Geographically-Targeted Spending in Mixed-Member Majoritarian Electoral Systems*

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Abstract

Can governments elected under mixed-member majoritarian (MMM) electoral systems use geographically-targeted spending to increase their chances of staying in office and if so, how? Despite its use in twenty eight countries around the world today, little research has addressed this question. We explain how MMM's combination of electoral rules and unlinked tiers creates a distinct strategic environment in which a large and small party can trade votes in one tier for votes in the other tier in a way that increases the number of seats won by both. Once in government, we explain how parties dependent on vote trading can use geographically-targeted spending to cement it. We test our propositions using original data from Japan (2003-2013) and Mexico (2012-2016). In both cases, we find that municipalities in which supporters split their ballots as instructed received more money after elections. Our findings have broad implications for research on MMM, distributive politics, and the politics of Japan and Mexico, respectively.

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If the switch from majoritarian electoral rules to proportional representation was the most common electoral reform of the 20th century, the switch to a mixed-member electoral system is proving to be the most common of the 21st.[1] Of the thirty eight countries using mixed-member systems to choose members of their Lower Houses today, twenty eight use a variant called 'mixed-member majoritarian' (MMM). At first glance, MMM resembles its more well known cousin, 'mixed-member proportional' (MMP), in that both select some legislators in a nominal tier (usually first-past-the-post in single-seat districts) and some in a list tier (usually closed-list proportional representation). There is a critical distinction between the two, however. Under MMM, the number of seats a party wins is the sum of those it wins in both tiers, whereas under MMP it is determined solely by those won in the list tier. This means that under MMM, parties seeking control of government have to be able to win seats in *both tiers*, as opposed to being able to concentrate on the list tier under MMP.[2]

We explain how MMM creates a strategic environment in which a large and small party can increase the number of seats won by forming an alliance and trading votes in one tier for votes in the other tier. Concretely, they can assign the candidacy of a given nominal tier district to one party and have both parties' supporters cast their nominal tier votes for this candidate and their list tier votes for the *other* party. With this trade, the party fielding the candidate trades list tier votes for nominal tier votes, thereby increasing its chances of winning another seat in the nominal tier. The party stepping back from competition in the nominal tier trades nominal tier votes for list tier votes, thereby increasing its chances of winning another seat in the list tier. We then explain how governing parties dependent on vote trading can use geographically-targeted spending to encourage their supporters to comply with this strategy, meaning split their votes accordingly. We point out that changes in vote shares can be used to discern whether supporters in a given geographic location complied.

To evaluate these propositions, we turn to Japan and Mexico. Together, these countries make up 20% of voters worldwide who elect members of their Lower Houses under MMM. We put together original data on voting behavior, government transfers, and other demographic and fiscal features of Japanese and Mexican municipalities. We use two-way fixed effect regressions to show that in both countries, municipalities in which supporters complied with the domi-

[1] Bormann and M. Golder 2013; Shugart and Wattenberg 2003a.

[2] Bawn and Thies 2003; Herron, Nemoto, and Nishikawa 2018; Reilly 2007; Shugart and Wattenberg 2003c.

nant coalition's vote trading strategy received more money after elections. Specifically, Japan's Liberal Democratic Party (LDP)-Komeito governing coalition used transfers to reward LDP supporters for switching their list tier votes to the Komeito in nominal tier districts in which the parties were running an LDP candidate (the Komeito stood down). In nominal tier districts in which the parties were running a Komeito candidate (the LDP stood down), the reverse was true: transfers were used to reward Komeito supporters for switching their list tier votes to the LDP. In Mexico's MMM system, voters cast a single 'fused' vote, which is used to allocate seats in both tiers. We find that the Institutional Revolutionary Party (PRI)-Ecological Green Party of Mexico (PVEM) coalition devised a means of converting this vote into *two* components. Discretionary transfers controlled by Mexico's Chamber of Deputies were used to reward PVEM supporters for switching the list component of their fused vote to the PRI in nominal tier districts in which the parties were running a joint candidate from the PVEM (not from the PRI).

Our study enriches our understanding of MMM and contributes to research on mixed-member systems, distributive politics, and the politics of Japan and Mexico, respectively. Existing research on coordination in MMM systems has focused mostly on parties' decisions to field joint candidates in nominal tier districts.[3] We extend this to offer a general theory for how the fielding of joint candidates in nominal tier districts is likely to be part of a broader coordination strategy that encompasses trades in both tiers. Existing research has also been unanimous in its presumption that coordination is not pursued in fused vote MMM systems.[4] When voters cast a fused vote, the only way a party can win votes in the list tier is by fielding candidates in nominal tier districts, which makes standing down unpalatable. We explain how parties can get around this problem by fielding the same (jointly-supported) candidate and appearing separately on the ballot. This means that the same candidate appears more than once, under the names of all the parties fielding her.[5] By assigning the candidacy to one party and having both parties' supporters vote for this candidate on the *other* party's list, parties can channel nominal tier votes toward one party and list tier votes toward the other. This increases the chance that the party fielding the candidate wins another seat in the nominal tier, while ensuring that regardless of this outcome, the other party gets all the list tier votes.

[3] Ferrara and Herron 2005; Riera 2013; Wang, Lin, and Hsiao 2016.
[4] Ferrara and Herron 2005; Rich 2015.
[5] To do this, parties fielding jointly-supported candidate must be permitted to present voters with separate lists.

Reflecting the fact that 33% of voters worldwide elect representatives via a mixed-member system, there is now a vast literature on their effects.[6] We extend this work to consider the effects of these systems on distributive politics and in particular, geographically-targeted spending. We already have compelling theories about how electoral systems in isolation influence whether and how governing parties use geographically-targeted spending to increase their chances of winning the next election.[7] What we do not have are theories about how the *combination* of electoral rules in a *mixed* system influences the way they do this. Mixed-member systems are not *absent* from research on distributive politics, but tend to be used as laboratories in which scholars can test whether their propositions about a *single* system hold up in a more controlled environment.[8]

Our findings lend support to the idea that mixed-member systems are better conceptualized as distinct strategic environments, whose outcomes are irreducible to either system in isolation.[9] Concretely, we show that the combination of electoral rules in an MMM system enables parties to win more seats by having their supporters switch one of their votes to an ally. Thus, MMM creates a distinct strategic environment in which parties can win more seats without having to win over new voters. It is unlikely that parties would be able to expand their seat share without having to convince at least *some* non-supporters to vote for them under any electoral system in isolation. In addition, we show that when governing parties are trading votes, it can make sense for a large governing party to direct resources at places where votes for it had declined. We would be unlikely to observe resources being distributed in this fashion, let alone parties *gaining seats* from doing so, under any electoral system in isolation.

A central question of interest in this literature is the extent to which mixed systems offer voters the 'best of both worlds', construed to mean representatives attentive to local concerns and parties capable of aggregating the concerns of broader swaths of voters.[10] Our study implies that MMM might be closer to what Jastramskis labels the 'worst of all worlds'.[11] Why? The way votes are converted into seats under MMM generates incentives for alliances to be formed between large and small parties on the basis of the complementary nature of their support bases.

[6] e.g. Bawn and Thies 2003; Herron, Nemoto, and Nishikawa 2018; E. Krauss, Nemoto, and Pekkanen 2012; Moser and Scheiner 2012; Naoi and E. Krauss 2009; Reilly 2007; Rich 2015; Shugart and Wattenberg 2003c; Thames and Edwards 2006.

[7] Ames 1995; Carey and Shugart 1995; Dahlberg and Johansson 2002; Rickard 2012; Tavits 2009.

[8] Kerevel 2015; Moser and Scheiner 2012; Pekkanen, Nyblade, and E. S. Krauss 2006; Stratmann and Baur 2002.

[9] K. E. Cox and Schoppa 2002.

[10] e.g. Kerevel 2010; Shugart and Wattenberg 2003c.

[11] Jastramskis 2019.

The fact that any small party with the right number of supporters in the right geographic area could be useful to a large governing party creates incentives for small parties to form and function as mercenaries. The more mercenary parties there are in a system, the more options a large governing party has in terms of alliance partner. Because mercenary parties will usually prefer a deal with a large *governing* party than with a large *opposition* party, by virtue of the former's control over resources, large opposition parties may face an uphill battle trying to unseat the government.

Our study also contributes to work on distributive politics. A large literature shows that majoritarian electoral systems encourage more pork-barreling than proportional representation,[12] and in a majoritarian system, spending is likely to be directed at 'marginal districts', where a large governing party needs a few extra votes to get over the finish line.[13] Because each additional district won in the nominal tier adds to a party's seat tally under MMM, as it does in a majoritarian system, then it makes sense for a large governing party to focus on acquiring additional votes in marginal districts in the nominal tier, just like a large governing party in a majoritarian system. The difference is that in a majoritarian system, large parties will have to convince *non-supporters* in marginal districts to vote for them. To the extent they have access to targetable resources, there are reasons to target them at non-supporters.[14] Under MMM, the presence of a second tier in which votes are also valuable gives large parties the option of using their *core supporters* to get those extra votes. By having their supporters split their votes and a small party's supporters do the same, large parties can win more votes in marginal districts without having to convince non-supporters to vote for them. Under MMM, then, geographically-targeted spending is likely to be a function of the degree to which both parties' supporters split their votes.

Our findings also shed new light on the inner workings of the coalitions that dominated Mexican and Japanese politics during the periods of study. Beyond the fact that vote trading likely contributed to both parties' dominance, it may also help explain why the coalition's policies do not always reflect the preferences of the smaller coalition partner. In Japan, the LDP-Komeito coalition has enacted changes to Japan's security policy that have left pundits scratching their heads as to why the Komeito, a pacifist party, acquiesced. It is possible that

[12] Carey and Shugart 1995; Funk and Gathmann 2013; Lancaster and Patterson 1990; Lizzeri and Persico 2001.
[13] McGillivray 2004; Ward and John 1999.
[14] Dixit and Londregan 1996; Golden and Min 2013; Stokes 2005.

geographically-targeted spending also functions as a tool to *buy* the smaller partner's support for policies it finds unpalatable. In support of this, Komeito supporters who switched their list votes to the LDP received considerably more spending on their communities than LDP supporters who switched their list votes to Komeito. The amount necessary to buy off the junior coalition partner may also vary systematically with the availability of alternative small parties with which the large party could forge trades with. We leave these important questions to future research.

1 Theory

Mixed-member systems are part of a broader class of multiple-tier electoral systems. In a multiple-tier system, seats are allocated in two or more overlapping sets of districts and voters are afforded either one or two votes to influence the allocation of seats in both tiers. For a multiple-tier system to qualify as a mixed-member system, one tier must involve the allocation of seats nominally (meaning that voters choose candidates by name and votes accrue to candidates) and the other must involve the allocation of seats to a party list (meaning that voters choose from among lists of candidates).[15] The idea behind a mixed-member system is to provide voters with parties capable of aggregating broad, society-wide interests (an advantage of proportional representation), as well as legislators capable of representing their local interests (an advantage of majoritarian systems).

1.1 Why Tier Linkage Matters

Mixed-member systems can be differentiated according to the electoral systems used in each tier, the district magnitude in each tier, the number of legislators elected in each tier, the number of votes voters cast, and other factors. A particularly important distinction is whether the results in each tier are kept separate from each other or linked. When they are *kept separate*, a party's seat tally is the sum of those it wins in both tiers.[16] If it wins 50% of votes in the list tier, it is entitled to 50% (or thereabouts) of the seats in that tier, plus however many seats it wins

[15] Herron, Nemoto, and Nishikawa 2018; Shugart and Wattenberg 2003b.

[16] The separate yet (relatively) equal nature of the tiers in unlinked systems is one reason not to call them 'tiers', due to the implied meaning that one is higher than the other (Gallagher and Mitchell 2005). We call them 'tiers' herein, while acknowledging that this is imperfect terminology.

in the nominal tier. This is a mixed-member majoritarian (MMM) electoral system. When the results in each tier are *linked*, a party's seat tally is determined primarily by its performance in the list tier, with seats won in the nominal tier functioning mostly as a mechanism to decide which of its candidates enter parliament.[17] If a party wins 50% of votes in the list tier, it is entitled to 50% of seats overall, regardless of how many it wins in the nominal tier. In a 100-seat parliament, then, it would be entitled to 50 seats. If, in addition to capturing 50% of list votes, it captures 30 seats in the nominal tier, then its 50 seats would be comprised of its 30 nominal tier winners, plus 20 candidates from its list. The tiers are 'linked' because the number of seats a party receives in the list tier is partially determined by the number it wins in the nominal tier. This is a mixed-member proportional (MMP) system.

If the idea behind a mixed-member system is to give voters the best of both worlds,[18] tier linkage is done to correct vote-seat distortions that arise from the nominal tier. Most mixed systems use first-past-the-post in single-seat-districts (hereafter, FPTP-SSDs) in the nominal tier. Under this system, the country is divided into numerous geographically-defined districts, voters have one vote, and the candidate capturing the most votes wins the seat. Because votes cast for losing candidates are wasted, outcomes can be wildly disproportionate, with larger parties typically winning a higher share of seats than ought to accrue to them based on vote share, with the opposite being true for small parties. A small party could capture a significant share of votes overall, but if none of its candidates placed first, would win no seats. By using list votes to determine a party's overall seat allocation, MMP dramatically reduces how much parties have to worry about outcomes in the nominal tier, thereby producing seat shares that are more proportional to a party's vote share.

