electoral systems had far greater incentives to use geographically-targeted spending than ruling parties in CLPR systems (e.g. Funk and Gathmann, 2013; Lizzeri and Persico, 2001; Milesi-Ferretti, Perotti and Rostagno, 2002; Ashworth and Bueno de Mesquita, 2006; Stratmann and Baur, 2002; Krauss, Pekkanen and Nyblade, 2006; Persson and Tabellini, 1999; Lancaster and Patterson, 1990; Lancaster, 1986). In a majoritarian system, a canonical example being first-past-the-post in SSDs, parties must place first in a majority of SSDs to command a legislative majority, which in parliamentary systems translates into control over government. Having to place first in one's SSD gives individual politicians an incentive to focus on obtaining spending that is targetable to their communities and party leaders an incentive to agree to this, so long as pressure on the budget is kept under control (Carey and Shugart, 1995). Because SSDs are likely to vary in the extent to which voters support the governing party's candidates, a governing party intent on recapturing its majority is likely to calculate that steering spending toward 'close' SSDs, where its candidates are winning or losing by small margins, will have a greater effect on its seat share than directing it toward 'safe' or 'hopeless' SSDs (McGillivray, 2004; Ward and John, 1999; Dixit and Londregan, 1996).

Many of these same studies concluded that the incentive to use geographically-targeted spending all but vanishes under CLPR, where votes are cast for parties and seats are awarded to parties in proportion to their vote share. Under CLPR, after clearing any legal threshold, the number of seats a party wins increases with its vote share. This means the marginal impact of an extra vote is the *same*, no matter where it is cast. A party could have captured 70% of the votes in one district and 10% in another, but because extra votes have the same impact on its seat share in both places, it has no incentive to prioritize one district over the other (McGillivray, 2004). Absent an incentive to prioritize particular regions, parties compete with promises of programmatic goods, which benefit broad swaths of voters (Lizzeri and Persico, 2001; Milesi-Ferretti, Perotti and Rostagno, 2002). Whereas governing parties in majoritarian systems also benefit from programmatic policies, their enactment requires deliberative time and budgetary resources, which can conflict with the pressures on individual members to channel spoils to their districts. Under CLPR, members are not subject to these same pressures because they owe their seats in parliament to votes for their party and to their party's placement of them on the list (Nemoto and Shugart, 2013; Shugart, Valdini and Suominen, 2005; Carey and Shugart, 1995).[2] To the extent that governing parties represent narrow interests under CLPR, it will be those of groups organized *nationally*, such as producers or bankers, not those of groups concentrated in specific regions (Rickard, 2012).

Recent studies have challenged the consensus that governing parties shy away from geographically-targeted spending under CLPR. In her study of trade policy in two majoritarian systems, McGillivray (2004) hypothesized that under CLPR, governing parties would steer spending toward regions where they already commanded relatively high levels of electoral support. Because extra votes have the same impact on a party's seat share no matter where they are cast, governing parties could get more electoral bang for their buck by steering spending toward people already partial to the party, whose votes are cheaper (see also Cox and McCubbins, 1986). Empirical work on Norway, Denmark, and Sweden corroborates this hypothesis.[3] Rickard (2018, chapter 7) studied the distribution of manufacturing subsidies across Norway's 19 PR districts.

[2] Because voters have a choice between a party's candidates under open-list PR (OLPR), those candidates have reason to cultivate a personal vote (Crisp et al., 2013; Ames, 1995; Golden and Picci, 2008).

[3] These three countries use 'flexible list proportional representation' (FLPR) (voters can modify the ordering of a party's candidates). Because high levels of voter coordination are required to modify orderings, scholars have argued that they function similarly to CLPR systems (e.g. Rickard, 2018, 179). Crisp et al. (2013), on the other hand, argue that because this feature of FLPR changes candidate behavior, it should be treated as a 'distinct sub-group' of PR system.

She found that relatively 'safe' districts, defined as those where the vote share captured by the largest governing (Labour) party exceeded that of the next-closest party by a large margin in the 2005 and 2009 elections, received more manufacturing subsidies per manufacturing sector-employee relative to more marginal districts. Tavits (2009) studied the distribution of grants to municipalities in Norway, Denmark, Sweden, and Finland (the latter uses OLPR). She found that grants flowed to 'stronghold' municipalities, defined as those where the governing parties' co-partisans controlled local politics.

The findings in a second set of studies, however, are consistent with the idea that governing parties direct spending at swing voters under CLPR. Dahlberg and Johansson (2002) studied the allocation of 'ecological' grants to municipalities by the Swedish government prior to the 1998 general election. Their goal was to examine whether the governing bloc directed grants toward 'core supporters' (on the grounds that less money is needed to buy their votes) or 'swing voters' (on the grounds that money would have a larger impact if targeted toward voters who were on the fence) (see also Dixit and Londregan, 1996). Their evidence supported the latter. Helland and Sorensen (2009) studied the Norwegian government's investments in roads from 1973 until 1997 and also found that spending was positively correlated with the proportion of swing voters in a PR district.

Other studies, while not about geographically-targeted spending per se, are consistent with the idea that swing voters are prioritized under CLPR. Latner and McGann (2005) posited that parties in Israel, which uses CLPR, and the Netherlands, which uses FLPR, treat the candidates they nominate and positions they nominate them in as resources to increase their vote totals. Candidate hometowns, then, reveal information about which regions a party is prioritizing. The study found that regions where the governing party was overwhelmingly strong and weak, respectively, had fewer elected members than regions middling in support for the party, which it attributed to the governing party's attempt to prioritize 'regions where those resources are more likely to produce a gain' in terms of seats. Nemoto and Shugart (2013) studied the relationship between electoral system and party decisions to nominate former local politicians in Japan. They found that parties were the least likely to nominate 'localized candidates' under CLPR, but when the governing party did nominate these candidates, it placed them at 'marginal' positions on the list, defined as sections of the list where candidates were on the cusp of winning (rather than in 'safe' or 'hopeless' sections). The authors interpreted this as evidence that governing parties use localized candidates to persuade voters to choose their list, when it matters for their seat share. In sum, the consensus that governments elected under CLPR are unlikely to use geographically-targeted spending has given way to a recognition that they *do*, but debate over *how* they do.

2 Theory

Our theory is in three parts. First, we show that when CLPR is used in multiple districts and separate competitions are conducted in each, parties can reverse the formula through which votes are converted into seats to calculate how many additional votes they need to win an additional seat in each district. Second, we show that under divisor-based formula, parties will find that they need *fewer* additional votes to capture another seat in districts where they captured *fewer* seats. We posit that parties will use these calculations to rank PR districts on the basis of their marginality, assigning the highest (most marginal) rank to the district where fewest additional votes would net the party an additional seat (we call this the party's 'marginal' PR district). Third, we anticipate that governing parties will prioritize increasing their vote totals in marginal PR districts and to this end, find geographically-targeted spending useful.

2.1 Reversing D'Hondt and Other Divisor-Based Formulae

Of the 47 countries using CLPR around the world today, 28 use divisor-based formulae to convert votes for parties into seats for those parties (Bormann and Golder, 2013). Divisor-based formulae take the total number of votes won by each party and divide it by divisors to obtain quotients. The first seat is allocated to the party with the highest quotient, the second seat is allocated to the party with the second-highest quotient, and so on, until all seats have been allocated. D'Hondt, used in 25 of these countries, uses divisors of 1, 2, 3, 4, and so on. Other divisor-based formula include Sainte-Laguë and Modified Sainte-Laguë, which use divisors of 1, 3, 5, 7 and so on, and 1.4, 3, 5, 7 and so on, respectively. Gallagher (1991) explains why D'Hondt advantages larger parties relative to Sainte-Laguë and Modified Sainte-Laguë and explains how divisor-based methods differ from alternative formulae for allocating seats under CLPR, based on largest-remainders (see also Lijphart, 1994, 63-67).

Table 1 illustrates how D'Hondt would divvy up ten PR seats among three parties with the reported vote tallies. The total number of votes received by each party is divided by 1, 2, 3, 4, and so on, to obtain quotients. The first seat is awarded to the party with the largest quotient, which by construction is the party capturing the most votes (Party B). The second seat is awarded to the party with the second-largest quotient (in this case, Party A) and so on, until all seats have been allocated. In this example, Party A captures three seats (the 2nd, 5th, and 7th), Party B captures five seats (the 1st, 3rd, 6th, 8th, and 9th), and Party C captures two seats (the 4th and 10th).

Table 1: How D'Hondt Would Allocate Ten Seats Among Three Parties with the Hypothetical Vote Totals Shown

Votes won	Party A (270,000)	Party B (354,000)	Party C (140,000)
Divided by 1	270,000 (2nd)	354,000 (1st)	140,000 (4th)
Divided by 2	135,000 (5th)	177,000 (3rd)	70,000 (10th)
Divided by 3	90,000 (7th)	118,000 (6th)	46,666.7
Divided by 4	67,500	88,500 (8th)	35,000
Divided by 5	54,000	70,800 (9th)	28,000
Divided by 6	45,000	59,000	23,333.3
Seat assignment:	3 seats	5 seats	2 seats

Blais and Lago (2009) explain how a given party p can reverse this process to calculate the number of additional votes it needs to capture an additional seat. First, party p identifies the last seat allocated that it did not win (conceptually, this is the seat it came closest to winning). For parties not capturing the last seat allocated (in Table 1, this is Parties A and B), the last seat allocated that they did not win is the last seat (the 10th). For the party capturing the last seat (Party C), the last seat allocated that it did not win is usually the second-to-last seat (unless it also captured this seat, in which case it would be the third-to-last, and so on). For Party C, then, it is the 9th. Once identified, party p calculates the minimum number of votes that must be added to its vote total for this seat to be reallocated to it, assuming no changes in other parties' vote totals. This is given by taking the number of votes in the quotient attached to this seat, subtracting the number of votes in party p's runner-up quotient (which was not high enough to obtain this seat), and multiplying the result by the divisor attached to party p's runner-up quotient.

Concretely, for Party A in Table 1, the calculation is: votes in quotient that won the 10th seat (70,000) − votes in Party A's runner-up quotient (67,500), x divisor attached to Party A's runner-up quotient (4). For Party B, it is: votes in quotient that won the 10th seat (70,000) − votes in Party B's runner-up quotient (59,000), x divisor attached to Party B's runner-up quotient (6). For Party C, it is: votes in quotient that won the 9th seat (70,800) − votes in Party C's runner-up quotient (46,666.7), x divisor attached to Party C's runner-up quotient (3). In sum, to win an additional seat, Party A needs a minimum of 10,000 more votes, Party B needs 66,000, and Party C needs 72,399.9 (rounded to 72,400). Tables 2, 3, and 4 illustrate how the seats in Table 1 would be reallocated had each party increased its vote total by these amounts.