Numerous scholars have pointed out that in mixed systems without tier linkage (MMM), parties have to win seats in both tiers, which induces them to behave differently from parties in mixed systems with tier linkage (MMP), who can concentrate on winning votes in the list tier.[19] We agree that parties are likely to behave differently, but for a different reason. When tiers are linked, votes in the nominal tier matter so little when it comes to deciding a party's seat allocation that a party could capture no votes in the nominal tier but still win a majority

[17] There are other ways in which the results in each tier can be linked, which we discuss below.

[18] Shugart and Wattenberg 2003c.

[19] e.g. Bawn and Thies 2003; Christensen and Selway 2017; Ferrara and Herron 2005; Herron, Nemoto, and Nishikawa 2018; Reilly 2007; Riera 2013; Shugart and Wattenberg 2003c; Thames and Edwards 2006; Wang, Lin, and Hsiao 2016.

of seats if it captured enough votes in the list tier. The fact that votes in the list tier are *vastly* more valuable than votes in the nominal tier makes it unlikely that any party could be convinced to give them up. When tiers are unlinked, in contrast, votes in both tiers are valuable from the perspective of allocating seats. It is not that votes in both tiers are *equally* valuable for all parties, it is that the value of votes in one tier is not dramatically overshadowed by the value of votes in the other. This creates a strategic environment in which it can pay off to give up votes in one tier for votes in the other.

1.2 How Vote Trading Can Work

Theories of electoral systems lead us to expect that large parties will find trades with small parties particularly fruitful under MMM, and vice versa. Why? The mechanics of how votes translate into seats in unlinked systems mean that large parties are likely to focus on winning additional seats in the nominal tier.[20] By virtue of being large, they will already be capturing a significant share of votes in the list tier and placing first in an enviable number of districts in the nominal tier. For them, the marginal impact of additional votes will be highest in nominal tier districts in which their candidates are in close races ('marginal districts').[21] The winner-take-all nature of the electoral systems used in nominal tier districts mean that in close races, a handful of additional votes can be sufficient to net the party an additional seat. Because votes translate into seats in a more proportional manner in the list tier, it will never be the case that a similarly small number of additional votes could net the party an additional seat. Large parties, then, will covet trades that will give them extra votes in close races in the nominal tier.

To solicit these additional votes, they can approach a small party. Small parties are likely to win the bulk of their seats in the list tier, where votes translate into seats in a more proportional manner than in the nominal tier. They will have supporters in nominal tier districts, but those supporters will rarely be numerous enough to make their own candidates competitive there. Knowing this, the large party could ask the small party to stand down in nominal tier districts where its candidates are in close races. Then, it could ask the small party to instruct its supporters there to cast their nominal tier ballots for the large party's candidate.[22] Because small

[20] Ferrara and Herron 2005.
[21] McGillivray 2004; Ward and John 1999.
[22] S. N. Golder 2006; Nemoto and Tsai 2016; Wang, Lin, and Hsiao 2016.

parties can expect extra list tier votes in nominal tier districts in which they field candidates,[23] they are unlikely to stand down without receiving something in return. The large party could offer to ask its supporters in those districts to cast their list tier votes for the small party. Such a trade would entail the supporters of both parties splitting their votes in these districts. Large party supporters would cast their *list tier* votes for the *small party*, while small party supporters would cast their *nominal tier votes* for the *large party*. If realized, such a trade would net the large party extra votes in close races in the nominal tier and the small party extra votes in the list tier. As a result, both can increase their seat share.

Thus far, we have presumed that voters have two votes to cast. In other unlinked systems, voters cast a 'fused vote', meaning they cast a single vote and this translates into a vote for the *candidate* in the nominal tier district and a vote for the candidate's *party* in the list tier. Under a fused vote, parties can only receive list tier votes when they field nominal tier candidates. Thus, stepping back from competition in a nominal tier district also means stepping back from competition in the list tier in that district. Studying the conditions under which parties field joint candidates in the nominal tier districts of mixed-member systems, Ferrara and Herron reasoned that fused ballots would dampen any incentives to do so.[24] Since then, studies of coordination in mixed-member systems have focused on systems where voters cast separate votes.[25]

We posit, in contrast, that unlinked systems with fused votes still entail the allocation of seats in two parallel tiers, which gives large and small parties incentives to trade votes in ways that increase the number of seats won. How could such trades be realized? A large and small party could agree to field the *same* (joint) candidate in a given nominal tier district, but present voters therein with *separate* party lists. Voters would thus be presented with a ballot upon which the name of the same candidate appears *twice*, next to the names of *both* coordinating parties. This gives voters who intend to vote for this candidate the ability to decide which of the two parties they want their fused vote to translate into a list tier vote for. If the parties strike a deal in which one party receives the candidacy in a nominal tier district in return for both parties' supporters voting for this candidate under the *other* party's list, then they have effectively parsed the fused vote into *two* components, one of which is cast for one party and the other which is cast for the other party. With such a trade, the party receiving the (joint)

[23] K. E. Cox and Schoppa 2002; Ferrara and Herron 2005.
[24] Ferrara and Herron 2005.
[25] Liff and Maeda 2019; Nemoto and Tsai 2016; Wang, Lin, and Hsiao 2016.

candidacy increases its chance of capturing an additional seat in the nominal tier, while the other party increases its chance of capturing an additional seat in the list tier.

In sum, regardless of whether voters cast one vote or two, the fact that votes in both tiers are valuable from the perspective of allocating seats under MMM means that a large and small party can gain from trading votes. Large parties have reason to trade list tier votes for nominal tier votes, while small parties have reason to trade nominal tier votes for list tier votes. At minimum, whether such trades are realized will be a function not only of parties' relative sizes, but also of synergies between their geographic distributions of support.

1.3 Why Geographically-Targeted Spending

Even though vote trading can pay off in terms of seats, it places a burden on voters who ordinarily support one of the coordinating parties. These supporters have to be told that, to maximize their preferred party's chances of winning the next election, they need to cast one of their votes for *another* party. Vote trading also carries risks for the coordinating parties. Both will fear being exploited by the other, where 'exploited' means one party instructs its supporters to switch one of their votes to the other party, but the latter does not reciprocate.[26] Not only would this yield a sub-optimal outcome in terms of seats, but it would also lead to a credibility loss in the eyes of one's supporters.

For these reasons, we posit that parties trading votes will use the material benefits under their control to encourage supporters to comply. A material benefit controlled by governing parties that will be particularly useful to this end is geographically-targeted spending. A large literature shows that governing parties are adept at using this type of spending to further their chances of remaining in office.[27] We posit that governing parties will promise to deliver funds to supporters who comply and withhold funds from supporters who do not.[28] Withholding money until after votes have been counted kills two birds with one stone: it eliminates the risk that supporters will pocket the money but not follow through on their promise to comply, and it eliminates the risk of being exploited by one's coordinating partner.

If material benefits are needed to cement vote trading, then why would a large governing party not use those benefits to *purchase* the additional votes it needs in close races in the nominal

[26] Nemoto and Tsai 2016.

[27] e.g. Dahlberg and Johansson 2002; Tavits 2009.

[28] An assumption we are making is that supporters are made aware of this.

tier directly? Because mobilizing supporters is cheaper than mobilizing non-supporters.[29] The costs of convincing a supporter to split her ballot on the grounds that this will increase her preferred party's chance of retaining office is smaller than the costs of convincing a non-supporter to vote for you. This is why, where possible, parties will prefer to work through their core supporters.[30] Under MMM, large parties will be focused on winning extra votes in close races in the nominal tier ('marginal districts'), just like they would under a pure majoritarian electoral system. The difference is that MMM gives large parties the tools to do so *through* their core supporters, while a majoritarian system would force them to to do by convincing non-supporters in marginal districts to vote for them. Where possible, parties will choose the former.

To gauge whether voters are splitting their votes accordingly, parties can use changes in vote shares in whatever geographic unit at which votes can be observed. A large party could verify that its supporters switched their list tier votes to a small party, for example, by examining whether list tier votes for itself went *down* as those for the small party went *up*. Using changes in vote shares to discern compliance rests on the assumption that perfect compliance – *every* supporter has split their vote – has not yet been reached. Because parties are coming together on the basis of whether they can supply votes needed by the other party (and not necessarily on the basis of ideological affinity or policy congruence), we anticipate that requests to split one's vote may be met with resistance initially. We anticipate this will diminish as the regime of rewards and penalties kicks in.

In sum, MMM encourages large and small parties with complementary geographic distributions of support to trade votes. When those parties are in government, they will have incentives to use geographically-targeted spending to cement the trade.

2 Cases of Mixed-Member Majoritarian

By our count, 28 countries around the world today use electoral systems qualifying as MMM. Within the family of MMM, systems vary according to whether tiers are completely independent ('pure MMM') or allow for 'partial linkage' based on vote transfers.[31] Systems in the latter category do not adjust the number of *seats* a party wins in one tier by the number it wins in the

[29] Dixit and Londregan 1996.
[30] G. W. Cox and McCubbins 1986.
[31] Shugart and Wattenberg 2003b.

other (otherwise they would be MMP), but do adjust the number of *votes* used to determine a party's seat allocation in one tier by the number of votes it receives in the other tier. Shugart and Wattenberg call these systems 'MMM with partial compensation'.[32] Like tier linkage based on seats, their effect is to redistribute seats away from large parties in favor of small ones, which compensates the latter for vote-seat distortions arising from the nominal tier. Because they reduce the seat bonus enjoyed by large parties by a lesser degree than tier linkage based on seats, they remain in the family of MMM.

Table 1 lists these countries. In the 'Pure MMM' category, the electoral systems used vary. In the nominal tier, most use FPTP-SSDs, but Senegal, Mauritania, Libya and Venezuela combine the use of FPTP-SSDs with multi-seat districts that use different electoral systems.[33] Andorra's nominal tier districts are all two-seat districts, for which it uses party bloc voting. Georgia, Lithuania, and Tajikistan use single-seat districts but require runoffs in the event no candidate wins a majority in the first round. In the list tier, most use closed-list proportional representation (CLPR), but Lithuania allows voters to cast preference votes for candidates on a party's list. Niger reserves nominal tier seats for under-represented minorities, while Pakistan and Zimbabwe use list tier seats for this purpose. In the Philippines, the number of seats parties can win in the list tier are subject to limits, but approximately 80% of legislators are elected via FPTP-SSDs in the nominal tier.[34] Monaco uses the same geographic district in both tiers.[35]

In the 'MMM with partial compensation' category, Korea has allocated 30 of its 47 list tier seats on a compensatory basis since 2019, but this is a small fraction of its 300-member legislature (the rest are elected via FPTP-SSDs). Hungary adjusts the votes used to determine a party's seat allocation in the list tier by the number of votes it wins in the nominal tier. Mexico places caps on the number of seats parties can win, which we describe below. Finally, countries in the 'MMM with majority-assuring provisions' category elect legislators in two unlinked tiers qualifying as nominal and list, but grant parties capturing a majority of votes in any list tier district all available seats in that district.

[32] Shugart and Wattenberg 2003b.

[33] In their multi-seat districts, Senegal and Mauritania use party bloc voting, Libya uses single-non-transferable vote (SNTV), and Venezuela uses bloc vote. Under party bloc voting, voters choose from among party lists and the list winning the most votes wins all available seats. Under SNTV, voters choose a candidate and the top M place-getters receive seats, where M is district magnitude.

[34] Note that the reservation of seats for under-represented groups may impact the likelihood of observing the vote-trading strategy outlined herein, especially in cases like the Philippines, where there are restrictions on which parties are allowed to compete in the list tier Hicken 2016.

[35] Monaco's electoral system is complex. Lundberg 2009 classifies it as MMM.

Table 1: Countries Using Mixed-Member Majoritarian For Lower House Elections

Type of MMM	**Countries**
Pure MMM	Andorra, Georgia, Guinea, Japan, Italy, Libya, Lithuania, Mauritania, Monaco, Nepal, Niger, Pakistan, Panama, Philippines, Russia, Senegal, Seychelles, Sudan, Taiwan, Tajikistan, Ukraine, Venezuela, Zimbabwe
MMM with partial compensation	Korea, Mexico, Hungary
MMM with majority-assuring provisions	Chad, Cameroon

Note: Data from International IDEA's Electoral System Design Database, the University of Michigan's Constituency-Level Election Archive (CLEA), ACE Electoral Knowledge Network, Inter-Parliamentary Union's Parline, Adam Carr's Election Archive, Shugart and Wattenberg 2003b, Jastramskis 2019, and Hicken 2016. Note that until an electoral reform in 2016, Italy employed vote transfers, which would have placed it in 'MMM with partial compensation'.

Notwithstanding this heterogeneity, what distinguishes all these systems from mixed systems with linked tiers is that votes in both tiers are valuable from the perspective of allocating seats. All countries in Table 1 with the exception of Andorra, Lithuania, and Monaco combine the use of FPTP-SSDs (not always exclusively) in the nominal tier with CLPR in the list tier. To evaluate our theory, we use two of these cases: Japan's Lower House, which has used separate vote MMM since 1996, and Mexico's Lower House, which has used its current version of fused-vote MMM since 1996.

3 Separate Vote MMM in Japan

Japan is a bicameral parliamentary system, of which the House of Representatives (HoR) is the more powerful House. HoR members serve four-year terms, but Prime Ministers can dissolve the HoR at any time. The HoR has used separate vote MMM to elect its members since an electoral reform in 1994.[36] Initially, 300 members were chosen via FPTP in SSDs and 200 members from party lists in eleven regional blocs according to CLPR. Over time, the number of members elected in both tiers has been reduced. As of 2017, 289 are chosen in SSDs and 176 via CLPR, for a total of 465. The number of seats in each CLPR bloc has been adjusted over time for population changes and currently ranges from 6 to 28. Votes cast in each CLPR bloc are used to apportion seats in that bloc, which is done via d'Hondt. In HoR elections, voters receive two ballots. On one, they write the name of their preferred SSD candidate. On the other, they write the name or abbreviation of their preferred party.

Formed in 1955, Japan's Liberal Democratic Party (LDP) captured majorities in every HoR election between 1958 and 1990, giving it uninterrupted control of government. In the 1993 election, it captured a plurality but lost control of government when other parties won enough seats between them to form a coalition government. In early 1994, this government introduced MMM. Midway through 1994, the LDP reentered government via a coalition of its own. Toward the end of 1999, the LDP convinced a small party, the Komeito, to join its coalition. The Komeito's religious underpinnings meant that the parties were unlikely bedfellows. Just three years earlier, LDP candidates had made "The Enemy is Komei" the 'centerpiece' of their campaign.[37] For years, LDP politicians had even argued that the Komeito's existence threatened the constitutional principle that religious organizations could not exercise political authority.[38] Helpfully, though, the Komeito had a history of preelectoral coordination.[39] The LDP-Komeito coalition has proved durable: the two parties have governed together ever since, with the exception of 2009-12.[40]

The LDP and Komeito began coordinating in the first election the partners faced, in 2000. Initially, leaders concentrated on how to divvy up SSDs. The LDP reportedly floated the idea of standing down in as many as 25 SSDs in favor of Komeito candidates.[41] It ended up running in 271 SSDs, while the Komeito ran in 18. In 4 of the 18, both parties ran candidates. By the 2003 election, they had stopped competing against each other in any SSD. In this and all subsequent HoR elections, LDP candidates have run in approximately 90% of SSDs (and Komeito candidates

[36]Prior to 1994, it used SNTV in multi-seat districts.
[37]Reed and Shimizu 2009, p. 38.
[38]Liff and Maeda 2019, p. 59.
[39]Christensen 2000; McLaughlin 2018.
[40]The LDP-Komeito coalition lost the 2009 election, but regained control of government with a landslide win in 2012.
[41]Reed and Shimizu 2009.

have stood down) and Komeito candidates have run in approximately 3% of SSDs (and LDP candidates have stood down).[42] Moreover, standing down has been accompanied, in the vast majority of SSDs, by explicit 'recommendations' that one's supporters cast their SSD votes for the other party's candidate. While in 2000, the LDP recommended 14 of the Komeito's 18 SSD candidates, since 2003 it has recommended all of them. In 2000, the Komeito recommended 58% of the LDP's SSD candidates. This percentage has risen since then, reaching 96% in 2017.[43]

Newspaper articles from the 2000 election describe how the parties went about exhorting their supporters to split their votes. Around the country, local Komeito chapters held town hall-style meetings, oftentimes attended by thousands, in which they explained to supporters that they needed to cast their SSD votes for the LDP candidate. Standard practice appears to be inviting prominent members of the LDP candidate's camp to attend and having them publicly pledge to deliver PR votes to the Komeito in return.[44] As the theory predicts, LDP candidates in close races were especially solicitous of Komeito SSD votes and thus appear to have made more of an effort to deliver PR votes in return.[45] In many cases, LDP candidates relied on LDP-affiliated local assembly members and organizations to do this. Local assembly members held small meetings in which they asked their supporters to vote Komeito in PR.[46] Organizations such as Japan Trucking, Prefectural Hospitals, or agricultural cooperatives publicly pledged to deliver 'every single one of my organization's PR votes to the Komeito'.[47] On occasion, LDP candidates shared their supporters' names and addresses with the local Komeito chapter, who proceeded to visit supporters' homes to solicit their votes.[48] In other cases, the LDP candidate attended one of the Komeito's town halls with their supporters and had both sides publicly pledge to split their votes.[49]

In 'LDP SSDs', then, it is generally believed that the Komeito instructs its supporters to cast their SSD votes for the LDP's candidate (and their CLPR votes for the Komeito) in exchange for the LDP candidate instructing its supporters to cast their CLPR votes for the Komeito

[42] Calculated from the number of SSDs where LDP candidates ran and Komeito candidates did not, and Komeito candidates ran and LDP candidates did not, respectively, in D. M. Smith and Reed 2018.

[43] Liff and Maeda 2019, p. 61.

[44] Asahi Shimbun 2000d,f.

[45] Asahi Shimbun 2000a.

[46] Asahi Shimbun 2000e.

[47] Asahi Shimbun 2000c,d.

[48] Reed and Shimizu 2009.

[49] Asahi Shimbun 2000b.

(and their SSD votes for the LDP's candidate).[50] Less is known about 'Komeito SSDs', where LDP candidates are standing down. Our theory concentrated on explicating the benefits to a large party of having a small party stand down in nominal tier districts in which its candidates need extra votes. As a result of differences in parties' geographic distributions of support, however, it is possible that the small party's candidate could be stronger than the large party's candidate in certain SSDs, such that the large party could decide to stand down in those SSDs in exchange for CLPR votes from the small party. We know much less about Komeito SSDs, but our theory leads us to expect that LDP supporters will be instructed to cast their SSD votes for the Komeito's candidate (and their CLPR votes for the LDP) in exchange for the Komeito candidate instructing its supporters to cast their CLPR votes for the LDP (and their SSD votes for their party's candidate).

We expect that the LDP-Komeito coalition will try to elicit compliance by making the distribution of valued geographically-targeted funding conditional upon it. In Japanese elections, votes are counted at the level of the municipality and almost all municipalities are contained within a single SSD.[51] Being able to observe how many CLPR votes were cast for each party in each municipality gives the coalition the tools to verify whether their supporters complied. Concretely, in LDP SSDs, compliance can be verified by examining whether CLPR votes for the LDP declined as those for the Komeito increased in municipality m relative to the previous election. In Komeito SSDs, compliance can be verified by examining whether CLPR votes for the Komeito declined as those for the LDP increased.

Our claim that HoR politicians make the distribution of government resources to municipalities contingent upon their voting behavior has support in the Japanese politics literature.[52] These and other studies credit a potent mix of conditions facilitating this: municipalities' dependence on the central government for resources; the large pool of 'national treasury disbursements' (NTD) made available by the central government each year, which is allocated at the discretion of bureaucrats for the purpose of funding projects in municipalities; and the ability of LDP incumbents to discern how municipalities vote and lean on bureaucrats to allocate NTD in ways

[50] Klein 2013; D. M. Smith 2014.

[51] Our empirical analysis focuses on the 2003, 2005, and 2012 HoR elections. In these, 1%, 3.6%, and 9% of municipalities, respectively, spanned more than one SSD. The number changed because municipal mergers reduced the number of municipalities.

[52] Catalinac, Mesquita, and A. Smith 2020; Saito 2010.

that benefit certain municipalities over others.[53] There is no question that NTD is a valued resource: approximately 16% of the average municipality's revenue in 2015 came from this type of transfer.[54] Concretely, we test the following:

- **Hypothesis I**: Municipalities in LDP SSDs (where LDP candidates run and Komeito candidates stand down) are rewarded with more NTD after elections when they increase CLPR votes for the Komeito and decrease them for the LDP.
- **Hypothesis II**: Municipalities in Komeito SSDs (where Komeito candidates run and LDP candidates stand down) are rewarded with more NTD after elections when they increase CLPR votes for the LDP and decrease them for the Komeito.

4 Fused Vote MMM in Mexico

Mexico is a presidential federal republic, with a bicameral legislature. Parties seek a majority of seats in the 500-member Chamber of Deputies (CoD) to shape the legislative process and lead negotiations over the Federal Expenses Budget, which is proposed by the President but requires approval by the Chamber. The Senate is smaller; comprising only 128 Members. Senators do not have the same influence over the Federal Expenses Budget as Deputies. A mixed-member system has been used to select members of the CoD since 1964. The current version is MMM with partial compensation and has been in place since 1996.[55] Its incorporation of a cap against over-representation is what disqualifies it from pure MMM.[56] In it, 300 Deputies are elected in SSDs and 200 via CLPR in five regional constituencies. Each constituency elects 40 Deputies. Deputies serve three-year terms. Following an electoral reform in 2014, Deputies elected in and after 2018 are, for the first time since the 1930's, permitted to seek consecutive reelection.[57] In elections, voters receive a single ballot, upon which appears a series of party-candidate combinations. They mark the combination for whom they wish to vote. This translates into a vote for the candidate in the SSD race and her party in the CLPR race.[58]

[53] e.g. Hirano 2006; Horiuchi and Saito 2003; Reed 1986; Saito 2010; Scheiner 2006.
[54] Yamada 2016.
[55] Weldon 2003.
[56] This cap is explained in Section A of the Supplementary Material.
[57] Motolinia 2020.
[58] Other pertinent details of Mexico's MMM system are explained in Section B of the Supplementary Material.

Formed in 1929, Mexico's Institutional Revolutionary Party (PRI) controlled an absolute majority in the CoD until the 1997 election, when economic crisis and social unrest prompted enough voters to cast their ballots for other parties.[59] This proved the harbinger for the election of the first non-PRI-affiliated President in more than seventy years in 2000, credited as evidence of Mexico's transition to democracy. The PRI held onto a plurality in the CoD during this President's administration, only to lose it in 2006, when a presidential election held concurrently with legislative elections gave momentum to two opposition parties. This relegated the PRI to third-largest party, a position it held until 2009, when it regained a plurality. It controlled in excess of 40% of CoD seats until 2018, when another concurrently-held election saw a coalition of parties excluding the PRI regain the presidency and majorities in the CoD and Senate.

At least since Mexico's transition to democracy, coordination has been a staple among parties contesting elections at all levels.[60] In 2003, the PRI convinced a small party, the Ecological Green Party of Mexico (PVEM), to ally with it in the CoD and coordinate with it in elections. Founded in 1993, the PVEM allied with the National Action Party (PAN) in the 2000 election, helping to facilitate the alternation of power. While the PVEM's ideological leanings are to the right of the PRI, its choice of coordinating partner appears to be motivated mainly by the desire to survive.[61] Since 2003, the PRI-PVEM coalition has coordinated in all elections.[62]

How does their coordination work? Under fused vote MMM, coordinating parties can field joint SSD candidates. Since 2007, parties fielding joint SSD candidates have also been permitted to present separate party lists. Doing so means that in 'alliance SSDs', voters are presented with a ballot upon which the *same* candidate appears under the names of *all* coordinating parties. Voters voting for the joint candidate thus have the option of choosing which of the candidate-party combinations they prefer. They can choose all or a subset of these. When a voter chooses the joint candidate under more than one coordinating party, one vote is recorded for the joint candidate in the SSD race and one vote is divided up among the chosen coordinating parties for the purpose of allocating CLPR votes.[63]

Our theory leads us to expect that in this setting, the PRI will propose fielding joint can-

[59] Magaloni 2006.

[60] Kellam 2017.

[61] Spoon and Pulido Gomez 2017.

[62] Casar 2012.

[63] How votes cast for more than one coordinating party translate into CLPR votes for those parties is explained in Section C of the Supplementary Material.

didates with the PVEM in SSDs where it anticipates a tough race. Then, it can offer the candidacies of some of those alliance SSDs to the PVEM in exchange for the PVEM instructing its supporters in those SSDs to vote for the joint candidate exclusively under the PRI's list. With this strategy, the PVEM benefits from having all votes cast for both parties count as votes for its SSD candidate. The PRI, on the other hand, insures itself against the possibility that the PVEM-affiliated joint candidate loses. When all votes for this candidate are cast under the PRI's list, then regardless of whether or not the candidate wins, the PRI gets to keep these votes, which translate into CLPR seats.[64]

Studies of PRI-PVEM coordination have focused on coordinated entry into SSDs.[65] Evidence that PRI politicians incorporated CLPR votes into trades forged with other parties in previous periods comes from Weldon. He cites interviewees in 1985, when the CoD used a version of separate vote MMM, who told him that voters were instructed to cast one of their ballots for the PRI and the other for its coordinating partner.[66] More recently, local newspaper articles describe how the PRI and PVEM exhorted their supporters to follow their electoral strategies. These include directly instructing supporters to cast their votes for the other party,[67] forming brigades to promote voting for one party but not the other in SSDs where the parties fielded joint candidates,[68] and distributing flyers encouraging supporters to vote for both parties.[69]

Further evidence, albeit indirect, comes from the affiliations of the two parties' joint candidates. In the first two elections in which joint candidates were fielded (2003 and 2006), the PRI kept more than 92% of the joint candidacies. In 2007, an electoral reform permitted coordinating parties to present separate lists.[70] This is when we expect the PRI would begin to exchange SSD candidacies for CLPR votes. In every election since 2007, the number of joint candidacies the PRI has kept for itself declined. Whereas it kept 90% in 2009, this dropped to 78% in 2012 and then 77% in 2015.[71]

[64]Mexico's proportionality restriction and rules governing the allocation of publicly-provided campaign funds generate additional incentives for large parties to seek CLPR votes. These are explained in the Supplementary Material's Section A.

[65]Montero 2016; Spoon and Gomez 2018; Spoon and Pulido Gomez 2017.

[66]Weldon 2003, p. 4.

[67]Ciudadania Express 2012.

[68]Parola 2016.

[69]Escamilla 2018.

[70]Until 2007, parties fielding joint candidates had to present joint lists. Because these lists were closed, the parties had to decide ahead of time which position would be filled by a candidate of which party. We anticipate that coordination would have involved exchanges of SSD candidacies for choice positions on the joint list.