Table 2: How the Ten Seats From Table 1 Would Have Been Distributed Had Party A Won 10,000 More Votes

Votes won	Party A (280,000)	Party B (354,000)	Party C (140,000)
Divided by 1	280,000 (2nd)	354,000 (1st)	140,000 (tie for 4th)
Divided by 2	140,000 (tie for 4th)	177,000 (3rd)	70,000 (tie for 9th)
Divided by 3	93,333.3 (7th)	118,000 (6th)	46,666.7
Divided by 4	70,000 (tie for 9th)	88,500 (8th)	35,000
Divided by 5	56,000	70,800	28,000
Divided by 6	46666.7	59,000	23,333.3
Seat assignment:	4 seats	4 seats	2 seats

We have used D'Hondt in this example, but parties operating under other divisor-based formulae can implement the same calculations, substituting in their divisors. This calculation illustrates an important feature of divisor-based formulae: as parties win more seats, the divisor attached to their runner-up quotient increases, which increases the number of additional votes needed to capture an additional seat. Party B, which captured five of the ten available seats, needs 66,000 more votes to capture another seat, while Party A, which captured three seats, needs just 10,000 more votes to capture another one. This is because having captured five seats,

Table 3: How the Ten Seats From Table 1 Would Have Been Distributed Had Party B Won 66,000 More Votes

Votes won	Party A (270,000)	Party B (420,000)	Party C (140,000)
Divided by 1	270,000 (2nd)	420,000 (1st)	140,000 (tie for 4th)
Divided by 2	135,000 (6th)	210,000 (3rd)	70,000
Divided by 3	90,000 (8th)	140,000 (tie for 4th)	46,666.7
Divided by 4	67,500	105,000 (7th)	35,000
Divided by 5	54,000	84,000 (9th)	28,000
Divided by 6	45,000	70,000 (10th)	23,333.3
Seat assignment:	3 seats	6 seats	1 seat

Table 4: How the Ten Seats From Table 1 Would Have Been Distributed Had Party C Won 72,400 More Votes

Votes won	Party A (270,000)	Party B (354,000)	Party C (212,400)
Divided by 1	270,000 (2nd)	354,000 (1st)	212,400 (3rd)
Divided by 2	135,000 (5th)	177,000 (4th)	106,200 (7th)
Divided by 3	90,000 (8th)	118,000 (6th)	70,800 (10th)
Divided by 4	67,500	88,500 (9th)	53,100
Divided by 5	54,000	70,800	42,480
Divided by 6	45,000	59,000	35,400
Seat assignment:	3 seats	4 seats	3 seats

Party B has to multiply the difference between votes in the quotient attached to the last seat and votes in its runner-up quotient by *six*, whereas Party A has to multiply its difference by *four*; hence, Party B needs more votes than Party A.

A second feature of divisor-based formulae is that the party capturing the last seat in a district typically needs more votes to capture another seat than parties not capturing the last seat. In our example, Party C captured only two seats, which is less than Parties A and B, but needs more votes than them (72,400 compared to 10,000 and 66,000, respectively) to capture another one. This is because the difference between votes in the quotient attached to the seat the party came closest to winning and votes in a party's runner-up quotient tends to be *greater* for parties capturing the last seat. For Party C, this difference is 24,133 (70,800 - 46,666.7), larger than the equivalent differences for Parties A and B, which are 2,500 (70,000-67,500) and 11,000 (70,000-59,000), respectively. Because these differences are then multiplied by the divisor in the party's runner-up quotient, the same relationship between seats and votes (namely, more seats won means more votes needed for another seat) holds for parties capturing the last seat. But a party capturing the last seat will typically require more additional votes to capture another seat than a party that captured an equivalent *number* of seats, none of which is last.

2.2 Ranking PR Districts According to their Marginality

Let us now consider the implications of this in a setting where *separate* competitions are conducted in *multiple* districts. Of the 47 countries using CLPR today, 28 use multiple, regional districts.[4] Of these, 16 conduct separate competitions in each, meaning that the votes parties receive in each district are tallied up and converted into seats in that district in a manner separate from other districts.[5] A party implementing the above calculation in each district will thus be able to *rank* districts on the basis of how many additional votes are needed to secure it an additional seat. Because of the inverse relationship between number of additional votes needed in a district and number of seats won there, parties will find that, generally-speaking, they need the *fewest* additional votes in the district where they won the *fewest* seats. We refer to this district as a party's *marginal* (PR) district.[6]

In countries satisfying our conditions, then, it is not the case that the value of each additional vote is the same, no matter where it is cast. The value of each additional vote *varies* across PR districts, just as it does across districts in a majoritarian system. In a majoritarian system, the

[4] This leaves 19 countries using CLPR in a single, nationwide district. Of these, 13 use it within the context of a mixed-member system (Bormann and Golder, 2013).

[5] What does it mean when the competitions in each PR district are not separate? Votes cast in the five PR districts used in elections to Mexico's Chamber of Deputies and the 26 PR districts used in elections to Italy's Chamber of Deputies, for example, are pooled at the national level *first* to determine each party's overall allotment of seats. These are then divvied up to PR districts based on how many votes parties received there. Our theory does not apply to these systems because parties cannot calculate the number of additional votes needed to secure them an additional seat in each PR district.

[6] Importantly, it is the district where the party captured the *fewest* seats, not the district where it captured the *smallest percentage* of seats. Take District A and District B, which have district magnitudes of ten and four, respectively. If Party A captures five seats in District A and two seats in District B, it has captured 50% of available seats in both. Because of the way the divisor works, however, Party A will find that fewer votes are required to garner a third seat in District B, where it is dealing with a divisor of *three*, than in District A, where it is dealing with a divisor of *six*. Party A's marginal district is thus District B.

value of each additional vote is thought to be highest in districts where a party's candidate won or lost by a narrow margin (hence the name 'marginal' districts), and lowest in districts where a party's candidate won by a large margin ('safe' districts) or lost by a large margin ('hopeless' districts) (Ward and John, 1999; Dixit and Londregan, 1996). Our calculations reveal that under CLPR, the value of each additional vote will be highest in the district where a party captured the fewest seats and lowest in the district where it captured the most seats. Additional votes, then, are worth the *most* in districts contributing the *least* to a party's seat share (akin to a 'hopeless' district in a majoritarian system) and worth the *least* in districts contributing the *most* to its seat share (akin to a 'safe' district in a majoritarian system).[7]

2.3 Relationship With Existing Measures of Marginality

How does our measure of the marginality of a PR district relate to existing measures? Blais and Lago (2009) measure the 'competitiveness' of a PR district by calculating the number of additional votes each party needs to win another seat and taking the minimum of these. Grofman and Selb (2009) measure 'competitiveness' with the minimum share of votes it would take for each party to gain *or* lose a seat. Both studies normalize their scores to facilitate comparison across districts. Folke (2014), on the other hand, measures the 'marginality' of a PR district based on the marginality of the last seat allocated. He calculates the size of the shifts in all parties' vote shares that would be sufficient for it to be reallocated. Fiva and Halse (2016) use a similar approach to capture the marginality of a political bloc's seat majority (see also Fiva, Folke and Sorensen, 2018). Cox, Fiva and Smith (2020) argue that such measures must include not only a consideration of how votes map onto seats, but also of how effort maps onto votes.

With the exception of Grofman and Selb (2009), these studies offer *general* measures of the competitiveness of PR districts. These are appropriate for their purposes: comparing election competitiveness and turnout under alternative electoral systems (Cox, Fiva and Smith, 2020; Blais and Lago, 2009) and identifying the causal impact of a given party on policy outcomes (Fiva and Halse, 2016; Folke, 2014), respectively. We offer a *party-specific* measure, which is appropriate for our purpose: investigating whether ruling parties elected under CLPR use

[7] We acknowledge that, generally-speaking, parties may find it easier to win over new voters in places where they have not already captured a large number of seats. Our theory uses the mechanics of how votes are converted into seats under CLPR to identify another reason why it makes sense for parties to prioritize PR districts where they have not performed well.

geographically-targeted spending to increase their chances of staying in office. To illustrate the fact that PR districts that are *generally* competitive (meaning small shifts in raw votes or vote shares are sufficient to disturb the seat distribution) will not competitive for *all* parties, we use data from our case (Japanese elections, described below). In 1996, the Blais and Lago (2009) methodology identifies Kita Kanto, where the Japan Communist Party needed another 1,204 votes to win another seat, as the most competitive PR district. Our methodology shows that the ruling party needed another 209,134 votes (seventeen times' that) to win another seat in Kita Kanto. In contrast, the ruling party needed just 14,609 extra votes to win another seat in the Kyushu PR district. Kita Kanto might be *generally* competitive, but it is not competitive for all parties and in this instance, was not competitive for the ruling party.

This same example can be used to illustrate why, for our purposes, the marginality of a PR district is better expressed in *raw votes*, not vote shares, like Grofman and Selb (2009). First, *votes* are used to allocate seats, not vote shares. Second, in differently-sized districts, the same vote share can translate into vastly different numbers of raw votes. Applying the Grofman and Selb (2009) methodology to the same 1996 Japanese election shows that to win another seat, the ruling party needs to increase its vote share by 6% in *both* the Kita Kanto and Kyushu blocs. However, as we just saw, 6% translates into 14,609 extra votes in Kyushu, but 209,134 (fourteen times' that) in Kita Kanto. From the perspective of a party deciding where to allocate its effort, using raw votes to compare districts makes more sense.

2.4 Targeting Spending at Marginal Districts

After elections, we anticipate that parties will rank PR districts according to their marginality. Because fewer additional votes translate into an additional seat in a party's more marginal PR districts, we anticipate that it will dedicate whatever resources it controls to these districts. If governing parties have access to geographically-targeted spending, we anticipate they will direct more of this to marginal PR districts. When the money is distributed is likely to depend on other features of a country's political system, such as whether parliament can be dissolved by the Prime Minister. In these countries, it behooves politicians to maintain a state of election readiness at all times, which leads us to expect that money flows immediately after votes are counted. How funds will be used *within* marginal PR districts is beyond the scope of this study.

However, our empirical tests, conducted on Japan, leave us with a conjecture that should be fleshed out theoretically and tested empirically, both in Japan and elsewhere.

3 Case of Japan

To test the theory, we turn to Japan's House of Representatives (HoR). Like the Lower Houses in 19 other countries around the world today, Japan's HoR uses CLPR within the context of a mixed-member electoral system. Adopted in 1994, Japan's system is mixed-member majoritarian (MMM), comprising an SSD and CLPR tier. In elections, voters receive two ballots. On one, they write the name of their preferred SSD candidate and the candidate with the most votes wins. When the system was first introduced, there were 300 SSDs. Since then, the number has been reduced to 289. On the second ballot, they write the name of a party presenting a list in their PR bloc. Japan is divided into 11 PR blocs, which vary in magnitude from 6 members in the Shikoku bloc to 29 in the Kinki bloc (previously, 7 and 33, respectively). PR blocs respect SSD borders, meaning that each SSD fits within a single PR bloc. The votes parties receive in each bloc are used to apportion seats in that bloc, which is done via D'Hondt. Initially, 200 members entered the HoR via CLPR. This was decreased to 180 in 1999 and is now 176.[8]

Since 1994, eight HoR elections have been held. The first four (in 1996, 2000, 2003, and 2005) returned majorities for the Liberal Democratic Party (LDP), in conjunction with its smaller coalition partner(s).[9] The fifth election (in 2009) returned a majority for the Democratic Party of Japan (DPJ), which formed a coalition after the election.[10] The sixth, seventh, and eighth elections (in 2012, 2014, and 2017) all returned majorities for the LDP.

The LDP, which was also in power from 1955 until 1993, is known for its skilful use of pork-barreling (McMichael, 2018; Christensen and Selway, 2017; Hirano, 2006; Horiuchi and Saito, 2003; Fukui and Fukai, 1996; Ramseyer and Rosenbluth, 1993). Leveraging the fact that Japanese municipalities are legally required to provide a whole range of services, yet face restrictions on their ability to raise the revenue to do so, LDP politicians parlayed their influence over the distribution of central government transfers to increase the number of votes won therein

[8]Online Appendix A lists each bloc, its district magnitude (adjusted over time for population changes), and the names of the 47 prefectures located within them.

[9]In 1996, these were the Japan Socialist Party and Sakigake. For elections since 1999, it has been the Komeito (Liff and Maeda, 2019).

[10]This coalition, with the People's New Party (PNP) and Social Democratic Party (SDP), gave the DPJ a majority in the House of Councillors (HOC).

(Catalinac, Bueno de Mesquita and Smith, 2019; McMichael, 2018; Saito, 2010; Scheiner, 2006; Horiuchi and Saito, 2003; Reed, 1986). Two categories of transfers have been used: 'local allocation tax' (LAT), which is need-based and allocated according to a formula, and 'national treasury disbursements' (NTD), which are awarded at the discretion of government bureaucrats for the purpose of funding specific projects in a municipality. More than one-third of the average municipality's annual revenue comes from these categories of transfer (Yamada, 2016; Horiuchi and Saito, 2003; Hirano, 2006).

A study of the 1980-2000 period, which includes two elections under MMM, shows how LDP incumbents used their influence over NTD allocations to municipalities to increase the number of eligible voters casting their district votes for them (where 'district' was multi-member from 1980-1994 and an SSD thereafter) (Catalinac, Bueno de Mesquita and Smith, 2019). The fact that the LDP uses geographically-targeted spending to increase the number of SSDs won makes it plausible that it is also using NTD to increase the number of PR seats won. The process through which NTD allocations are decided upon is a black box, but Saito (2010) explains that LDP incumbents influence it by asking bureaucrats to fund certain projects over others. Our theory implies that, after elections, the ruling party determines which PR blocs are marginal and devotes greater effort to persuading bureaucrats to fund projects for the municipalities in those blocs. Thus far, we have no evidence the DPJ-led government (2009-2012) used geographically-targeted spending. But work on this period describes LDP politicians' frustration at their lack of access to bureaucrats, which implies that access is not a function of being LDP, but a function of being in power (Endo, Pekkanen and Reed, 2013).

Our study joins others that have tested propositions about a single electoral system in the context of a mixed system (e.g. Rickard, 2012; Pekkanen, Nyblade and Krauss, 2006). Doing so carries the risk that an outcome of interest is not a product of competition in the tier which which one is concerned, but competition in the *other* tier. We acknowledge this risk, but believe it to be lower in our case because we have a good idea of how competition in the SSD tier is likely to be influencing geographically-targeted spending. This enables us to design empirical tests of our hypothesis that explicitly control for competition in the SSD tier (specifically, the vote share a municipality supplies its LDP or DPJ winner and other SSD-level characteristics that influence the amount of money received, described below). Ultimately, it is difficult to attribute the pattern of spending we observe to competition in the SSD tier.

4 Data

We analyzed the six HoR elections between 1996 and 2012 because we lacked data on all variables for the 2014 and 2017 elections. First, we obtained votes cast for parties presenting lists in all PR blocs in these six HoR elections and the seat allocations those vote totals produced.[11] Using this data, we constructed a Votes Needed variable for each party in each election, which records the number of additional votes the party needs to win an additional seat in each PR bloc. For a given party in a given election, the variation in number of additional votes needed was large. In the 2000 election, for example, the LDP needed 28,474 more votes in the Tohoku bloc, but 447,260 (fifteen times' more) in the Tokai bloc.[12] With these Votes Needed variables, we constructed a marginality ranking for each party in each election, assigning '11' to a party's most marginal bloc (where fewest extra votes are required for another seat) and '1' to its least.

Second, we compiled comprehensive data on Japanese municipalities in the 1996-2013 period. For annual amounts of NTD, we relied on data from Nikkei NEEDs, supplemented where necessary with data from official government sources.[13] We also relied on Nikkei NEEDs for control variables: namely, per capita income, population, 'fiscal strength', proportion of residents employed in primary industries, proportion of residents aged 15 and under, proportion of residents aged 65 and over, and population density (Horiuchi and Saito, 2003).[14] Data on municipalities' voting behavior in both tiers of Japan's MMM electoral system was gathered from JED-M (Mizusaki, 2014) and data on the SSDs municipalities were located in came from Reed and Smith (2015).

5 Results

We adopt a three-pronged empirical strategy. First, we present figures demonstrating the expected positive correlation between NTD received by PR bloc and PR bloc marginality. Second,

[11] We gathered this from 'Shugiin Giin Sosenkyo Saikou Saibansho Saiban Kan Kokumin Shinsa Kekka Shirabe' (Results of House of Representatives Elections and Citizen Reviews of Justices to the Supreme Court), held in the National Diet Library.

[12] Even if we exclude PR blocs where the LDP captured the last seat in 2000, the range is still 28,474 in Tohoku to 292,591 in Hokuriku Shinetsu.

[13] The NEEDs data is described `http://www.nikkei.co.jp/needs/contents/regional.html`.

[14] The first three are measured annually. The second three are measured in censuses conducted every five years. For values in off-years, we used the value in the census year closest to the off-year. Population density was created by dividing a municipality's population by its size in kilometers squared. 'Fiscal strength' is the share of the cost of delivering services that a municipality can finance with revenue derived from taxation.

we present the results of two-way fixed effect regressions, which show that municipalities in marginal PR blocs received significantly more NTD after these six elections. Third, we consider rival explanations.

5.1 Marginality, Electoral Strength, and Transfers

Figure 1 plots two relationships of interest. The figure on the left plots a best fit line and 95% confidence interval of the logarithm of per capita NTD received by PR blocs in the years following these six HoR elections as a function of the bloc's position in the ruling party's marginality ranking.[15] Higher values on the y-axis mean the PR bloc received a larger post-election NTD allocation, whereas higher values on the x-axis mean that it was more marginal for the ruling party. As expected, the slope of the line is positive. The figure on the right plots a best fit line and 95% confidence interval of the logarithm of per capita NTD received by PR blocs in the years following these six HoR elections as a function of the raw number of additional votes the ruling party needed to win another seat. Higher values on the y-axis mean the PR bloc received a larger post-election NTD allocation, whereas higher values on the x-axis mean larger numbers of votes were needed. As expected, the slope of the line is negative. Because neither figure controls for other ways in which PR blocs differ from each other, they are not tests of the theory. The fact that we observe the expected correlations, however, even without controls, lends credence to it.

5.2 Fixed Effect Regressions

Next, we conduct two-way fixed effect regressions. Our dependent variable is the logarithm of per capita transfers (NTD) received by municipalities in the fiscal years following the 1996, 2000, 2003, 2005, 2009, and 2012 HoR elections.[16] Our independent variable of interest is Marginal Bloc. This is a dummy coded '1' if the municipality is located in a PR bloc at the highest or

[15] This is the bloc's position in the LDP's marginality ranking for 1996, 2000, 2003, 2005 and 2012, and for the DPJ's in 2009. We calculated the post-election per capita NTD allocation received by each bloc by taking the sum of NTD allocations received by municipalities in the bloc in the year after the election and dividing this by the bloc's population. Note that Figure 1 was made without the Tohoku PR bloc in 2012 on account of the substantially larger allocations these municipalities received. This likely reflected the reconstruction taking place as a result of the 2011 earthquake. Online Appendix B presents Figure 1 with the Tohoku bloc in 2012 included. The slopes are similar. Online Appendix C shows that all the results presented below are robust to the inclusion of controls for having experienced an earthquake causing human casualties and/or property damage or a flood causing human casualties at some point since the previous election.

[16] Japan's fiscal year runs from April 1 until March 31 of the following year.