[71]Even if we treat 'watermelon' candidates (PVEM affiliates who were former PRI politicians) as PRI candidates,

We posit that when the PRI-PVEM coalition controlled enough seats to dominate the CoD, they tried to elicit compliance by making the distribution of geographically-targeted spending conditional upon it. Votes in Mexican elections are counted and reported at the polling station and easily aggregated to municipality. The great majority of municipalities are nested within SSDs.[72] Concretely, we posit that compliance can be verified by examining whether, in SSDs with PVEM-affiliated joint candidates, votes cast for the joint candidate under the PRI label increased as votes cast for the joint candidate under the PVEM or both parties' labels decreased in municipality m relative to a previous election.

For many years, government resources in the form of 'patronage, pork and spoils' were the 'glue' that bound voters to the PRI's 'party-led hegemonic regime'.[73] Almost every study to date has focused on how Presidents wield geographically-targetable resources such as allocations to municipalities under the poverty relief program 'PRONASOL',[74] conditional cash transfers,[75] and other federal transfers.[76] Hiskey provides evidence that these resources are distributed *after* elections, once vote shares have been verified.[77] The fact that a President's budget requires CoD approval, however, creates room for Deputies to add amendments furthering their interests. Kerevel finds that Deputies alter the President's budget to "a substantial degree" and documents a relationship between the number of SSD-targeted amendments added by Deputies and the tier from which they are elected.[78]

We posit that the PRI-PVEM coalition used the as-yet unstudied 'Municipal and State Infrastructure Strengthening Fund' ('FORTALECE') to elicit compliance. Dubbed the "handouts fund" ('fondo para moches') by the news media,[79] it fell under the 'Economic and Salary Provisions' section of the federal budget and consisted of annual allocations to municipalities that were added as amendments by Deputies.[80] Like NTD in Japan, these allocations were awarded

the number of SSD candidacies the PRI kept for itself was similar in 2003 and 2006 (96%) and begins declining after the reform (95% in 2009, 91% in 2012, and 87% in 2016 (Spoon and Gomez 2018).

[72]Our empirical analysis focuses on the 2012 and 2015 CoD elections. In these, only 2.5% of municipalities spanned more than one SSD.

[73]Magaloni 2006.

[74]Collier 1992; Hiskey 1999; Molinar and Weldon 1994.

[75]De La O 2015.

[76]Campos, A. Garcia, and Ruiz 2018; Costa-I-Font, Rodriguez-Oreggia, and Lunapla 2003; Rodriguez-Oreggia and Rodriguez-Pose 2004.

[77]Hiskey 1999.

[78]Kerevel 2015.

[79]e.g. Jimenez and Alcantara 2016.

[80]A telephone interview with an official from Mexico's Budget Transparency Agency confirmed that this fund is entirely under the control of Deputies (August 22, 2018, New York-Mexico City).

for specific projects, which municipalities had to apply for.[81] In 2015, a total of 10 billion pesos (approximately $500 million USD) were allocated to municipalities under this fund.[82] These allocations are valued: in 2016, 70% of the average Mexican municipality's income came from federal transfers.[83] Unlike NTD in Japan, which have been available for decades, FORTALECE funds appear in the budget only in the period 2013-17, which limits our analysis to this period.[84] Concretely, we test the following:

- **Hypothesis III**: Municipalities in SSDs with PVEM-affiliated joint candidates are rewarded with more FORTALECE after elections when they increase votes for this candidate under the PRI label and decrease them under the PVEM or both parties' label.

5 Data

We assembled original data on all municipalities in Japan (1996-2013) and Mexico (2011-16). For Japan, election returns come from JED-M[85] and NTD comes from Nikkei NEEDs, supplemented where necessary with data from official government sources.[86] We also used Nikkei NEEDs for the standard control variables used in research on transfers:[87] per capita income, population, fiscal strength, proportion of residents employed in agriculture, proportion of residents aged 15 and under, proportion of residents aged 65 and over and population density.[88] For Mexico, elections data is from the National Electoral Institute.[89] For FORTALECE, we relied on the relevant section of the Federal Expenses Budget for allocations in 2013[90] and on data collected by the Ministry of Finance and Public Credit's Budget Transparency Project for allocations

[81] This fund consisted of four separate funds until 2016, when they were combined into one. We combine allocations under each of the four for the years before 2016 (I. Garcia 2017).

[82] Cervantes 2017.

[83] IMCO 2018.

[84] In late 2017, the head of the PRI's parliamentary CoD group, Cesar Camacho, announced that the PRI had decided to 'remove any present or future temptation' for Deputies to 'steer funds toward municipalities of their choosing' by eliminating the fund (Expansion 2017).

[85] Mizusaki and Mori 2014.

[86] The NEEDs data is described here.

[87] Horiuchi and Saito 2003.

[88] The first three are measured annually. The second three are measured in censuses 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 a government calculation of the proportion of the cost of delivering services that a municipality can finance with revenue derived from taxation.

[89] INE 2018.

[90] Camara de Diputados 2012.

from 2014 until 2017.[91] We collected data on the following control variables: state of emergency declarations, population and poverty, municipality size, and their designation as urban or rural.[92]

6 Rewarding Vote Trading in Japan

To examine Hypothesis I, we restricted our analysis to Japanese municipalities located exclusively within LDP SSDs (those with LDP candidates and without Komeito candidates) in the 2003, 2005, and 2012 HoR elections.[93] Table 2 presents the results of fixed effect regressions using this sample of 4,497 municipalities. The dependent variable is Log($\text{Transfers}_{m,t+1}$): the logarithm of per capita NTD received by municipalities in the fiscal years following the 2003, 2005, and 2012 HoR elections. We have three independent variables of interest. One, ΔKomeito PR $\text{VS}_{m,t}$ is the change in share of municipality m's voting population who cast their PR votes for the Komeito at time t (the current election) relative to the previous election (with higher scores indicating greater *increases* in share of voting population who voted Komeito in PR). Two, Negative ΔLDP PR $\text{VS}_{m,t}$ is the change in share of municipality m's voting population who cast their PR votes for the LDP at time t (the current election) relative to the previous election, multiplied by -1 (with higher scores indicating greater *decreases* in share of the voting population who voted LDP in PR). Three, the interaction of ΔKomeito PR $\text{VS}_{m,t}$ and Negative ΔLDP PR $\text{VS}_{m,t}$ captures the effect of a simultaneous *increase* in share of a municipality's voting population who voted Komeito in PR and *decrease* in share of its voting population who voted LDP in PR.[94]

In all models, SSD-year fixed effects control for features of a municipality's SSD in a given election that could influence the amount of transfers received by all municipalities therein. These could include whether the coalition's candidate was victorious or whether the SSD ended up

[91] Transparencia Presupuestaria 2018.

[92] For the first variable, we used data from the Governance Ministry's Civil Protection Office. (SEGOB 2018) For the second and third, we relied on data compiled by the National Population Council (CONAPO 2017). For the latter two, we relied on the National Institute of Statistics and Geography. (INEGI 2017) Municipalities are defined as rural if they contain less than 2,500 people, and in a state of emergency if a natural disaster has placed a municipality at imminent risk.

[93] We begin our analysis in 2003 because this was the first election after the two parties began coordinating where our three independent variables are observed (the Komeito did not run as a separate party in 1996, meaning that ΔKomeito PR $\text{VS}_{m,t}$ is not observed in 2000). We exclude 2009 because the LDP-Komeito coalition lost the 2009 election, meaning it was not in control of transfers in 2010.

[94] We use shares of eligible voters rather than raw numbers of PR votes to account for the fact that municipalities vary greatly in size, even within the same SSD. Descriptive statistics are in Section D of the Supplementary Material. We present summarized results here. The full specification, which includes coefficients on the control variables, is presented in Section E of the Supplementary Material.

with *two* HoR representatives (due to a candidate from one party winning and a candidate from another party losing but then entering parliament via the PR tier).[95] Our inclusion of SSD-year fixed effects means that we are comparing the amount of transfers received by municipalities in the same SSD-year. In Models 2 and 4, we add municipality fixed effects. This controls for time-invariant features of a municipality that could influence the amount of transfers it receives, such as its ability to put together proposals for projects for which to seek funding and build a consensus around those projects. Municipality fixed effects enable us to leverage changes in the *same* municipality's level of compliance with the coalition's vote trading strategy over time.

All models in Table 2 also include the following time-varying municipality-level controls: 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. All models also include the logarithm of per capita transfers received by the municipality the year of the election. The lagged dependent variable helps us guard against the possibility that a municipality's voting behavior has no independent effect on transfers once the transfers it received the year of the election are accounted for. If this was the case, it would suggest that another factor was causing municipalities to exhibit greater compliance in elections *and* receive more transfers.[96] Models 3 and 4 include an additional control: ΔLDP SSD $\text{VS}_{m,t}$, which captures the change in share of municipality m's voting population casting their SSD votes for the LDP candidate at time t relative to the previous election. This controls for the possibility that changes in electoral support for the LDP's SSD candidate could be driving any observed effect of ΔKomeito PR $\text{VS}_{m,t}*$ Negative ΔLDP PR $\text{VS}_{m,t}$ on transfers. Finally, because the nature of a municipality's SSD determines how LDP and Komeito supporters are supposed to cast their PR votes, we cluster standard errors by SSD.

The positive, significant coefficients on ΔKomeito PR $\text{VS}_{m,t}*$ Negative ΔLDP PR $\text{VS}_{m,t}$ (all models) show that in LDP SSDs, controlling for time-invariant and time-varying municipality-

[95] Japan permits dual candidacy, meaning a candidate can run in an SSD and appear simultaneously on a party's list (enabling her to win a list seat in the event she loses her SSD) (Pekkanen, Nyblade, and E. S. Krauss 2006).

[96] Model 2 and 4's inclusion of municipality fixed effects and a lagged dependent variable means that coefficients in these specifications are vulnerable to a bias first described by Nickell 1981. Unfortunately, no good solution exists. We include both because we have reasons to worry about time-invariant *and* time-varying municipality-level features that influence transfers. Angrist and Pischke 2009, chapter 5, however, suggest that researchers can increase confidence in their results by presenting similar results across slightly different specifications. In Table 2, the results in Models 1 and 3, which use the lagged dependent variable but not the fixed effect, are similar to the results in Models 2 and 4, which use both. In Section E of the Supplementary Material, we present Models 2 and 4 (which use the fixed effect) without the lag. The coefficients on ΔKomeito PR $\text{VS}_{m,t}*$ Negative ΔLDP PR $\text{VS}_{m,t}$ remain significant and slightly increase in size.

Table 2: In LDP SSDs, municipalities that increased PR votes for the Komeito while decreasing them for the LDP in the 2003, 2005, and 2012 HoR elections were rewarded with more money after elections. Municipalities that decreased PR votes for the LDP (without changes to Komeito PR vote share) were penalized with less money, while municipalities that increased PR votes for the Komeito (without changes to LDP PR vote share) were neither penalized nor rewarded.

	Dependent Variable: Log(Transfers$_{m,t+1}$)			
	Model 1	Model 2	Model 3	Model 4
ΔKomeito PR VS$_{m,t}$* Negative ΔLDP PR VS$_{m,t}$	0.00249***	0.00211**	0.00249***	0.00210***
	[0.00093]	[0.00081]	[0.00093]	[0.00081]
ΔKomeito PR VS$_{m,t}$	-0.00518	-0.00018	-0.00518	-0.00111
	[0.00778]	[0.00851]	[0.00808]	[0.00859]
Negative ΔLDP PR VS$_{m,t}$	-0.00996**	-0.00913**	-0.00997**	-0.00717
	[0.00399]	[0.00434]	[0.00420]	[0.00497]
ΔLDP SSD VS$_{m,t}$			-0.00001	0.00162
			[0.00203]	[0.00210]
Log(Transfers$_{m,t}$)	0.72027***	0.49787***	0.72027***	0.49762***
	[0.02646]	[0.03422]	[0.02647]	[0.03409]
Constant	-1.82202***	9.14976***	-1.82202***	9.36568***
	[0.29620]	[3.27514]	[0.29612]	[3.30196]
Controls	Yes	Yes	Yes	Yes
SSD-Year FE	Yes	Yes	Yes	Yes
Municipality FE		Yes		Yes
Observations	4,497	4,497	4,497	4,497
R-squared	0.80792	0.75881	0.80792	0.75888
Number of municipalities		2,293		2,293

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

level features, as well as features of the municipality's SSD-year and changes in electoral strength of the LDP's SSD candidate, municipalities that increased PR votes for the Komeito while decreasing them for the LDP in the 2003, 2005, and 2012 HoR elections received more money after elections. Substantively, Model 1 shows that a one percentage point increase in ΔKomeito PR $VS_{m,t}$ in a municipality where the share of eligible voters casting PR votes for the LDP *declined* by 10% (Negative ΔLDP PR $VS_{m,t}$=10) is predicted to *increase* the amount of NTD received by 1,139 yen per person (approximately $10.50 USD). In contrast, the same one percentage point increase in ΔKomeito PR $VS_{m,t}$ in a municipality where the share of eligible voters casting PR votes for the LDP *increased* by 10% (Negative ΔLDP PR $VS_{m,t}$=-10) is predicted to *decrease* the amount of NTD received by 1,695 yen per person (approximately $15.60 USD). These average marginal effects, with their 95% confidence intervals, are displayed in Figure 1. Their substantive effects are summarized in Table 3.[97] Hainmueller, Mummolo, and Xu 2019 explain why valid inferences as to the effects of an interaction with at least one continuous variable can be drawn only after researchers have verified that the interaction effect is linear and there is sufficient common support for the moderator. Section E implements their diagnostics, which support both assumptions.

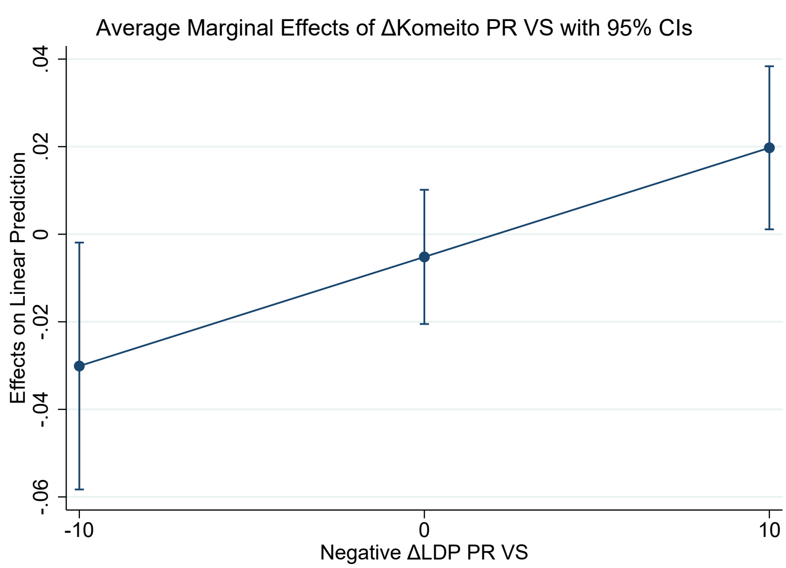

Figure 1: The average marginal effect of a one percentage point increase in ΔKomeito PR $VS_{m,t}$ with 95% confidence intervals at different levels of Negative ΔLDP PR $VS_{m,t}$ in LDP SSDs (from Table 2's Model 1).

[97] Average marginal effects were calculated with other continuous variables held constant at their sample means.

Table 3: Substantive effects on transfers of the average marginal effect of a one percentage point increase in ΔKomeito PR $VS_{m,t}$ at different values of Negative ΔLDP PR $VS_{m,t}$ in LDP SSDs (from Table 2's Model 1).

	Predicted Effect on $Transfers_{m,t+1}$		
	At Sample Means	Neg ΔLDP PR $VS_{m,t}$=10 (LDP votes *decrease*)	Neg ΔLDP PR $VS_{m,t}$=-10 (LDP votes *increase*)
Marginal Effect of one percentage point increase in ΔKomeito PR $VS_{m,t}$	-342 yen (-3.15 USD)	1,139 yen (10.50 USD)	-1,695 yen (15.60 USD)
		Difference: 2,834 yen (26 USD)	

Note: Marginal effects calculated with continuous variables held constant at sample means.

We also examined whether the effect of ΔKomeito PR $VS_{m,t}*$ Negative ΔLDP PR $VS_{m,t}$ could be explained by other parties' supporters switching their PR votes to the Komeito and the LDP's PR vote share declining for another reason. We created Negative ΔNon-LDP/Komeito PR $VS_{m,t}$, which is the change in share of municipality m's voting population casting their PR votes for *neither* the LDP *nor* the Komeito at time t relative to the previous election, multiplied by -1 (with higher scores indicating greater *decreases* in share of the voting population who voted for another party in PR). We then reran Table 2 with Negative ΔNon-LDP/Komeito PR $VS_{m,t}$ instead of Negative ΔLDP PR $VS_{m,t}$, keeping everything else about the specifications identical. The results are in Section G of the Supplementary Material. None of the coefficients (on ΔKomeito PR $VS_{m,t}$, Negative ΔLDP PR $VS_{m,t}$, or ΔKomeito PR $VS_{m,t}*$Negative ΔNon-LDP/Komeito PR VS are significant in any specification. This suggests that our results are not attributable to other factors bringing about changes in the two parties' vote shares. In sum, these results support Hypothesis I.

Next, we examine whether a similar reward regime, but in reverse, operates in the small number of SSDs where the LDP stands down and a Komeito candidate runs (Hypothesis II). By 'reverse', we mean that in these SSDs, we expect municipalities that decrease PR votes for the Komeito while increasing them for the LDP receive more money. Table 4 presents the results of a regression on the 63 municipalities in Komeito SSDs in the 2003, 2005, and 2012 HoR elections. The specification is identical to that in Model 1 of Table 2.[98] The negative, significant

[98]We present the summarized results here and the full specification, which includes coefficients on the control variables, in Section F of the Supplementary Material. We cannot conduct the other specifications in Table 2 because the number of observations is too low. Controlling for ΔKomeito SSD $VS_{m,t}$ (change in share of a municipality's

coefficient on ΔKomeito PR VS$_{m,t}$* Negative ΔLDP PR VS$_{m,t}$ demonstrates that in Komeito SSDs, controlling for time-varying municipality-level features and features of the municipality's SSD-year, municipalities that increased PR votes for the Komeito while decreasing them for the LDP in the 2003, 2005, and 2012 HoR elections received *less* money the year after the election. While this pattern of behavior is rewarded in LDP SSDs, it is *penalized* in Komeito SSDs.

Substantively, in Komeito SSDs, a one percentage point increase in ΔKomeito PR VS$_{m,t}$ in a municipality where the share of eligible voters casting PR votes for the LDP *declined* by 10% (Negative ΔLDP PR VS$_{m,t}$=10) is predicted to *decrease* the amount of NTD received by 10,525 yen per person (approximately \$96.80 USD). In contrast, the same one percentage point increase in ΔKomeito PR VS$_{m,t}$ in a municipality where the share of eligible voters casting PR votes for the LDP *increased* by 10% (Negative ΔLDP PR VS$_{m,t}$=-10) is predicted to *increase* the amount of NTD received by 9,651 yen per person (approximately \$88.80 USD). These average marginal effects, with their 95% confidence intervals, are displayed in Figure 2. Their substantive effects are summarized in Table 5.[99] As with Table 2, Section F of the Supplementary Material reveals that the assumptions of linearity and common support for the moderator are met. It is striking that we observe a statistically significant coefficient on ΔKomeito PR VS$_{m,t}$* Negative ΔLDP PR VS$_{m,t}$ in the expected direction and in a specification controlling for prior transfers and SSD-year fixed effects on a sample of only 63 observations. In sum, this supports Hypothesis II.

6.1 What Else Can Our Results Tell Us About Transfers?

In LDP SSDs, municipalities where PR votes increased for the Komeito as they decreased for the LDP received more money after elections. In Komeito SSDs, the reverse is true: municipalities where PR votes increased for the Komeito as they decreased for the LDP received *less* money after elections. This supports our claim that in our period of study, the LDP-Komeito governing coalition used transfers to motivate LDP supporters to switch their PR votes to the Komeito in LDP SSDs and Komeito supporters to switch their PR votes to the LDP in Komeito SSDs. The coefficients on the uninteracted variables can tell us more about how the coalition uses transfers.

First, let us take a closer look at LDP SSDs. In Table 2, the coefficients on ΔKomeito PR VS$_{m,t}$

eligible voters who cast their SSD votes for the Komeito candidate), for example, reduces the number of observations to just 23.

[99] Average marginal effects were calculated with other continuous variables held constant at their sample means.

Table 4: In Komeito SSDs, municipalities that increased PR votes for the Komeito while decreasing them for the LDP in the 2003, 2005, and 2012 HoR elections were penalized with less money after elections. Municipalities that decreased PR votes for the LDP (without changes to Komeito PR vote share) were also penalized, while municipalities that increased PR votes for the Komeito (without changes to LDP PR vote share) were neither penalized nor rewarded.

	Dependent Variable: Log(Transfers$_{m,t+1}$)
	Model 1
ΔKomeito PR VS$_{m,t}$* Negative ΔLDP PR VS$_{m,t}$	-0.008***
	[0.001]
ΔKomeito PR VS$_{m,t}$	-0.007
	[0.010]
Negative ΔLDP PR VS$_{m,t}$	-0.057***
	[0.002]
Log(Transfers$_{m,t}$)	0.530***
	[0.053]
Constant	-2.663***
	[0.227]
Controls	Yes
SSD-Year FE	Yes
Observations	63
R-squared	0.659

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

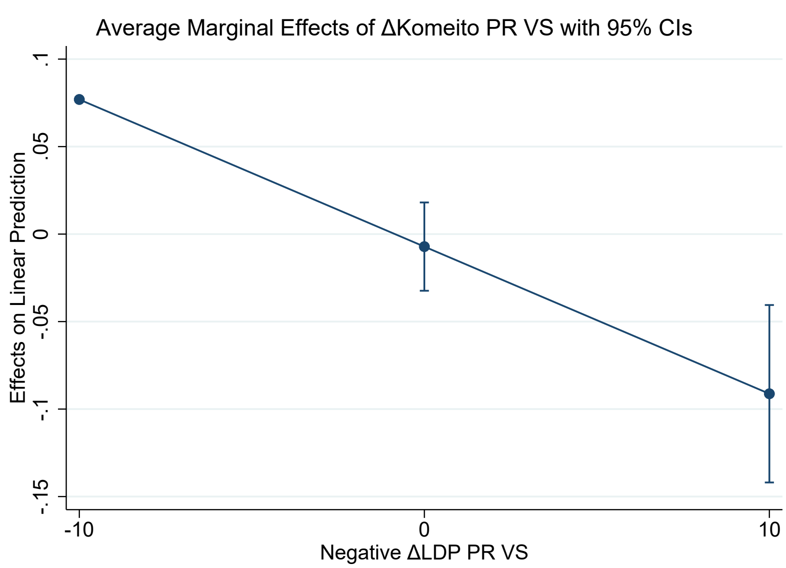

Figure 2: The average marginal effect of a one percentage point increase in ΔKomeito PR VS$_{m,t}$ with 95% confidence intervals at different levels of Negative ΔLDP PR VS$_{m,t}$ in Komeito SSDs (from Table 4).

are negative and insignificant. This means that municipalities where PR votes increased for the Komeito and stayed the same for the LDP were neither penalized with less money, nor rewarded

Table 5: Substantive effects on transfers of the average marginal effect of a one percentage point increase in ΔKomeito PR $VS_{m,t}$ at different values of Negative ΔLDP PR $VS_{m,t}$ in Komeito SSDs (from Table 4).

	Predicted Effect on $Transfers_{m,t+1}$		
	At Sample Means	Neg ΔLDP PR $VS_{m,t}$=10 (LDP votes *decrease*)	Neg ΔLDP PR $VS_{m,t}$=-10 (LDP votes *increase*)
Marginal Effect of one percentage point increase in ΔKomeito PR $VS_{m,t}$	490 yen (4.50 USD)	-10,524.5 yen (-96.80 USD)	9,651 yen (88.80 USD)
		Difference: 20,176 yen (185.60 USD)	

Note: Marginal effects calculated with continuous variables held constant at sample means.

with more. This suggests that the coalition rewarded LDP supporters for switching their PR votes to the Komeito (the positive, significant coefficient on ΔKomeito PR $VS_{m,t}*$ Negative ΔLDP PR $VS_{m,t}$), but did not reward Komeito supporters for mobilizing more PR votes for their own party. This implies that Komeito supporters were unable to get more money for their communities by mobilizing more PR votes for their party in LDP SSDs.

The coefficients on Negative ΔLDP PR $VS_{m,t}$, on the other hand, are negative and significant, except in Model 4, where it is negative and insignificant. A negative, significant coefficient on Negative ΔLDP PR $VS_{m,t}$ means that municipalities where PR votes decreased for the LDP and stayed the same for the Komeito were penalized with less money after elections. This implies that transfers may also have been used to encourage LDP supporters to cast their PR votes for the LDP. In the specification that leverages over-time variation in the same municipality's voting behavior and also controls for changes in the share of eligible voters casting SSD votes for the LDP candidate (Model 4), however, ΔKomeito PR $VS_{m,t}*$ Negative ΔLDP PR $VS_{m,t}$ remains positive and significant, while Negative ΔLDP PR $VS_{m,t}$ loses its significance. This means that the coalition rewarded municipalities where LDP supporters switched their PR votes to the Komeito, not municipalities where they increased PR votes for the LDP.

Turning to Komeito SSDs (Table 4), the coefficient on Negative ΔLDP PR $VS_{m,t}$ is negative and significant, which means that municipalities where PR votes decreased for the LDP and stayed the same for the Komeito were penalized. In Komeito SSDs, then, transfers are used to motivate LDP supporters to mobilize more PR votes for the LDP. The coefficient on ΔKomeito PR $VS_{m,t}$, on the other hand, is negative and insignificant. This means that municipalities where PR votes increased for the Komeito and stayed the same for the LDP are neither penalized nor rewarded. In Komeito SSDs, then, the coalition rewards municipalities where Komeito supporters switch their PR votes to the LDP (the negative, significant coefficient on ΔKomeito PR $VS_{m,t}*$ Negative ΔLDP PR $VS_{m,t}$), but refrains from penalizing municipalities where PR votes for the Komeito increase. This implies that in Komeito SSDs, Komeito supporters can gain more money for their community only by switching their PR votes to the LDP, not by casting them for the Komeito.

7 Rewarding Vote Trading in Mexico

To examine Hypothesis III, Table 6 presents the results of fixed effect regressions. The dependent variable is Log($\text{Transfers}_{m,t+1}$): the logarithm of per capita FORTALECE received by municipalities in the years following the CoD elections held in 2012 and 2015, respectively. Model 1 focuses on municipalities located exclusively within alliance SSDs with PVEM-affiliated joint candidates; Model 2 focuses on municipalities in alliance SSDs with PRI-affiliated joint candidates; and Model 3 focuses on municipalities in non-alliance SSDs, where both parties fielded their own candidates.[100]

In Models 1 and 2, we have three independent variables of interest: ΔPRI $VS_{m,t}$, or change in share of municipality m's voting population who selected the joint candidate under the PRI label exclusively at time t (the current election) relative to the most recent similar election;[101] Negative (ΔPVEM or PVEM-PRI $VS_{m,t}$), or change in share of municipality m's voting population who selected the joint candidate under either the PVEM label or both parties' labels at time t relative to the most recent similar election, multiplied by -1 (with higher scores indicating greater *decreases* in share of the voting population selecting the joint candidate under either the PVEM or both parties' labels at time t relative to the most recent similar election); and their

[100] We present the summarized results here and the full specification, which includes coefficients on the control variables, in Section I of the Supplementary Material.