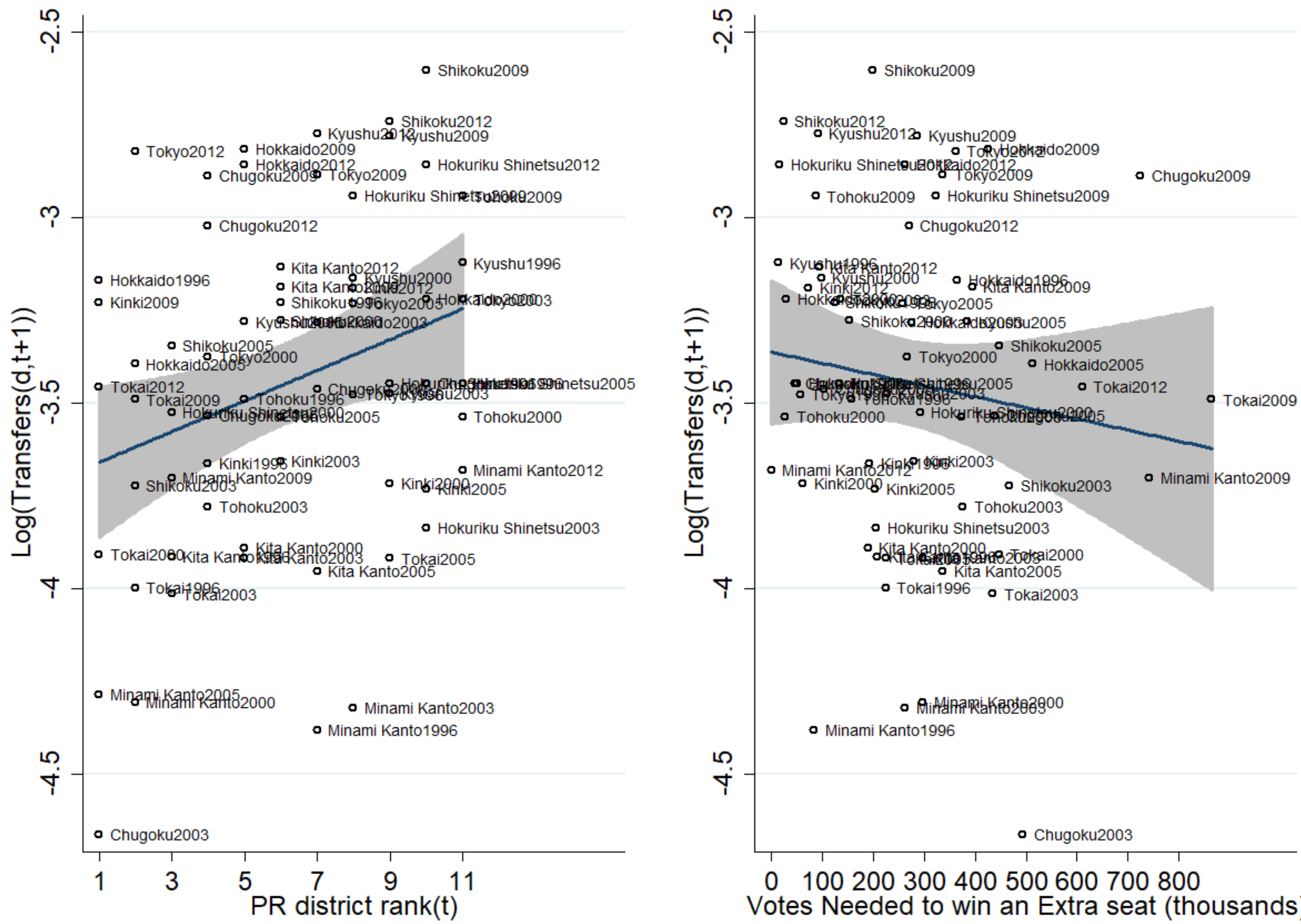

Figure 1: PR Blocs Ranked Higher in Marginality for the Ruling Party (Left) and PR Blocs in which Fewer Additional Votes Are Needed to Net the Ruling Party an Additional Seat (Right) Received Larger NTD Allocations after the 1996, 2000, 2003, 2005, 2009, and 2012 Japanese HoR Elections

second-highest position on the ruling party's marginality ranking and '0' otherwise. We convert the marginality ranking to a dummy to avoid imposing the restriction that shifts in the ranking have the same effect on the dependent variable regardless of *where* in the ranking they occur. Because a bloc's position in the ranking is determined by the number of additional votes needed to net the ruling party another seat, and because this increases as the number of seats won by the ruling party increases, shifts in the ranking a higher levels (from 11 to 10, for example) require fewer votes than shifts in the ranking at lower levels (from 2 to 1). This non-linearity is not captured with a continuous variable. A dummy coded to indicate whether a bloc was marginal for the ruling party is sufficient for assessing whether governing parties spend more on marginal blocs. On average, the ruling party needed 82,089 additional votes to capture an additional seat in PR blocs coded as 'marginal' and 315,333 (almost four times' that) in blocs coded as 'non-marginal'.

Our main analysis in Table 5 uses municipality fixed effects to control for time-invariant features of a municipality that could influence the transfers it receives, such as whether it can put together compelling proposals for projects to be funded. We use year fixed effects to control for factors specific to a given year that could have influenced the transfers received by all municipalities therein. A positive, significant coefficient on Marginal Bloc would indicate that the *same* municipality received more NTD when it was located in a marginal PR bloc than when it was not.

The main threat to inference in this design is the possibility that time-*varying* features of a municipality are systematically correlated with it ending up in a marginal PR bloc, and it is these variables that are driving any observed effect of Marginal Bloc. Put another way, it is not being in a marginal PR bloc that causes municipalities to receive more transfers, it is the factors that cause municipalities to end up in marginal PR blocs that cause them to receive more transfers. To address this, we include three sets of time-varying municipality-level controls. One, we include population (logged), per capita income (logged), proportion of residents employed in agriculture, proportion of residents who are dependent (aged 15 and under or 65 and over), population density, and fiscal strength, which are standard controls in work on the political determinants of transfers in Japan (e.g. Hirano, 2006; Horiuchi and Saito, 2003). Two, we control for the per capita NTD received (logged) the year of the election (the lagged dependent variable). Three, Model 1 includes LDP or DPJ PR $\text{VS}_{m,t}$ (the share of eligible voters in the municipality who cast their PR votes for the ruling party), Model 2 includes LDP or DPJ SSD $\text{VS}_{m,t}$ (the share of eligible voters in the municipality who cast their SSD votes for the ruling party's candidate), and Model 3 includes both LDP or DPJ PR $\text{VS}_{m,t}$ and LDP or DPJ SSD $\text{VS}_{m,t}$, with the caveat that they are highly correlated. These variables guard against the possibility that any observed effect of Marginal Bloc is driven by features of a municipality's voting behavior, which may also be correlated with it ending up in a marginal PR bloc. Because our treatment (Marginal Bloc) is assigned to a PR bloc, we cluster standard errors by PR bloc.

The positive, significant coefficients on Marginal Bloc (all models) reveal that ending up in a marginal PR bloc nets a municipality a larger per capita NTD allocation the year after the election. Substantively, the coefficient on Marginal Bloc in Model 3 shows that ending up in a marginal PR bloc netted a municipality an NTD allocation that was 2.7% larger. This amounts to an extra 1,527 yen per person (or $14.50 USD).

Another threat to inference in this design is the possibility that the effect of Marginal Bloc is being driven by characteristics of a municipality's SSD, which may be systematically correlated with it ending up in a marginal PR bloc. Put differently, it is possible that municipalities in marginal PR blocs receive more money not because they are in marginal PR blocs but because they are in SSDs that receive more money for other reasons and these SSDs are systematically more likely to end up in marginal PR blocs. Existing studies identify both time-varying and time-invariant SSD-level attributes that could influence the amount of money municipalities receive. Pekkanen, Nyblade and Krauss (2006), for example, find that ruling parties distributed valued legislative posts to their so-called 'zombie' candidates (candidates who lost their SSDs by relatively narrow margins and, by virtue of being dual-listed in the PR tier and losing narrowly, gained a seat in the PR tier). Horiuchi and Saito (2003) find that SSDs with smaller populations, which are over-represented relative to SSDs with larger populations, receive more transfers. Saito (2010) holds that SSDs consisting of more municipalities have more local politicians, who use their ability to mobilize votes for LDP affiliates in HoR elections to elicit more transfers. Catalinac, Bueno de Mesquita and Smith (2019) show that SSDs where municipalities vary more in size receive more transfers on the grounds that uncertainty over how a municipality's 'performance' will be compared to other municipalities in the same SSD is greater in 'asymmetric' SSDs, requiring larger payoffs to rouse voters to the polls.

Table 5: Municipalities in Marginal PR Blocs Received More Money After Japanese HoR Elections, 1996-2012 (Municipality Fixed Effects, Year Fixed Effects and Time-Varying Municipality-Level Controls).

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.030**	0.032**	0.027**
	[0.013]	[0.013]	[0.012]
LDP or DPJ PR VS$_{m,t}$	0.209		0.484**
	[0.128]		[0.160]
LDP or DPJ SSD VS$_{m,t}$		-0.086	-0.186**
		[0.067]	[0.070]
Log(Transfers$_{m,t}$)	0.522***	0.521***	0.522***
	[0.022]	[0.022]	[0.023]
Fiscal Strength$_{m,t}$	-0.208*	-0.195*	-0.205*
	[0.107]	[0.107]	[0.107]
Log(Population$_{m,t}$)	-0.224	-0.172	-0.245
	[0.167]	[0.176]	[0.161]
Log(Income$_{m,t}$)	-0.557**	-0.534**	-0.556**
	[0.219]	[0.216]	[0.216]
Dependent Population$_{m,t}$	0.183	0.356	0.145
	[0.600]	[0.632]	[0.582]
Agriculture$_{m,t}$	0.198	0.279	0.110
	[0.573]	[0.596]	[0.577]
Population Density$_{m,t}$	0.000*	0.000**	0.000**
	[0.000]	[0.000]	[0.000]
Constant	0.523	0.015	0.724
	[1.681]	[1.790]	[1.602]
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Observations	13,113	13,113	13,113
R-squared	0.557	0.557	0.558

Robust standard errors clustered at the bloc level in brackets
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

To address the possibility that either time-invariant or time-varying features of a municipality's SSD could be driving the effect of Marginal Bloc, Table 6 presents the same three specifications, replacing municipality fixed effects and most of the time-varying municipality-level controls with SSD fixed effects and time-varying SSD-level controls.[17] Our time-varying

[17]These specifications are possible because SSDs, like municipalities, vary across elections in terms of whether they end up in a marginal PR bloc. Let us also clarify that if municipalities were always located in the *same* SSD, time-invariant SSD-level features would be captured with the municipality fixed effect. However, our period of study coincides with a period in which municipal mergers reduced the total number of municipalities, meaning that many

SSD-level controls are population, dependent population, proportion of population employed in agriculture, per capita income, population density, number of municipalities, asymmetry in municipality size, fiscal strength, and LDP or DPJ Competitiveness$_{d,t}$, a continuous variable capturing the competitiveness of the ruling party's SSD candidate. To calculate the latter, we took the vote share of the ruling party's SSD candidate and divide it by the vote share of the SSD winner (hence ruling party SSD winners receive 1 and higher proportions indicate greater competitiveness).[18] Ideally, we would include all the time-varying municipality-level controls we had in Table 5, but many are highly correlated with their SSD-level counterparts, making it unwise to do so. Instead, we control for the three we expect influence transfers, which also exhibit less correlation with their SSD-level counterparts: LDP or DPJ PR VS$_{m,t}$, LDP or DPJ SSD VS$_{m,t}$, and Log(Transfers$_{m,t}$). As in Table 5, we include year fixed effects and cluster our standard errors by PR bloc.[19]

The positive, significant coefficients on Marginal Bloc are slightly larger than those in Table 5. Municipalities in marginal PR blocs received larger NTD allocations the year after the election. Substantively, the coefficient on Marginal Bloc in Model 3 shows that municipalities in marginal PR blocs received an NTD allocation that was 2.9% larger. This amounts to an extra 1,608 yen per person (or $15.28 USD).[20]

5.3 Alternative Explanations

Our results support the theory: municipalities in marginal PR blocs received more money after these elections. We consider three rival explanations. One, our theory suggests that ruling parties rank PR blocs based on how many additional votes would net the party an additional seat. Alternatively, ruling parties could rank PR blocs based on how many additional votes

municipalities found themselves in SSDs that were different to the ones they were in before. Thus, time-invariant SSD-level attributes are not accounted for with the municipality fixed effect.