[101] Some CoD elections are concurrent with presidential elections, which has consequences for levels of support and turnout. We anticipate that the PRI-PVEM coalition would have compared municipality m's vote shares with its vote shares in the most recent *similar* election, meaning that 2012 will be compared to 2006 (both concurrent) and 2015 will be compared to 2009 (neither were). Our independent variables were constructed to reflect this. Comparing municipality m's vote shares in 2012 with those in 2006 would have presented an additional wrinkle: coordinating parties had to present joint lists in 2006, meaning that only the number of votes cast for the PRI-PVEM coalition is observed. Our construction of the independent variable for 2012 reflects what we can expect a coalition interested in verifying the extent of compliance would have done, and is detailed in Section H of the Supplementary Material.

Table 6: In alliance SSDs with PVEM-affiliated candidates, municipalities that increased votes for this candidate under the PRI label exclusively while decreasing them under the PVEM or both parties' labels were rewarded with more money after the 2012 and 2015 elections (Model 1). In alliance SSDs with PRI-affiliated candidates (Model 2) and non-alliance SSDs (Model 3), municipalities that increased votes for the PRI (exclusively, in the case of Model 2) are rewarded.

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
	Joint Candidate (PVEM)	Joint Candidate (PRI)	Non-Alliance District
ΔPRI VS$_{m,t}$* Negative (ΔPVEM or PVEM-PRI VS$_{m,t}$)	0.00214*	0.00000	
	[0.00117]	[0.00051]	
ΔPRI VS$_{m,t}$	0.01261	0.01169*	0.01760**
	[0.01849]	[0.00618]	[0.00755]
Negative (ΔPVEM or PVEM-PRI VS$_{m,t}$)	0.02680*	0.01310	
	[0.01370]	[0.00848]	
ΔPRI VS$_{m,t}$* Negative (ΔPVEM VS$_{m,t}$)			-0.00037
			[0.00214]
Negative (ΔPVEM VS$_{m,t}$)			0.01483
			[0.01942]
SSD-Year FE	Yes	Yes	Yes
Observations	170	1,135	635
R-squared	0.67101	0.62542	0.72780

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

interaction, which captures the effect of a simultaneous *increase* in votes for the joint candidate under the PRI label exclusively and *decrease* in votes for the joint candidate under the PVEM or both parties' labels. In Model 3 (non-alliance districts), our three independent variables of interest are: ΔPRI $\text{VS}_{m,t}$, or change in share of municipality m's voting population voting PRI at time t relative to beforehand; Negative (ΔPVEM $\text{VS}_{m,t}$), or change in share of municipality m's voting population voting PVEM at time t relative to beforehand, multiplied by -1; and their interaction.

In all models, SSD-year fixed effects control for features of a municipality's SSD in a given election that could influence the amount of transfers received by all municipalities therein after the election. Our inclusion of SSD-year fixed effects means that we are comparing amounts of transfers received by municipalities in the same SSD-year. All models include the following time-varying municipality-level controls: population (logged), a dummy variable indicating whether the municipality is rural or urban, population density, surface area of the municipality (in squared kilometers), poverty index, and a dummy variable indicating whether the municipality is in a state of emergency. We cluster standard errors by SSD.

Hypothesis III concerns municipalities in alliance SSDs with PVEM-affiliated joint candidates (Model 1). The positive, significant coefficient on the interaction shows that, controlling for features of a municipality's SSD-year and other time-varying differences, municipalities in alliance SSDs with PVEM-affiliated candidates that increased votes for the joint candidate under the PRI's label exclusively while decreasing them for this candidate under the PVEM or both parties' labels received more money the year after elections. Substantively, Model 1 shows that a one percentage point increase in Negative (ΔPVEM or PVEM-PRI $\text{VS}_{m,t}$) – which corresponds to a one percentage point *decrease* in share of voters choosing the joint candidate under the PVEM or both parties' labels – in a municipality where the share of voters choosing the joint candidate under the PRI label exclusively increased by 10% is predicted to *increase* the amount of FORTALECE received by 9.9 pesos per person (approximately 50 US cents). The same one percentage point increase in Negative (ΔPVEM or PVEM-PRI $\text{VS}_{m,t}$) in a municipality where the share of voters choosing the joint candidate under the PRI label exclusively decreased by 10% is predicted to *increase* the amount of FORTALECE received by 1.1 pesos per person (approximately 5 US cents). These average marginal effects, with their 95% confidence intervals, are displayed in Figure 3. Their substantive effects are summarized in Table 7.[102] Section I of the Supplementary Material presents the diagnostics recommended by Hainmueller, Mummolo, and Xu 2019, which show that the assumptions of linearity and common support for the moderator hold.

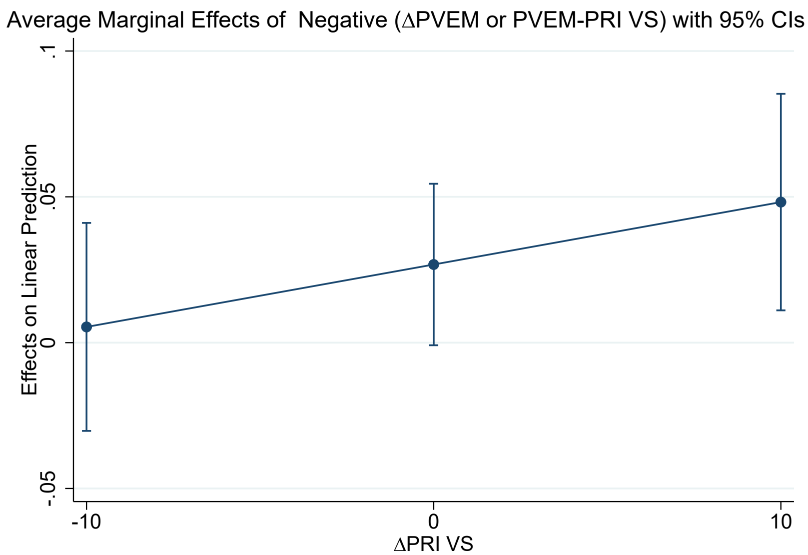

Figure 3: The average marginal effect of a one percentage point increase in Negative (ΔPVEM or PVEM-PRI $VS_{m,t}$) with 95% confidence intervals at different levels of ΔPRI $VS_{m,t}$ in alliance SSDs with PVEM-affiliated candidates (from Model 1 of Table 6).

Table 7: Substantive effects on transfers of the average marginal effect of a one percentage point increase in Negative (ΔPVEM or PVEM-PRI $VS_{m,t}$) at different values of ΔPRI $VS_{m,t}$ in alliance SSDs with PVEM candidates.

	Predicted Effect on $Transfers_{m,t+1}$		
	At Sample Means	ΔPRI $VS_{m,t}$=10	ΔPRI $VS_{m,t}$=-10
Marginal Effect of one percentage point increase in Neg (ΔPVEM or PVEM-PRI $VS_{m,t}$) (votes for PVEM/both lists *decrease*)	6.9 pesos (34 US cents)	9.9 pesos (50 US cents)	1.1 pesos (5 US cents)
		Difference: 8.8 pesos (45 US cents)	

Note: Marginal effects calculated with continuous variables held constant at sample means.

The positive, significant coefficient on Negative (ΔPVEM or PVEM-PRI $VS_{m,t}$), on the other hand, shows that decreases in votes for the joint candidate under the PVEM or both

[102] Average marginal effects were calculated with other continuous variables held constant at their sample means.

parties' labels are, when ΔPRI $\text{VS}_{m,t}$ is zero, rewarded with more money after elections. Substantively, a one percentage point *decrease* in votes cast under the PVEM or both parties' labels results in a per person gain of 5.44 pesos (approximately 30 US cents). The non-significant coefficient on ΔPRI $\text{VS}_{m,t}$ means that increases in votes for the joint candidate under the PRI label exclusively are neither penalized nor rewarded. Viewed together, these results show that in alliance SSDs with PVEM-affiliated candidates, FORTALECE is used to encourage supporters choosing the joint candidate under the PVEM or both parties' labels to *switch* to casting them under the PRI's label only.

Table 6's Models 2 and 3 serve as placebo tests. In alliance SSDs with PRI-affiliated candidates (Model 2), neither the coefficient on the interaction nor on Negative (ΔPVEM or PVEM-PRI $\text{VS}_{m,t}$) are significant. In non-alliance SSDs (Model 3), neither the coefficient on the interaction nor on Negative (ΔPVEM $\text{VS}_{m,t}$) are significant. This means that it is only in alliance SSDs where the PRI has forfeited the joint candidacy to the PVEM (Model 1) that FORTALECE is used to encourage voters to switch their votes from the joint candidate under the PVEM or both parties' labels to the joint candidate under the PRI label. This supports Hypothesis III.

7.1 What Else Can Our Results Tell Us About Transfers?

In SSDs where the two parties fielded a joint candidate who was PRI-affiliated (Model 2), the coefficient on ΔPRI $\text{VS}_{m,t}$ is positive and significant, while the coefficient on Negative (ΔPVEM or PVEM-PRI $\text{VS}_{m,t}$) is insignificant. This means that the coalition rewarded increases in votes cast for the PRI-affiliated joint candidate under the PRI label only, but neither rewarded nor penalized increases in votes cast for the PRI-affiliated joint candidate under the PVEM or both parties' labels. Substantively, a one percentage point increase in votes for the PRI-affiliated joint candidate under the PRI label translates into an extra 2.65 pesos per person (approximately 15 US cents). In these SSDs, then, transfers are used to encourage supporters to cast both components of their fused vote for the PRI. Presumably because votes cast for the joint candidate under the PVEM or both parties' label in SSDs where the joint candidate is PRI increase the chance of the PRI's candidate winning the SSD, the PRI does not *dissuade* voters from casting their votes this way. But nor does it encourage this.

In Model 3, the coefficient on ΔPRI $\text{VS}_{m,t}$ is similarly positive and significant, revealing that the coalition rewards increases in votes cast for the PRI. Substantively, a one percentage point increase in votes cast for the PRI translates into an extra 4.41 pesos per person (approximately 25 US cents). Rewards for voting PRI are largest in these non-alliance SSDs. The coefficient on Negative (ΔPVEM $\text{VS}_{m,t}$) is similarly insignificant. Thus, in non-alliance SSDs, transfers are used to encourage supporters to cast both components of their vote for the PRI.

8 Conclusion

Our theory is in two parts. First, we explained how MMM creates a distinct strategic environment under which a large and small party can form an alliance and trade votes in one tier for votes in the other in a way that increases the number of seats won by both. Second, we posited that governing parties dependent on such trades can use geographically-targeted spending to cement them. We used original data on Japanese and Mexican municipalities to show that the LDP-Komeito and PRI-PVEM coalitions did exactly this in the period of study.

For scholars of comparative politics, we have identified a new pathway through which governing parties can remain in power under MMM. This pathway is likely to be preferable when the larger governing party has policies that make it unpopular with the median voter. Under most other electoral systems, this party would be forced to refine its policy positions to make them more palatable to the median voter or provide enough targeted goods to overcome any resistance by the median voter. Under MMM, however, it can form an alliance with a small party, have both parties' supporters split their votes, and use targeted goods as a reward for doing so. With this strategy, the only constituencies the large party has to please are its own supporters and its ally's supporters. This is likely to have far-ranging consequences for governance and representation. At its limit, it may mean that non-supporters are cut out of the spoils and find government unresponsive to their concerns. While these voters will be drawn to the opposition, they will not necessarily find a viable alternative there. A large opposition party aiming to establish itself as a viable alternative to the governing coalition would gain from realizing a similar trade, but will have to face the fact that small parties are likely to form and function as mercenaries, vying for inclusion in the governing coalition. Non-supporters may end up having to bandwagon with the governing coalition.

The first step to investigating whether the theory's more dire implications are being borne out is to see whether this electoral strategy is being used in the 26 other countries using MMM.

Political science literature and news reports reveal evidence of coordination in all but one of these countries (Tajikistan). Electoral autocracies and recently-transitioned democracies tend to see coordination among opposition parties, with the goal of unseating the dominant parties.[103] Among democracies, stand-down agreements in nominal tier districts are common. The following four cases may be especially instructive to study: Italy, which since 2017 has used a fused vote system similar to Mexico's but without the cap on over-representation; Taiwan, which uses a system similar to Japan's; Thailand, which used MMM until 2017, after which it introduced a system closer to MMP;[104] and Korea, which transitioned from pure MMM to MMM with partial compensation in 2019. In Korea, large parties had the audacity to *create* small parties with which they could ally after the passage of an electoral reform that ruled that some list seats would be awarded on a compensatory basis.[105]

After evaluating how common this electoral strategy is, future research should investigate how MMM stacks up against alternative electoral systems in the ease with which governing parties are voted out of power, the alignment of government policies with the interests of the median voter, and the responsiveness of governments to crises and changes that influence the median voter. In addition, future work should flesh out other ways in which the distinct strategic environment created by MMM's combination of electoral rules influences other outcomes of interest.

For scholars of Japan and Mexico, our study shows that the longstanding governing coalitions of both countries contested elections by encouraging supporters to split their votes and using government resources to overcome any resistance to this. Future research should focus on three questions. One, what role did this strategy play in perpetuating the dominance of these parties? Central to this will be investigating why the LDP-Komeito coalition lost the 2009 HoR election and the PRI-PVEM coalition lost the 2018 CoD election, and why, in the Japanese case, the parties that won in 2009 were unable to replicate the strategy to win again in 2012. Two, what, if any, relationship is there between the size of the payoffs supporters receive for splitting their votes and the *policies* implemented by the governing coalitions? Is Japan's LDP neutralizing the Komeito's opposition to its desired defense policies by increasing the size of the payoffs to Komeito supporters? Three, are the parties pursuing similar vote trading strategies at other

[103] Cameroon, Chad, Sudan, Mauritania, and Zimbabwe fall into this category.
[104] Hicken and Pundit 2019.
[105] Yonhap News Agency 2019.

levels of government, such as for the Upper Houses, local governments, and in the case of Mexico, the presidency? We urge scholars to tackle these questions.

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Geographically-Targeted Spending in Mixed-Member Majoritarian Electoral Systems

Supplementary Material

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A Mexico's Cap on Over-Representation, Threshold, and Rules About Publicly-Provided Campaign Funds

Here, we explain three pertinent features of Mexico's MMM system. First, the Mexican Constitution establishes two 'caps' to avoid over-representation: 1) no party can claim more than 300 Deputies, elected in either tier, even if it captures more than 52% of votes; and 2) no party's percentage of Deputies is allowed to exceed by more than 8% the percentage of votes the party obtained in an election. There is one exception to this, which we explain below, but before doing so, we note that in this latter calculation, the number of PR votes won by the party are used. This may be another reason why a majority-seeking party coordinating with a small party in Mexico may prefer to keep PR votes to itself: by doing so, it can avoid triggering this cap on over-representation.

The exception to this is parties that, by winning SSDs, obtain a percentage of seats that is larger than the percentage of votes received plus 10. Let us imagine that a party won 200 SSDs, but all by very tight margins, meaning that it obtained 30 per cent of all votes cast. In addition, the party receives 70 seats by PR. This means that the party has won 54% of seats in the COD (270 seats out of 500), but has only won 30% of the votes. This party is thus in violation of the second cap. To qualify for this exception, the party's percentage of seats won in the SSD tier (in this example, 40%) cannot be larger than the percentage of all votes obtained (in this example, 30%) plus 10 (meaning: 40%). The party in our example qualifies for the exception.

In the event any party does exceed its permitted number of seats, these seats are distributed among the remaining parties.

Second, Article 54 of the Mexican Constitution stipulates that a party must have registered candidates in at least two thirds of the 300 SSDs and obtained at least 3% of all valid votes to receive a PR seat.

Third, a 1996 reform established that of the campaign funds provided by the government, 70% would be distributed among political parties with a national registry according to their vote shares in the previous COD election, with the remaining 30% being equally distributed amongst all parties. In this calculation too, the number of votes the party wins in PR are used. This is another reason why a majority-seeking party in Mexico may prefer to maximize PR votes.

B How Seats in the PR Tier are Allocated in Mexico's COD Elections

The number of valid votes cast for a party list in each of Mexico's five PR constituencies is pooled at the national level first, and then divided by 200 to ascertain the number of votes needed for a party to obtain a single seat.[1] For example, if 50 million valid votes were cast in an election, a party would need 250,000 votes (50 million/200) to capture a seat. Then, the party that won the most votes is identified. Dividing the total number of valid votes cast for that party by this quotient yields the number of seats this party ought to receive, barring caps on over-representation, explained below, are not violated. For example, if Party A receives 20 million votes, this means it is entitled to 80 seats (20 million/250,000 votes). Then, the total number of votes Party A received in each of the five constituencies is divided by the same quotient. Thus, if Party A received 3 million votes in Constituency 1, then Constituency 1 would receive 12 of Party A's 80 seats (3 million/250,000 votes).

After allocating the total number of seats awarded to Party A and the distribution of those seats across the five constituencies, the allocation for the remaining parties is done simultaneously in the following manner. First, the number of votes cast for Party A (in this example, 20 million) is subtracted from the total number of valid votes cast (in this example, 50 million) and

[1]The total number of valid votes is the total number of votes minus votes cast for parties that did not reach the threshold, independent candidates, and non-registered candidates, as well as null votes.

the result is divided by the number of seats remaining to be allocated (in this example, 80 were awarded to Party A, leaving 120 of the 200 remaining). This quotient (30 million votes/120) determines the number of votes each of the remaining parties needs to have obtained to win a seat. Next, regional quotients are generated by dividing the total number of valid votes cast in each constituency minus the total number of valid votes cast for Party A in each constituency by the number of seats remaining to be allocated in each constituency. If 6 million valid votes were cast in Constituency 1 and 3 million of those were cast for Party A, enabling it to receive 12 of Party A's 80 seats, then the regional quotient for Constituency 1 is 6 million minus 3 million, divided by the 28 seats (the total number of seats available minus 12). This regional quotient (in this example, 107,143 votes) represents the number of votes each party needs to obtain a seat in each constituency (in this example, Constituency 1). To obtain the final distribution of seats, the total number of votes each party received in each constituency is divided by the constituency's regional quotient.[2]

C How PR Votes Cast for More Than One Coordinating Party are Divided Up

Here we explain how votes cast for a joint candidate under more than one coordinating party's label translate into PR votes for those parties. First, what does casting one's vote for a joint candidate under more than one coordinating party's label look like? If two coordinating parties present a joint candidate, this means the joint candidate appears twice on the ballot, under the names of both coordinating parties. As Montero explains, a voter can select the joint candidate under one party's label, the joint candidate under the other party's label, or the joint candidate under both party's labels.

When a voter casts her ballot in this manner, one vote is added to the joint candidate's tally in the SSD race. Then, one vote is divvied up equally among the number of chosen parties for the purposes of PR. For instance, let us say ten votes were cast for the PRI-PVEM joint-candidate in SSD A. Four were cast under the PRI label, three under the PVEM label, and three under both party's labels. First, the joint candidate receives 10 votes in the SSD race.

[2]Throughout the process, leftover seats are assigned by largest remainder.

Second, each coordinating party receives 100% of the votes cast under their label *only* (the PRI receives four and the PVEM, three). Third, votes cast under more than one of the coordinating parties' labels are divided equally among the selected parties (three votes are divided among two parties, totalling 1.5 votes for each party). When dividing the votes does not generate an integer number (as in this case), the residuals are summed (0.5 + 0.5) and assigned to the coordinating party that obtained the largest number of votes under its label only (in our example, the PRI, producing 2 votes for the PRI and 1 for the PVEM). Finally, the total number of PR votes for each coordinating party is given by adding the total number of votes each party got under its label only to the 'divided up votes' (the PRI receives 6 votes (4 + 2) and the PVEM receives 4 (3 + 1) votes).

D Descriptive Statistics

Table D.1: Descriptive Statistics for the Case of Japan

	Mean	Standard Deviation	Min	Max	Observations
Komeito $SSD_{m,t}$	0.017	0.130	0.000	1.000	10174
ΔKomeito PR $VS_{m,t}$	0.420	1.908	-20.155	16.019	6404
Negative ΔLDP PR $VS_{m,t}$	0.202	4.311	-40.627	40.670	9733
Log($\text{Transfers}_m, t$)	-3.396	0.744	-7.922	1.954	9818
Fiscal $\text{Strength}_m, t$	0.441	0.286	0.000	2.850	9764
Log($\text{Population}_m, t$)	9.783	1.418	5.142	15.966	10374
Log(Income_m, t)	0.072	0.266	-1.064	1.647	9822
Dependent $\text{Population}_m, t$	0.381	0.054	0.000	0.629	9117
$\text{Agriculture}_m, t$	0.062	0.057	0.000	0.625	9116
Population $\text{Density}_m, t$	1108.222	2498.595	1.304	19315.560	10374

Table D.2: Descriptive Statistics for the Case of Mexico

	Mean	Standard Deviation	Min	Max	Observations
Log($\text{Transfers}_m, t$)	4.612	1.217	-2.055	9.433	2064
Negative ΔPVEM or PVEM-PRI $VS_{m,t}$	-1.991	5.321	-53.284	16.897	4864
ΔPRI $VS_{m,t}$	1.146	8.542	-69.193	34.696	4864
Log($\text{Population}_m, t$)	9.439	1.581	4.466	14.419	4913
Poverty Index_m, t	-0.000	0.997	-2.296	5.030	4913
Surface Area_m, t	796.408	2092.160	2.200	53237.801	4909
Population $\text{Density}_m, t$	289.348	1187.954	0.144	17206.451	4908
Rural_m, t	0.151	0.358	0.000	1.000	4918
State of $\text{Emergency}_m, t$	0.193	0.394	0.000	1.000	4915

E Supplementary Analyses for Hypothesis I

In Table E.1, we present the full specification of the main paper's Table 2. In Table E.2, we present Models 2 and 4 of Table E.1 (which use the fixed effect) without the lag. In Figure E.1, we present the Hainmueller, Mummolo, and Xu diagnostic.

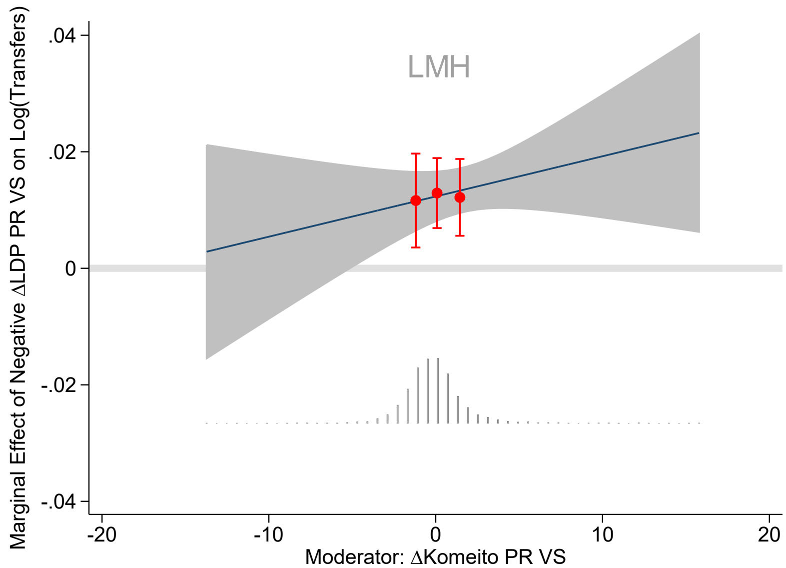

Figure E.1: Here, we present the Hainmueller, Mummolo, and Xu diagnostic for Model 4 in Table 2. Results show the estimated marginal effects using both the linear interaction model and the binning estimator. The conditional marginal-effect estimates of the binning estimator line up very closely with the linear interaction effect from the original model. The histogram at the bottom of the figure corroborates that there is sufficient common support across values of ΔKomeito PR $VS_{m,t}$.

Table E.1: In LDP SSDs, municipalities that increased PR votes for the Komeito while decreasing them for the LDP in the 2003, 2005, and 2012 HOR elections were rewarded with more money after elections. Municipalities that decreased PR votes for the LDP (without changes to Komeito PR vote share) were penalized with less money, while municipalities that increased PR votes for the Komeito (without changes to LDP PR vote share) were neither penalized nor rewarded (full specification).

	Dependent Variable: Log(Transfers$_{m,t+1}$)			
	Model 1	Model 2	Model 3	Model 4
ΔKomeito PR VS$_{m,t}$* Negative ΔLDP PR VS$_{m,t}$	0.00249***	0.00211**	0.00249***	0.00210***
	[0.00093]	[0.00081]	[0.00093]	[0.00081]
ΔKomeito PR VS$_{m,t}$	-0.00518	-0.00018	-0.00518	-0.00111
	[0.00778]	[0.00851]	[0.00808]	[0.00859]
Negative ΔLDP PR VS$_{m,t}$	-0.00996**	-0.00913**	-0.00997**	-0.00717
	[0.00399]	[0.00434]	[0.00420]	[0.00497]
ΔLDP SSD VS$_{m,t}$			-0.00001	0.00162
			[0.00203]	[0.00210]
Log(Transfers$_m, t$)	0.72027***	0.49787***	0.72027***	0.49762***
	[0.02646]	[0.03422]	[0.02647]	[0.03409]
Fiscal Strength$_m, t$	0.01344	-0.43850**	0.01344	-0.44286**
	[0.05553]	[0.17705]	[0.05565]	[0.17700]
Log(Population$_m, t$)	-0.01181	-1.07479***	-0.01181	-1.09582***
	[0.01229]	[0.31366]	[0.01225]	[0.31636]
Log(Income$_m, t$)	0.16477**	-0.55025*	0.16478**	-0.55130*
	[0.07829]	[0.31466]	[0.07802]	[0.31517]
Dependent Population$_m, t$	1.26937***	-0.32327	1.26939***	-0.32766
	[0.47491]	[1.39813]	[0.47512]	[1.39629]
Agriculture$_m, t$	0.09327	-0.62286	0.09328	-0.64946
	[0.27014]	[1.80227]	[0.27057]	[1.80205]
Population Density$_m, t$	0.00001	0.00023	0.00001	0.00023
	[0.00001]	[0.00015]	[0.00001]	[0.00015]
Constant	-1.82202***	9.14976***	-1.82202***	9.36568***
	[0.29620]	[3.27514]	[0.29612]	[3.30196]
SSD-Year FE	Yes	Yes	Yes	Yes
Municipality FE		Yes		Yes
Observations	4,497	4,497	4,497	4,497
R-squared	0.80792	0.75881	0.80792	0.75888
Number of municipalities		2,293		2,293

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

Table E.2: These two models are identical to Model 2 and Model 4 in Table 1, but without the lagged dependent variable.