[18] This calculation, known in Japanese politics as 'sekihairitsu', is used by parties to decide which of their candidates gets a PR seat. In Japanese elections, parties present lists of candidates in each PR bloc, but place candidates who are also running in an SSD at the same position on the list. After votes are counted, parties rank losers on the basis of their sekihairitsu and assign the n PR seats they won to the top n candidates.

[19] Our inclusion of SSD-level controls means that the small fraction of municipalities whose borders span more than one SSD are excluded. This removes 0.4% of municipalities in 1996 and 2000, 1% in 2003, 3.6% in 2005, and 9% in 2012 (the number increases because municipal mergers reduced the total number of municipalities). Our inclusion of Asymmetry in Municipality Size$_{d,t}$ further limits the sample to municipalities whose SSD comprises more than one municipality.

[20] Online Appendix D presents the same table, replacing LDP or DPJ Competitiveness$_{d,t}$ with Zombie$_{d,t}$, a dummy coded 1 if the ruling party's candidate lost the SSD but received a PR seat, and 0 otherwise. The coefficients on Marginal Bloc remain positive and significant (and are larger).

Table 6: Municipalities in Marginal PR Blocs Received More Money After HOR Elections, 1996-2012 (SSD Fixed Effects, Year Fixed Effects and Time-Varying SSD-Level and Municipality-Level Controls).

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.030***	0.033***	0.029***
	[0.008]	[0.008]	[0.008]
LDP or DPJ PR VS$_{m,t}$	0.471***		0.562***
	[0.089]		[0.105]
LDP or DPJ SSD VS$_{m,t}$		0.197***	-0.086
		[0.059]	[0.066]
Log(Transfers$_{m,t}$)	0.706***	0.710***	0.706***
	[0.017]	[0.018]	[0.017]
Asymmetry in Municipality Size$_{d,t}$	0.236	0.219	0.243
	[0.225]	[0.228]	[0.223]
Fiscal Strength$_{d,t}$	-0.207	-0.201	-0.210
	[0.148]	[0.157]	[0.146]
Agriculture$_{d,t}$	1.041	1.080	1.039
	[0.791]	[0.788]	[0.787]
Dependent Population$_{d,t}$	0.102	0.120	0.100
	[0.193]	[0.188]	[0.193]
Population Density$_{d,t}$	-0.061*	-0.049	-0.063*
	[0.031]	[0.032]	[0.031]
Log(Population$_{d,t}$)	0.018	0.020	0.018
	[0.059]	[0.059]	[0.059]
Log(Per Capita Income$_{d,t}$)	-0.047	-0.047	-0.046
	[0.083]	[0.091]	[0.082]
Log(Number of Municipalities$_{d,t}$)	-0.046	-0.037	-0.044
	[0.032]	[0.029]	[0.033]
LDP or DPJ Competitiveness$_{d,t}$	-0.066***	-0.114***	-0.037
	[0.017]	[0.023]	[0.022]
Constant	-1.462*	-1.386*	-1.493*
	[0.753]	[0.754]	[0.754]
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes
Observations	13,482	13,482	13,482
R-squared	0.756	0.756	0.756

Robust standard errors clustered at the bloc level in brackets
*** p<0.01, ** p<0.05, * p<0.1

would be required for another party to capture one of its seats. In our theory, governing parties spend to win seats; in this (rival) theory, they spend to prevent a narrowly-won seat from being lost. Online Appendix E explains how we constructed a dummy variable called 'Bloc (Narrowly-Won Last Seat)' to examine this possibility. In short, we find some evidence that spending is used in this manner, but the evidence is not robust to the inclusion of time-invariant and time-varying SSD-level characteristics.

Second, we explained above why parties capturing the last seat in a PR district will typically require more votes to capture another one. While the calculation still involves the divisor, meaning that the inverse relationship between seats won and additional votes needed still holds for these parties, the first part of the calculation – the distance between votes in their runner-up quotient and votes in the quotient attached to the seat they came closest to winning – is different for these parties. To make sure the coefficients on Marginal Bloc in Tables 5 and 6 are not driven by the presence of PR blocs where the ruling party captured the last seat, we constructed a version of the marginality ranking that *excludes* municipalities in these blocs. We then constructed an alternative Marginal Bloc variable, coded '1' if the municipality is located at one of the two highest positions on this ranking and '0' otherwise. Online Appendix F presents tables that are otherwise identical to Tables 5 and 6, but use this alternative Marginal Bloc variable. The coefficients remain positive and significant.

Third, district magnitude varies across Japan's 11 PR blocs. If smaller district magnitudes are associated with fewer additional votes needed to win another seat, then this could be a concern because ruling parties may have other reasons to spend more on PR blocs with smaller district magnitudes. We can rule out the possibility that the effects of Marginal Bloc are masquerading as the effects of district magnitude because there is no correlation between number of additional votes the ruling party needs in a bloc and district magnitude ($r = 0.065$).[21]

6 Conclusion

In countries where CLPR is used in multiple districts and separate competitions are conducted in each, we show that parties can rank PR districts according to how many extra votes are needed to win an extra seat. Under divisor-based formulae, we show that parties will find they need the *fewest* additional votes in districts where they captured the *fewest* seats. We call these a party's 'marginal' PR district. We then posit that ruling parties with access to geographically-

[21] Blais and Lago (2009, 97) also report no correlation between district magnitude and competitiveness.

targeted spending will target this spending at marginal PR districts. Consistent with the theory, we found that Japanese municipalities that ended up in PR blocs that were marginal for the largest ruling party in elections received more money the year after the election. This result obtained in specifications that leveraged over-time variation in the *same* municipality's location in a marginal bloc and in specifications that controlled for systematic differences in the SSDs municipalities are located in. Being in a marginal PR bloc was found to have increased a municipality's per person NTD allocation by between \$14.50 and \$15.28 (USD).

For comparativists, our study is one of the first to connect the mechanics of divisor-based formulae to government behavior and policy outcomes. Whether governing parties in other countries satisfying our conditions are using spending in this manner should be investigated. In countries using divisor-based formulae but not meeting our other conditions, we suggest scholars investigate an alternative implication of the formula's mechanics: the fact that large parties will need many more additional votes to capture another seat than small parties. As a result, larger parties in coalition with smaller parties may prefer to allocate scarce resources to increasing their smaller partner's vote tally, rather than their own. If so, this would have important implications for our understanding of why coalitions tend to prevail under CLPR and the terms of the relationships between partners.

The dynamic we have uncovered also speaks to another important literature in comparative politics. In a cross-national study, Anderson and Guillory (1997) found that people who voted for an opposition party ("losers", in their terminology) are less satisfied with democracy than people who voted for a governing party ("winners"). They also found that losers in consensual political systems, of which a proportional representation electoral system is a characteristic, exhibit *higher* levels of satisfaction than losers in majoritarian political systems. If, as our findings suggest, governing parties in countries meeting our conditions spend more on PR districts where they performed worse, this means they are spending more on places with more losers. Despite not having their preferred representatives in office, then, losers in these systems may not be as disadvantaged as they first appear. There are likely several reasons why losers in consensual systems exhibit higher satisfaction than losers in majoritarian systems, but another could be the dynamic we uncover.

For readers interested in Japanese politics, we have shown that ruling parties use geographically-targeted spending to increase the number of PR seats won. Existing studies, which have focused exclusively on the ruling LDP, show that it is also used to increase the number of SSDs won. Future work should examine whether these strategies are used simultaneously. If so, this implies that within SSDs, money flows to 'core supporters' (municipalities returning high vote shares), but across PR blocs, money flows to 'swing voters' (municipalities in marginal PR blocs). This provides an intriguing basis upon which the 'core supporters versus swing voters' debate could be reconciled. We encourage future work to flesh this out further theoretically and test it empirically, both in Japan and elsewhere.

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Online Appendix: Why Geographically-Targeted Spending Under Closed-List Proportional Representation Favors Marginal Districts

A Features of Japan's 11 PR Blocs

Table A.1: District Magnitudes and Prefectures in Japan's 11 PR Blocs, 1996-2012.