	Dependent Variable: Log(Transfers$_{m,t+1}$)	
	Model 1	Model 2
ΔKomeito PR VS$_{m,t}$* Negative ΔLDP PR VS$_{m,t}$	0.003*	0.003*
	[0.001]	[0.001]
ΔKomeito PR VS$_{m,t}$	0.004	0.002
	[0.009]	[0.009]
Negative ΔLDP PR VS$_{m,t}$	-0.011**	-0.008
	[0.005]	[0.007]
ΔLDP SSD VS$_{m,t}$		0.003
		[0.003]
Fiscal Strength$_m, t$	-0.504**	-0.511**
	[0.211]	[0.211]
Log(Population$_m, t$)	-0.455	-0.490
	[0.481]	[0.483]
Log(Income$_m, t$)	-1.521***	-1.522***
	[0.508]	[0.508]
Dependent Population$_m, t$	2.107	2.098
	[1.964]	[1.962]
Agriculture$_m, t$	0.711	0.667
	[2.358]	[2.352]
Population Density$_m, t$	0.000	0.000
	[0.000]	[0.000]
Constant	0.547	0.894
	[5.088]	[5.107]
SSD-Year FE	Yes	Yes
Observations	4,497	4,497
R-squared	0.673	0.673

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

F Supplementary Analyses for Hypothesis II

In Table F.1, we present the full specification of the main paper's Table 4. In Figure F.1, we present the Hainmueller, Mummolo, and Xu diagnostic.

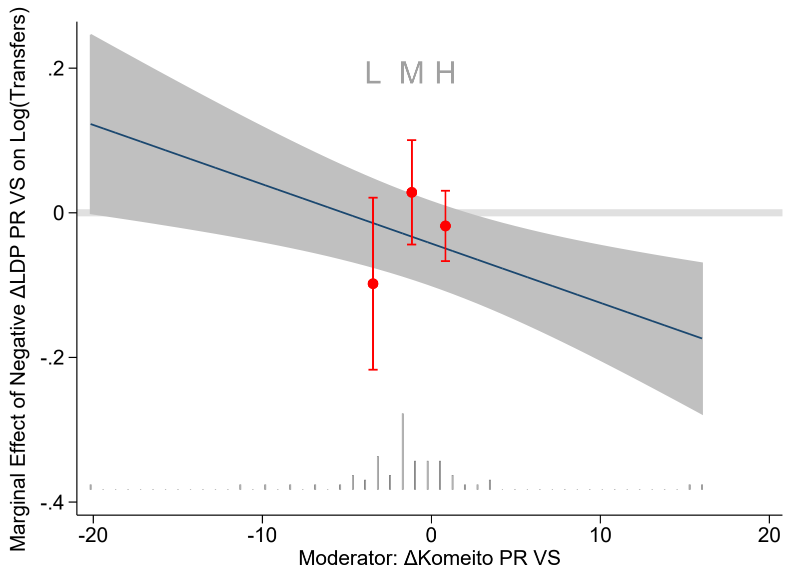

Figure F.1: Here, we present the Hainmueller, Mummolo, and Xu diagnostic for Model 1 in Table 4. Results show the estimated marginal effects using both the linear interaction model and the binning estimator. Because the confidence intervals of the binning estimators overlap with the linear interaction effect from the original model, we cannot reject the possibility that the conditional marginal effect estimates of the binning estimator are equal to those from the linear interaction effect in the original model. The histogram at the bottom of the figure corroborates that there is sufficient common support across values of ΔKomeito PR $\text{VS}_{m,t}$.

Table F.1: In Komeito SSDs, municipalities that increased PR votes for the Komeito while decreasing them for the LDP in the 2003, 2005, and 2012 HOR elections were penalized with less money after elections. Municipalities that decreased PR votes for the LDP (without changes to Komeito PR vote share) were also penalized, while municipalities that increased PR votes for the Komeito (without changes to LDP PR vote share) were neither penalized nor rewarded (full specification).

	Dependent Variable: Log(Transfers$_{m,t+1}$)
	Model 1
ΔKomeito PR VS$_{m,t}$∗ Negative ΔLDP PR VS$_{m,t}$	-0.008***
	[0.001]
ΔKomeito PR VS$_{m,t}$	-0.007
	[0.010]
Negative ΔLDP PR VS$_{m,t}$	-0.057***
	[0.002]
Log(Transfers$_{m,t}$)	0.530***
	[0.053]
Fiscal Strength$_m, t$	-3.048**
	[0.925]
Log(Population$_m, t$)	0.208*
	[0.087]
Log(Income$_m, t$)	0.536*
	[0.212]
Dependent Population$_m, t$	0.277
	[0.660]
Agriculture$_m, t$	0.305
	[0.940]
Population Density$_m, t$	0.000***
	[0.000]
Constant	-2.663***
	[0.227]
Controls	Yes
SSD-Year FE	Yes
Observations	63
R-squared	0.659

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

G Placebo Tests

In Table G.1 we present the placebo test explained in the main paper, where we redo Table 2 with Negative ΔNon-LDP/Komeito PR $\text{VS}_{m,t}$ instead of Negative ΔLDP PR $\text{VS}_{m,t}$.

Table G.1: In LDP SSDs, municipalities that increased PR votes for the Komeito while decreasing them for all non LDP or Komeito parties in the 2003, 2005, and 2012 HOR elections were not rewarded with more money after the election.

	Dependent Variable: Log($\text{Transfers}_{m,t+1}$)			
	Model 1	Model 2	Model 3	Model 4
ΔKomeito PR $\text{VS}_{m,t}$* Negative ΔNon-LDP/Komeito PR $\text{VS}_{m,t}$	-0.001	-0.001	-0.001	-0.001
	[0.001]	[0.001]	[0.001]	[0.001]
ΔKomeito PR $\text{VS}_{m,t}$	-0.003	0.002	-0.003	0.002
	[0.007]	[0.009]	[0.007]	[0.009]
Negative ΔNon-LDP/Komeito PR $\text{VS}_{m,t}$	-0.001	0.002	-0.002	0.001
	[0.004]	[0.005]	[0.004]	[0.005]
ΔLDP SSD $\text{VS}_{m,t}$			0.003	0.003
			[0.002]	[0.002]
Log($\text{Transfers}_m, t$)	0.722***	0.499***	0.722***	0.498***
	[0.026]	[0.034]	[0.026]	[0.034]
Fiscal $\text{Strength}_m, t$	0.020	-0.450**	0.018	-0.454**
	[0.055]	[0.178]	[0.056]	[0.178]
Log($\text{Population}_m, t$)	-0.013	-1.277***	-0.013	-1.226***
	[0.012]	[0.306]	[0.012]	[0.305]
Log(Income_m, t)	0.190**	-0.485	0.182**	-0.506
	[0.078]	[0.319]	[0.077]	[0.319]
Dependent $\text{Population}_m, t$	1.279***	-0.594	1.271***	-0.437
	[0.469]	[1.410]	[0.470]	[1.402]
$\text{Agriculture}_m, t$	0.058	-0.696	0.063	-0.768
	[0.276]	[1.802]	[0.274]	[1.807]
Population $\text{Density}_m, t$	0.000	0.000*	0.000	0.000*
	[0.000]	[0.000]	[0.000]	[0.000]
Constant	-1.815***	11.169***	-1.806***	10.606***
	[0.294]	[3.226]	[0.296]	[3.214]
SSD-Year FE	Yes	Yes	Yes	Yes
Municipality FE		Yes		Yes
Observations	4,497	4,497	4,497	4,497
R-squared	0.807	0.758	0.807	0.758
Number of municipalities		2,293		2,293

Robust standard errors at the district level in brackets

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

H Construction of Independent Variables for 2012

As the main paper explains, coordinating parties were required to present joint lists in the 2006 election, meaning that only the number of votes cast for the PRI-PVEM *coalition* is observed in this election. The coalition would thus not have been able to distinguish how many votes, of this total, were cast for either partner. In 2012, then, how might a coalition go about verifying whether party supporters complied with instructions to split their votes? We posit that it is likely to have used the results of the 2009 election to calculate the ratio of votes contributed by each coordinating partner, and apply that ratio to the total number of votes received by the coalition in 2006.

More concretely, let us say that in municipality m, the PRI-PVEM coalition received 10 votes in 2006 and 15 in 2009[3], out of which 9 were cast under the PRI label and 6 under the PVEM label. Accordingly, the share of votes that the PRI contributed to the coalition's total in 2009 corresponds to 9 / (9 + 6) = 0.6 or 60%. Similarly, the share of votes that the PVEM contributed to the coalition's total in 2009 corresponds to 6 / (9 + 6) = 0.4 or 40%. To calculate the number of votes that the coalition might expect corresponded to each partner in the 2006 election, we apply these 2009 ratios to the total number of votes received by the PRI-PVEM coalition in 2006. By this calculation, of the 10 votes the coalition received in 2006, the PRI was responsible for 6 of these (10 * 0.6) and the PVEM 4 votes (10 * 0.4).

I Supplementary Analyses for Hypothesis III

In Table I.1, we present the main paper's full specification of Table 6. In Figure I.1, we present the Hainmueller, Mummolo, and Xu diagnostic.

[3] We exclude votes cast under both party's labels to calculate these ratios.

Table I.1: In alliance SSDs with PVEM-affiliated candidates, municipalities that increased votes for this candidate under the PRI label only while decreasing them under the PVEM or both parties' labels were rewarded with more money after the 2012 and 2015 elections (Model 1). In alliance SSDs with PRI-affiliated candidates (Model 2) and non-alliance SSDs (Model 3), municipalities that increased votes for the PRI (only, in the case of Model 2) are rewarded(full specification).

	Dependent Variable: Log(Transfers$_{m,t+1}$)		
	Model 1	Model 2	Model 3
	Joint Candidate (PVEM)	Joint Candidate (PRI)	Non-Alliance District
ΔPRI VS$_{m,t}$* Negative ΔPVEM or PVEM-PRI VS$_{m,t}$	0.00214*	0.00000	
	[0.00117]	[0.00051]	
ΔPRI VS$_{m,t}$	0.01261	0.01169*	0.01760**
	[0.01849]	[0.00618]	[0.00755]
Negative ΔPVEM or PVEM-PRI VS$_{m,t}$	0.02680*	0.01310	
	[0.01370]	[0.00848]	
ΔPRI VS$_{m,t}$* Negative ΔPVEM VS$_{m,t}$			-0.00037
			[0.00214]
Negative ΔPVEM VS$_{m,t}$			0.01483
			[0.01942]
Log(Population$_m, t$)	-0.57112***	-0.59565***	-0.76725***
	[0.08555]	[0.03845]	[0.04072]
Population Density$_m, t$	0.00038	-0.00004	0.00013
	[0.00049]	[0.00011]	[0.00014]
Rural$_m, t$	0.70873***	0.26496	-0.02332
	[0.19987]	[0.16927]	[0.12453]
Poverty Index$_m, t$	-0.19277	-0.07279	-0.06650
	[0.13466]	[0.07298]	[0.08012]
Surface Area$_m, t$	-0.00000	0.00001	0.00001
	[0.00002]	[0.00001]	[0.00002]
State of Emergency$_m, t$	-0.05235	0.09994	0.16675
	[0.15587]	[0.10039]	[0.17202]
Constant	10.21101***	11.62302***	12.34533***
	[0.83591]	[0.41986]	[0.41195]
SSD-Year FE	Yes	Yes	Yes
Observations	170	1,135	635
R-squared	0.67101	0.62542	0.72780

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

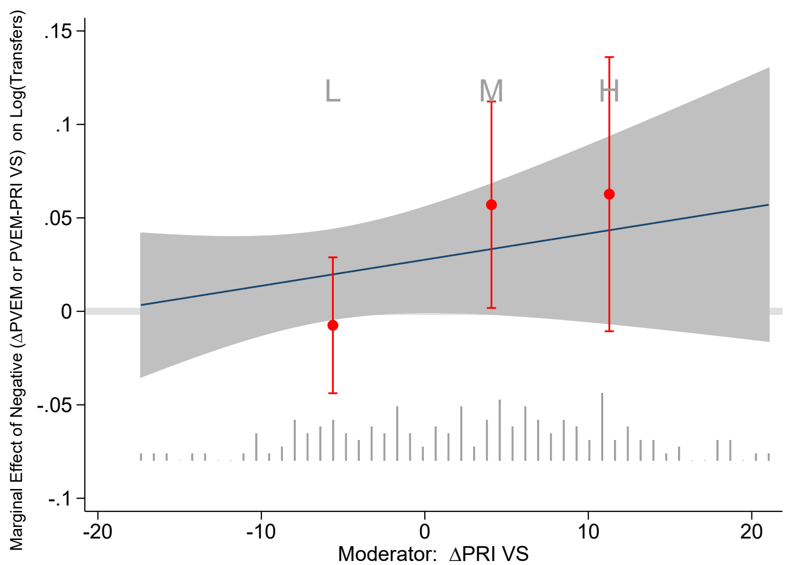

Figure I.1: Here, we present the Hainmueller, Mummolo, and Xu diagnostic for Model 1 in Table 6. Results show the estimated marginal effects using both the linear interaction model and the binning estimator. Because the confidence intervals of the binning estimators overlap with the linear interaction effect from the original model, we cannot reject the possibility that the conditional marginal-effect estimates of the binning estimator are equal to those from the linear interaction effect from the original model. The histogram at the bottom of the figure corroborates that there is sufficient common support across values of $\Delta \text{PRI}_{m,t}$.