PR bloc	Prefectures	1996	2000	2003	2005	2009	2012
Hokkaido	Hokkaido	9	8	8	8	8	8
Tohoku	Aomori, Iwate, Miyagi, Akita, Yamagata, Fukushima	16	14	14	14	14	14
Kanto North	Ibaraki, Tochigi, Gunma, Saitama	21	20	20	20	20	20
Tokyo	Tokyo	19	17	17	17	17	17
Kanto South	Chiba, Kanagawa, Yamanashi	23	21	22	22	22	22
Hokuriku Shinetsu	Niigata, Toyama, Ishikawa, Fukui, Nagano	13	11	11	11	11	11
Tokai	Gifu, Shizuoka, Aichi, Mie	23	21	21	21	21	21
Kinki	Shiga, Kyoto, Osaka, Hyogo, Nara, Wakayama	33	30	29	29	29	29
Chugoku	Tottori, Shimane, Okayama, Hiroshima, Yamaguchi	13	11	11	11	11	11
Shikoku	Tokushima, Kagawa, Ehime, Kochi	7	6	6	6	6	6
Kyushu	Fukuoka, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima, Okinawa	23	21	21	21	21	21
Total:		200	180	180	180	180	180

B Figure with Tohoku 2012

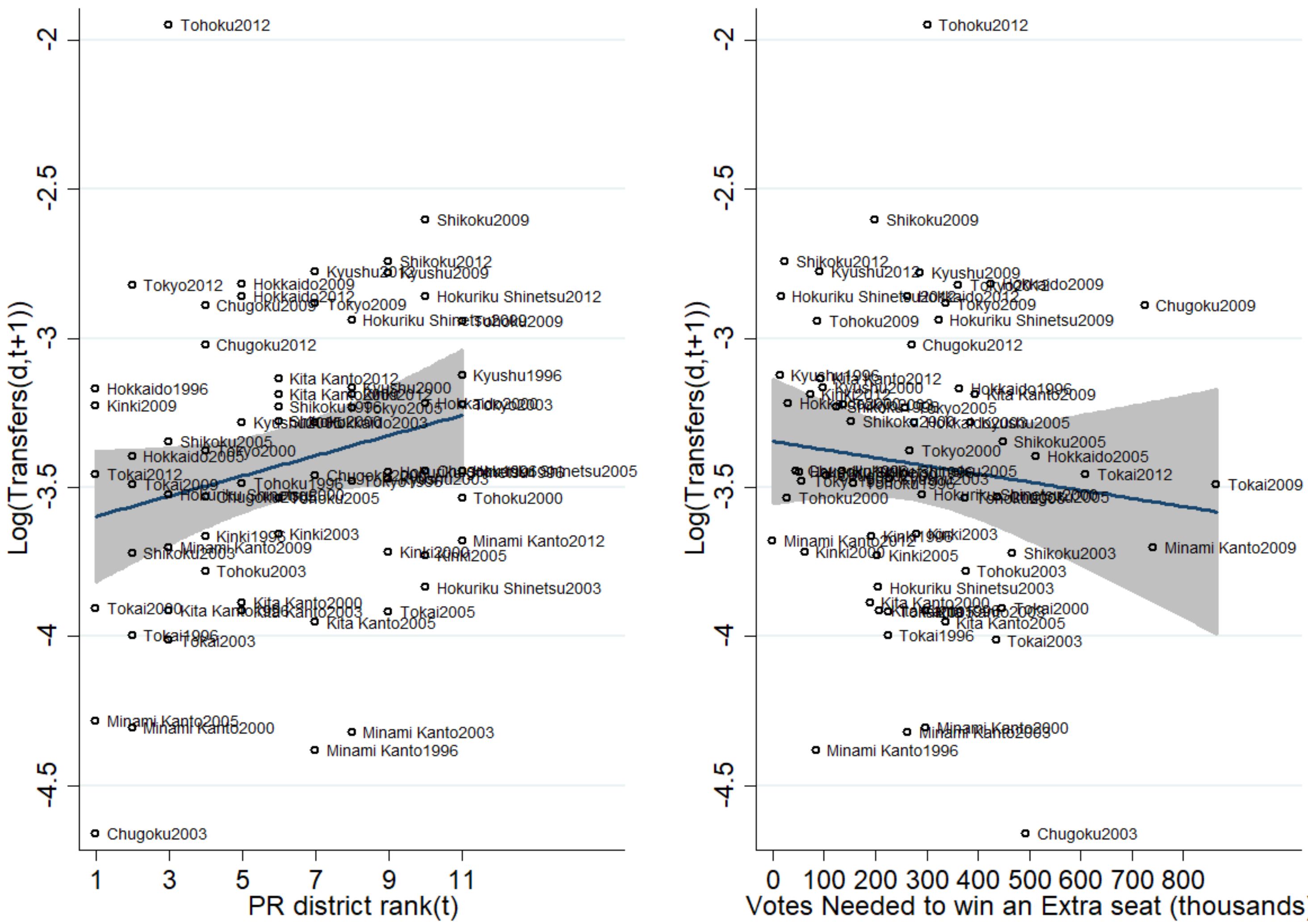

Figure B.1: For PR blocs in the 1996, 2000, 2003, 2005, 2009, and 2012 HOR elections, we plot their position in the ruling party's marginality ranking (left, x-axis) and the number of additional votes the ruling party needed to capture another seat (right, x-axis), respectively, against the size of the bloc's per capita NTD allocation in the year after the election (y-axis). PR blocs that ranked higher in marginality received larger allocations (left). PR blocs where a smaller number of additional votes were needed to net the ruling party an additional seat received larger allocations (right). This figure includes the Tohoku bloc in the 2012 election.

C Results With a Control for Natural Disasters

We compiled a list of named earthquakes that caused human casualties and/or damage to property and named floods that caused human casualties from the Japan Meteorological Agency's website. This list, called the 'List of Named Earthquakes and Meteorological Phenomena', is available here: https://www.jma.go.jp/jma/kishou/know/meishou/meishou_ichiran.html. The Fire and Disaster Management Agency's website contains PDF reports pertaining to each of the named earthquakes and floods that occurred since 1995. This list is available here: https://www.fdma.go.jp/disaster/info/. For the 1995 Kobe earthquake, the FDMA report was in a different format. For this earthquake only, we relied on the municipality-level coding from Horiuchi and Saito (2003), which listed 18 municipalities as having been affected by this earthquake.

Using this data, we created Natural Disaster$_m$, a dummy variable coded '1' if the municipality was affected by a named earthquake or flood at any point since the previous election, and '0' otherwise. Tables C.1 and C.2 replicate Tables 5 and 6 in the paper, with this control.

To account for variation in the earthquake's intensity across municipalities, we constructed two measures. First, we created a categorical variable capturing the seismic intensity of the earthquake that affected municipalities experienced in the years since the last election. The variable has four categories: Not Affected, Low Intensity (for all municipalities affected by a seismic intensity of 5), Medium Intensity (for all municipalities affected by a seismic intensity of 6), and High Intensity (for all municipalities affected by a seismic intensity of 7). Tables C.3 and C.4 replicate Tables 5 and 6 in the paper, with this control. Note that this regression excludes the 1995 earthquake, as we do not have municipality-level seismic intensity data for this earthquake. Second, we used a continuous variable capturing the earthquake's magnitude. Tables C.5 and C.6 replicate Tables 5 and 6 in the paper with this control.

Table C.1: This table replicates Table 5 in the main paper, but includes Natural Disaster$_m$ as an additional control.

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.031**	0.033**	0.028**
	[0.013]	[0.012]	[0.012]
LDP or DPJ PR VS$_{m,t}$	0.212		0.485**
	[0.128]		[0.160]
LDP or DPJ SSD VS$_{m,t}$		-0.085	-0.185**
		[0.066]	[0.070]
Log(Transfers$_{m,t}$)	0.520***	0.519***	0.519***
	[0.021]	[0.021]	[0.021]
Fiscal Strength$_{m,t}$	-0.208*	-0.195*	-0.205*
	[0.106]	[0.106]	[0.106]
Log(Population$_{m,t}$)	-0.228	-0.175	-0.248
	[0.167]	[0.178]	[0.162]
Log(Income$_{m,t}$)	-0.548**	-0.525**	-0.547**
	[0.212]	[0.210]	[0.209]
Dependent Population$_{m,t}$	0.207	0.379	0.168
	[0.602]	[0.632]	[0.584]
Agriculture$_{m,t}$	0.226	0.306	0.137
	[0.564]	[0.587]	[0.568]
Population Density$_{m,t}$	0.000*	0.000**	0.000**
	[0.000]	[0.000]	[0.000]
Natural Disaster$_m$	0.057	0.055	0.055
	[0.033]	[0.034]	[0.033]
Constant	0.536	0.025	0.735
	[1.679]	[1.788]	[1.600]
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Observations	13,113	13,113	13,113
R-squared	0.557	0.557	0.558

Robust standard errors clustered at the bloc level in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table C.2: This table replicates Table 6 in the main paper, but includes Natural Disaster$_m$ as an additional control.

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.034***	0.039***	0.033***
	[0.008]	[0.008]	[0.008]
LDP or DPJ PR VS$_{m,t}$	0.466***		0.554***
	[0.088]		[0.100]
LDP or DPJ SSD VS$_{m,t}$		0.195***	-0.083
		[0.060]	[0.064]
Log(Transfers$_{m,t}$)	0.706***	0.710***	0.706***
	[0.017]	[0.018]	[0.017]
Asymmetry in Municipality Size$_{d,t}$	0.229	0.211	0.235
	[0.224]	[0.227]	[0.222]
Fiscal Strength$_{d,t}$	-0.200	-0.192	-0.203
	[0.151]	[0.160]	[0.150]
Agriculture$_{d,t}$	0.965	0.986	0.965
	[0.803]	[0.793]	[0.799]
Dependent Population$_{d,t}$	0.117	0.137	0.114
	[0.186]	[0.181]	[0.186]
Population Density$_{d,t}$	-0.059*	-0.047	-0.061*
	[0.032]	[0.033]	[0.031]
Log(Population$_{d,t}$)	0.018	0.020	0.018
	[0.059]	[0.059]	[0.059]
Log(Per Capita Income$_{d,t}$)	-0.032	-0.031	-0.032
	[0.079]	[0.085]	[0.078]
Log(Number of Municipalities$_{d,t}$)	-0.047	-0.038	-0.045
	[0.032]	[0.029]	[0.033]
LDP or DPJ Competitiveness$_{d,t}$	-0.071***	-0.120***	-0.043*
	[0.016]	[0.023]	[0.021]
Natural Disaster$_m$	0.005	0.001	0.005
	[0.020]	[0.022]	[0.020]
Constant	-1.460*	-1.382*	-1.490*
	[0.749]	[0.750]	[0.751]
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes
Observations	13,482	13,482	13,482
R-squared	0.756	0.756	0.756

Robust standard errors clustered at the bloc level in brackets
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table C.3: This table replicates Table 5 in the main paper, but includes categorical variable Seismic Intensity$_m$ as an additional control.

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.032**	0.034**	0.029**
	[0.013]	[0.012]	[0.012]
LDP or DPJ PR VS$_{m,t}$	0.226*		0.496***
	[0.119]		[0.154]
LDP or DPJ SSD VS$_{m,t}$		-0.081	-0.182**
		[0.066]	[0.070]
Log(Transfers$_{m,t}$)	0.517***	0.517***	0.517***
	[0.020]	[0.020]	[0.020]
Fiscal Strength$_{m,t}$	-0.218*	-0.204*	-0.215*
	[0.105]	[0.106]	[0.106]
Log(Population$_{m,t}$)	-0.235	-0.180	-0.254
	[0.172]	[0.182]	[0.166]
Log(Income$_{m,t}$)	-0.538**	-0.515**	-0.537**
	[0.215]	[0.213]	[0.213]
Dependent Population$_{m,t}$	0.216	0.394	0.178
	[0.598]	[0.630]	[0.581]
Agriculture$_{m,t}$	0.241	0.325	0.154
	[0.565]	[0.586]	[0.568]
Population Density$_{m,t}$	0.000*	0.000**	0.000**
	[0.000]	[0.000]	[0.000]
Seismic Intensity (Low)$_m$	-0.072	-0.068	-0.073
	[0.050]	[0.053]	[0.050]
Seismic Intensity (Medium)$_m$	0.116*	0.110*	0.113*
	[0.059]	[0.057]	[0.058]
Seismic Intensity (High)$_m$	0.127	0.136	0.139
	[0.348]	[0.337]	[0.330]
Constant	0.583	0.050	0.774
	[1.716]	[1.817]	[1.635]
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Observations	13,097	13,097	13,097
R-squared	0.557	0.557	0.558

Robust standard errors clustered at the bloc level in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table C.4: This table replicates Table 6 in the main paper, but includes categorical variable Seismic Intensity$_m$ as an additional control.

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.034***	0.039***	0.033***
	[0.008]	[0.008]	[0.008]
LDP or DPJ PR VS$_{m,t}$	0.466***		0.556***
	[0.087]		[0.098]
LDP or DPJ SSD VS$_{m,t}$		0.194***	-0.084
		[0.060]	[0.065]
Log(Transfers$_{m,t}$)	0.706***	0.710***	0.706***
	[0.017]	[0.018]	[0.017]
Asymmetry in Municipality Size$_{d,t}$	0.237	0.218	0.243
	[0.228]	[0.231]	[0.226]
Fiscal Strength$_{d,t}$	-0.209	-0.199	-0.212
	[0.149]	[0.160]	[0.148]
Agriculture$_{d,t}$	0.960	0.980	0.960
	[0.809]	[0.798]	[0.806]
Dependent Population$_{d,t}$	0.117	0.138	0.114
	[0.186]	[0.181]	[0.186]
Population Density$_{d,t}$	-0.055	-0.044	-0.058*
	[0.031]	[0.032]	[0.030]
Log(Population$_{d,t}$)	0.016	0.019	0.017
	[0.060]	[0.059]	[0.060]
Log(Per Capita Income$_{d,t}$)	-0.025	-0.025	-0.024
	[0.078]	[0.085]	[0.077]
Log(Number of Municipalities$_{d,t}$)	-0.047	-0.039	-0.045
	[0.032]	[0.029]	[0.033]
LDP or DPJ Competitiveness$_{d,t}$	-0.070***	-0.119***	-0.042*
	[0.016]	[0.023]	[0.021]
Seismic Intensity (Low)$_m$	-0.054	-0.053	-0.053
	[0.046]	[0.050]	[0.046]
Seismic Intensity (Medium)$_m$	0.004	-0.003	0.004
	[0.023]	[0.023]	[0.023]
Seismic Intensity (High)$_m$	0.318	0.304	0.324
	[0.432]	[0.430]	[0.425]
Constant	-1.443*	-1.366	-1.474*
	[0.759]	[0.760]	[0.761]
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes
Observations	13,467	13,467	13,467
R-squared	0.756	0.756	0.756

Robust standard errors clustered at the bloc level in brackets

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

Table C.5: This table replicates Table 5 in the main paper, but includes Earthquake Magnitude_m as an additional control.

	Dependent Variable: Log($\text{Transfers}_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.031**	0.033**	0.028**
	[0.013]	[0.012]	[0.012]
LDP or DPJ PR $\text{VS}_{m,t}$	0.212		0.485**
	[0.128]		[0.160]
LDP or DPJ SSD $\text{VS}_{m,t}$		-0.085	-0.184**
		[0.066]	[0.070]
Log($\text{Transfers}_{m,t}$)	0.519***	0.519***	0.519***
	[0.020]	[0.020]	[0.020]
Fiscal $\text{Strength}_{m,t}$	-0.208*	-0.195*	-0.205*
	[0.106]	[0.106]	[0.106]
Log($\text{Population}_{m,t}$)	-0.228	-0.176	-0.248
	[0.169]	[0.179]	[0.163]
Log($\text{Income}_{m,t}$)	-0.547**	-0.524**	-0.546**
	[0.211]	[0.208]	[0.208]
Dependent $\text{Population}_{m,t}$	0.210	0.382	0.170
	[0.603]	[0.632]	[0.585]
$\text{Agriculture}_{m,t}$	0.232	0.312	0.144
	[0.560]	[0.581]	[0.563]
Population $\text{Density}_{m,t}$	0.000*	0.000**	0.000**
	[0.000]	[0.000]	[0.000]
Earthquake Magnitude_m	0.008	0.008	0.008
	[0.005]	[0.005]	[0.005]
Constant	0.534	0.022	0.732
	[1.685]	[1.794]	[1.605]
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Observations	13,113	13,113	13,113
R-squared	0.557	0.557	0.558

Robust standard errors clustered at the bloc level in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table C.6: This table replicates Table 6 in the main paper, but includes Earthquake Magnitude$_m$ as an additional control.

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.033***	0.039***	0.032***
	[0.008]	[0.008]	[0.008]
LDP or DPJ PR VS$_{m,t}$	0.465***		0.553***
	[0.087]		[0.099]
LDP or DPJ SSD VS$_{m,t}$		0.195***	-0.083
		[0.060]	[0.065]
Log(Transfers$_{m,t}$)	0.706***	0.711***	0.706***
	[0.017]	[0.018]	[0.017]
Asymmetry in Municipality Size$_{d,t}$	0.229	0.211	0.235
	[0.225]	[0.228]	[0.223]
Fiscal Strength$_{d,t}$	-0.197	-0.189	-0.200
	[0.152]	[0.161]	[0.151]
Agriculture$_{d,t}$	0.953	0.974	0.953
	[0.804]	[0.793]	[0.800]
Dependent Population$_{d,t}$	0.118	0.138	0.115
	[0.186]	[0.181]	[0.186]
Population Density$_{d,t}$	-0.059*	-0.048	-0.062*
	[0.032]	[0.033]	[0.031]
Log(Population$_{d,t}$)	0.017	0.019	0.017
	[0.060]	[0.059]	[0.060]
Log(Per Capita Income$_{d,t}$)	-0.037	-0.036	-0.036
	[0.082]	[0.089]	[0.081]
Log(Number of Municipalities$_{d,t}$)	-0.047	-0.039	-0.046
	[0.032]	[0.030]	[0.033]
LDP or DPJ Competitiveness$_{d,t}$	-0.071***	-0.120***	-0.043*
	[0.016]	[0.023]	[0.021]
Earthquake Magnitude$_m$	-0.001	-0.002	-0.001
	[0.003]	[0.003]	[0.003]
Constant	-1.451*	-1.373	-1.481*
	[0.757]	[0.758]	[0.759]
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes
Observations	13,482	13,482	13,482
R-squared	0.756	0.756	0.756

Robust standard errors clustered at the bloc level in brackets

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

D Results with Another Measure of SSD Marginality

As the paper explains, $\text{Zombie}_{d,t}$ is a dummy variable that takes the value of 1 for municipalities in SSDs where the ruling party's candidate lost but was able to enter parliament via the PR tier, and 0 otherwise. Tables D.1 and D.2 replicate Tables 5 and 6 in the paper, replacing LDP or DPJ $\text{Competitiveness}_{d,t}$ with $\text{Zombie}_{d,t}$.

Table D.1: This table replicates Table 5 in the main paper, but includes $\text{Zombie}_{d,t}$ as an additional control.

	Dependent Variable: Log($\text{Transfers}_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.030**	0.032**	0.027**
	[0.013]	[0.013]	[0.012]
LDP or DPJ PR $\text{VS}_{m,t}$	0.214		0.486**
	[0.129]		[0.161]
LDP or DPJ SSD $\text{VS}_{m,t}$		-0.086	-0.185**
		[0.067]	[0.070]
Log($\text{Transfers}_{m,t}$)	0.522***	0.521***	0.522***
	[0.022]	[0.022]	[0.023]
Fiscal $\text{Strength}_{m,t}$	-0.208*	-0.195*	-0.205*
	[0.107]	[0.107]	[0.107]
Log($\text{Population}_{m,t}$)	-0.225	-0.172	-0.245
	[0.166]	[0.176]	[0.160]
Log($\text{Income}_{m,t}$)	-0.554**	-0.533**	-0.554**
	[0.217]	[0.215]	[0.214]
Dependent $\text{Population}_{m,t}$	0.184	0.357	0.145
	[0.597]	[0.632]	[0.581]
$\text{Agriculture}_{m,t}$	0.204	0.281	0.114
	[0.572]	[0.598]	[0.578]
Population $\text{Density}_{m,t}$	0.000*	0.000**	0.000**
	[0.000]	[0.000]	[0.000]
$\text{Zombie}_{d,t}$	0.008	0.002	0.004
	[0.009]	[0.009]	[0.009]
Constant	0.526	0.014	0.724
	[1.679]	[1.789]	[1.600]
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Observations	13,113	13,113	13,113
R-squared	0.557	0.557	0.558

Robust standard errors clustered at the bloc level in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table D.2: This table replicates Table 6 in the main paper, but includes $\text{Zombie}_{d,t}$ as an additional control.

	Dependent Variable: Log($\text{Transfers}_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.034***	0.039***	0.032***
	[0.008]	[0.008]	[0.008]
LDP or DPJ PR $\text{VS}_{m,t}$	0.422***		0.615***
	[0.089]		[0.092]
LDP or DPJ SSD $\text{VS}_{m,t}$		0.061	-0.152***
		[0.056]	[0.047]
Log($\text{Transfers}_{m,t}$)	0.706***	0.713***	0.706***
	[0.017]	[0.018]	[0.017]
Asymmetry in Municipality $\text{Size}_{d,t}$	0.242	0.233	0.244
	[0.228]	[0.234]	[0.226]
Fiscal $\text{Strength}_{d,t}$	-0.200	-0.195	-0.207
	[0.155]	[0.162]	[0.149]
$\text{Agriculture}_{d,t}$	1.178	1.191	1.035
	[0.810]	[0.781]	[0.822]
Dependent $\text{Population}_{d,t}$	0.085	0.108	0.101
	[0.182]	[0.181]	[0.190]
Population $\text{Density}_{d,t}$	-0.063*	-0.053	-0.065*
	[0.031]	[0.031]	[0.032]
Log($\text{Population}_{d,t}$)	0.018	0.021	0.018
	[0.060]	[0.059]	[0.059]
Log(Per Capita $\text{Income}_{d,t}$)	-0.026	-0.025	-0.028
	[0.080]	[0.084]	[0.077]
Log(Number of $\text{Municipalities}_{d,t}$)	-0.053	-0.037	-0.045
	[0.031]	[0.030]	[0.033]
$\text{Zombie}_{d,t}$	0.010	0.005	0.006
	[0.008]	[0.010]	[0.009]
Constant	-1.507*	-1.472*	-1.528*
	[0.750]	[0.743]	[0.752]
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes
Observations	13,482	13,482	13,482
R-squared	0.756	0.755	0.756

Robust standard errors clustered at the bloc level in brackets
*** p<0.01, ** p<0.05, * p<0.1

E Results With Another Measure of PR Bloc Marginality

To examine whether our findings are better explained by the ruling party's efforts to prevent a narrowly-won seat from being lost, we constructed an alternative marginality ranking. This calculates, for PR blocs where the ruling party captured the last seat allocated in the bloc, the number of votes it would have to *lose* for this seat to go to another party. We exclude PR blocs where the ruling party did not capture the last seat from this calculation because by definition, these are not blocs where the last seat won by the ruling party was 'narrowly-won'. For example, if the last seat won by the ruling party in an 8-seat district was the 7th seat, losing votes would likely relegate it to winning the 8th (and last) seat instead of the 7th. Only the loss of a relatively *large* number of votes would mean the total loss of this seat.

For PR blocs in which the ruling party captured the last seat, we calculated the number of additional votes each of the *other* parties contesting the bloc would need to capture it. For each bloc, the minimum of these indicates how narrowly-won the last seat was. We construct an alternative marginality ranking, which ranges from '1' to 'n', where n is the number of blocs in which the ruling party captured the last seat. The bloc coded 1 is the bloc whose last seat was most narrowly-won by the ruling party. Using this, we constructed 'Bloc (Narrowly-Won Last Seat)', a dummy coded '1 if the municipality's PR bloc was at the highest or second-highest position in this ranking and '0' otherwise. In 'Bloc (Narrowly-Won Last Seat)', we re-include PR blocs where the ruling party did not capture the last seat and code all of these '0'.

Tables E.1 and E.2 replicate Tables 5 and 6 but use 'Bloc (Narrowly-Won Last Seat)' instead of Marginal Bloc. The coefficient on Bloc (Narrowly-Won Last Seat) is significant in two of the three specifications leveraging over-time variation in the same municipality's location in a PR bloc, but not in the specifications that control for time-invariant and time-varying SSD-level differences. On balance, the evidence suggests that transfers are used to win the ruling party an additional seat, not to prevent a narrowly-won seat from being lost.

Table E.1: This table replicates Table 5 in the main paper, but replaces Marginal Bloc with Bloc (Narrowly Won Last Seat). Its coefficient is significant in Models 1 and 3.

	Dependent Variable: Log($\text{Transfers}_{m,t+1}$)		
	Model 1	Model 2	Model 3
Bloc (Narrowly Won Last Seat)	0.041*	0.036	0.038*
	[0.020]	[0.020]	[0.020]
LDP or DPJ PR $\text{VS}_{m,t}$	0.273**		0.543***
	[0.106]		[0.145]
LDP or DPJ SSD $\text{VS}_{m,t}$		-0.074	-0.185**
		[0.069]	[0.073]
Log($\text{Transfers}_{m,t}$)	0.519***	0.519***	0.519***
	[0.022]	[0.022]	[0.023]
Fiscal $\text{Strength}_{m,t}$	-0.220*	-0.205*	-0.216*
	[0.110]	[0.110]	[0.110]
Log($\text{Population}_{m,t}$)	-0.233	-0.169	-0.253
	[0.162]	[0.173]	[0.156]
Log($\text{Income}_{m,t}$)	-0.549**	-0.529**	-0.548**
	[0.233]	[0.230]	[0.228]
Dependent $\text{Population}_{m,t}$	0.239	0.432	0.197
	[0.620]	[0.655]	[0.595]
$\text{Agriculture}_{m,t}$	0.188	0.299	0.100
	[0.587]	[0.615]	[0.588]
Population $\text{Density}_{m,t}$	0.000	0.000*	0.000*
	[0.000]	[0.000]	[0.000]
Constant	0.580	-0.042	0.778
	[1.658]	[1.778]	[1.577]
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Observations	13,113	13,113	13,113
R-squared	0.557	0.557	0.558

Robust standard errors clustered at the bloc level in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table E.2: This table replicates Table 6 in the main paper, but replaces Marginal Bloc with Bloc (Narrowly Won Last Seat). Its coefficient is not significant in any specification.

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
Bloc (Narrowly Won Last Seat)	0.025	0.023	0.025
	[0.017]	[0.017]	[0.016]
LDP or DPJ PR VS$_{m,t}$	0.486***		0.589***
	[0.088]		[0.097]
LDP or DPJ SSD VS$_{m,t}$		0.198***	-0.098
		[0.059]	[0.061]
Log(Transfers$_{m,t}$)	0.705***	0.709***	0.705***
	[0.017]	[0.018]	[0.017]
Asymmetry in Municipality Size$_{d,t}$	0.210	0.192	0.218
	[0.221]	[0.224]	[0.220]
Fiscal Strength$_{d,t}$	-0.227	-0.219	-0.230
	[0.149]	[0.159]	[0.147]
Agriculture$_{d,t}$	1.075	1.112	1.073
	[0.909]	[0.906]	[0.901]
Dependent Population$_{d,t}$	0.114	0.130	0.111
	[0.216]	[0.212]	[0.215]
Population Density$_{d,t}$	-0.064*	-0.052	-0.068**
	[0.030]	[0.031]	[0.029]
Log(Population$_{d,t}$)	0.025	0.027	0.025
	[0.058]	[0.058]	[0.058]
Log(Per Capita Income$_{d,t}$)	-0.025	-0.027	-0.024
	[0.080]	[0.092]	[0.078]
Log(Number of Municipalities$_{d,t}$)	-0.051	-0.042	-0.049
	[0.031]	[0.029]	[0.033]
LDP or DPJ Competitiveness$_{d,t}$	-0.069***	-0.118***	-0.036*
	[0.016]	[0.023]	[0.019]
Constant	-1.538*	-1.452*	-1.573*
	[0.742]	[0.743]	[0.745]
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes
Observations	13,482	13,482	13,482
R-squared	0.756	0.755	0.756

Robust standard errors clustered at the bloc level in brackets
*** p<0.01, ** p<0.05, * p<0.1

F Results Without PR Blocs Where the Ruling Party Captured the Last Seat

Table F.1: This table replicates Table 5 in the main paper, but excludes municipalities located in PR blocs where the ruling party captured the last seat.

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.037**	0.038**	0.033**
	[0.014]	[0.014]	[0.014]
LDP or DPJ PR VS$_{m,t}$	0.442**		0.767***
	[0.188]		[0.188]
LDP or DPJ SSD VS$_{m,t}$		-0.064	-0.218**
		[0.106]	[0.085]
Log(Transfers$_{m,t}$)	0.454***	0.454***	0.452***
	[0.018]	[0.018]	[0.018]
Fiscal Strength$_{m,t}$	-0.187	-0.165	-0.186
	[0.127]	[0.128]	[0.126]
Log(Population$_{m,t}$)	-0.121	-0.017	-0.161
	[0.269]	[0.275]	[0.253]
Log(Income$_{m,t}$)	-0.563*	-0.539*	-0.562*
	[0.282]	[0.279]	[0.289]
Dependent Population$_{m,t}$	0.428	0.656	0.358
	[0.734]	[0.754]	[0.697]
Agriculture$_{m,t}$	0.388	0.504	0.272
	[0.797]	[0.851]	[0.819]
Population Density$_{m,t}$	0.000	0.000*	0.000*
	[0.000]	[0.000]	[0.000]
Constant	-0.926	-1.896	-0.528
	[2.684]	[2.740]	[2.514]
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Observations	9,290	9,290	9,290
R-squared	0.474	0.473	0.476

Robust standard errors clustered at the bloc level in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table F.2: This table replicates Table 6 in the main paper, but excludes municipalities located in PR blocs where the ruling party captured the last seat.

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
Marginal Bloc	0.037***	0.040***	0.035***
	[0.010]	[0.011]	[0.011]
LDP or DPJ PR VS$_{m,t}$	0.524***		0.630***
	[0.075]		[0.100]
LDP or DPJ SSD VS$_{m,t}$		0.226***	-0.098
		[0.050]	[0.067]
Log(Transfers$_{m,t}$)	0.700***	0.706***	0.700***
	[0.022]	[0.023]	[0.022]
Asymmetry in Municipality Size$_{d,t}$	-0.062	-0.083	-0.051
	[0.262]	[0.255]	[0.266]
Fiscal Strength$_{d,t}$	-0.121	-0.101	-0.128
	[0.170]	[0.188]	[0.171]
Agriculture$_{d,t}$	0.419	0.364	0.454
	[1.294]	[1.320]	[1.290]
Dependent Population$_{d,t}$	0.132	0.180	0.118
	[0.304]	[0.293]	[0.303]
Population Density$_{d,t}$	0.042	0.066	0.037
	[0.064]	[0.066]	[0.064]
Log(Population$_{d,t}$)	0.051	0.060	0.049
	[0.076]	[0.071]	[0.076]
Log(Per Capita Income$_{d,t}$)	-0.190*	-0.255*	-0.173
	[0.103]	[0.115]	[0.100]
Log(Number of Municipalities$_{d,t}$)	-0.070	-0.064	-0.067
	[0.042]	[0.036]	[0.044]
LDP or DPJ Competitiveness$_{d,t}$	-0.052	-0.104**	-0.021
	[0.031]	[0.035]	[0.020]
Constant	-1.860*	-1.834*	-1.869*
	[0.962]	[0.920]	[0.968]
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes
Observations	9,460	9,460	9,460
R-squared	0.749	0.748	0.749

Robust standard errors clustered at the bloc level in brackets
*** p<0.01, ** p<0.05, * p<0.1