Direct and Indirect Representation[1]

Shigeo Hirano[2]
Department of Political Science
Columbia University

Michael M. Ting[3]
Department of Political Science and SIPA
Columbia University

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[2]Political Science Department, 420 W 118th St., New York NY 10027 (sh145@columbia.edu).

[3]Political Science Department, 420 W 118th St., New York NY 10027 (mmt2033@columbia.edu).

Abstract

How much can a constituency influence the power of its representative in the legislature? We develop a theoretical model of the constituency basis of legislator influence. The key players in the model are interest groups who may receive targeted transfers from the legislature. The model predicts that the amount of transfers that such groups receive is increasing in their ability to help a party win a legislative seat in the next election. We test this claim using the changes in Japanese central-to-municipality transfers after a representative passes away while in office. We find that electorally "strong" constituency groups do not lose transfers when they lose their representatives. However, when "weak" constituency groups lose their representatives the transfers decrease by roughly 8 percent.

1. Introduction

In a representative democracy, constituencies are indirectly represented in the policy-making process by their chosen representatives.[1] Representatives help insure that public policies reflect the interests of their constituents. Thus, we would expect that the value of a representative should be most apparent with respect to policies that distribute benefits to specific constituencies, such as targeted government transfers.

In most theoretical models of distributive politics with multiple districts, constituencies receive benefits because of individual representatives' activities in the legislature (e.g. Baron and Ferejohn, 1989; Weingast, Shepsle and Johnsen, 1981).[2] Legislators are usually motivated by some personal interest in delivering benefits to their constituents, which is often assumed to be related to a re-election motive.[3] Constituents therefore receive government transfers as a function of the characteristics or strategies of their legislators.

The comparative politics literature on clientelism, especially in Latin America, Africa, South Asia and Eastern Europe, has long established another mechanism behind targeted transfers. A number of scholars highlight the role of local constituency organizations in influencing the allocation of distributive benefits (e.g. Kitschelt and Kselman, 2010; Scott, 1969). Party networks, local political machines and political "brokers" or "fixers" are widely seen as mobilizers and monitors of voting behavior within groups of constituents (e.g. Stokes, 2005; Calvo and Murillo, 2013; Ames, 2001). The constituency groups that deliver votes are rewarded with various clientelistic benefits, which usually include access to government resources such as patronage or public expenditures. In describing these local organizations in Argentina, Levitsky (2001, 62) writes, "Local organizations control the bulk of patronage distribution, mobilize activists, and deliver a large percentage of the party vote." What is often less clear in this literature is how the interests of these constituency groups are incorporated into the policy-making process. Are these constituency interests represented

[1]The municipality level electoral data used in this paper is available at (www.bokutakusha.com/ldb/ldb_databank.html). District level electoral data is available at (www.fps.chuo-u.ac.jp/∼sreed/DataPage.html). The economic and demographic data is available from the Nikkei Economic Electronic Databank System (NEEDS; http://www.nikkei.co.jp/needs/contents/regional.html).

[2]See Shepsle and Weingast (1994) for a review of theoretical developments on distributive politics.

[3]Levitt and Snyder (1997) provide some empirical evidence that U.S. House members receive higher electoral support when they bring federal outlays back to their districts.

indirectly though elected representatives, as described in the theoretical models, or somehow incorporated more directly into distributive policies?

In this paper we reconcile these views by incorporating local constituency groups in a theoretical model of distributive politics. We offer an alternative to existing models of electoral and distributive politics with legislative bargaining. In addition to the ability to bargain over distributive goods, a legislator's influence may reflect the underlying organization of his/her constituents. The intuition for the argument is as follows. Suppose that a political organization "controls" a bloc of votes in a candidate's district, and that each candidate's vote total depended on both the organization's support and a random partisan national tide. Suppose also that parties value larger legislative coalitions, since they may help parties to realize spillovers from pork projects. A large, well-organized group would then be at an advantage in securing pork benefits, since it can credibly threaten a party with the loss of a seat in a future election. Likewise, a small group would be disadvantaged, since its candidate's electoral fortunes are more affected by the random tide.

One plausible way to examine the constituency support hypothesis is to consider the extreme case of what happens when a constituency loses its representative altogether. These legislators can obviously no longer participate in bargaining over pork, but leave behind constituents who may hold their former representative's colleagues accountable for pork. We can then ask a simple question: Is the allocation of distributive goods to constituencies with large cohesive organizations less sensitive to the loss of their representative in the legislature than those with smaller or less cohesive organizations?

The first half of the paper elaborates the logic of the constituent basis of legislator influence through a game theoretic model. The model is intended to illustrate the influence of constituency groups on government spending in the simplest possible way. We believe that the model is potentially applicable to any environment in which parties can influence the distribution of spending toward specific interest groups and groups can mobilize votes for candidates. It can accommodate both multi- and single-member districts, and does not require that all (or even most) voters be associated with an interest group. Although an extensive literature addresses the distribution of public expenditures, to our knowledge this

is the first paper to incorporate constituency groups and elections directly into a model of bargaining over distributive goods.

In the game, a legislature distributes public spending over two periods, separated by an election. Each sitting legislator and candidate is associated with two features; first, a political party affiliation, and second, a constituency group that controls a block of votes in the district.[4] There is some uncertainty about the ability of each group to deliver an electoral victory, since electoral outcomes also depend on a nationwide partisan tide.

Government spending is targetable toward the supporters of specific legislators. This allows constituency groups to tie the parties' electoral prospects to the amount of government transfers received. In particular, if a legislator becomes unable to participate during the first bargaining session, then his/her associated group can bargain with the party for a "set-aside" of transfers in return for continued electoral support. The party, which is concerned with maximizing its future seat share, can then propose a set-aside of transfers for the group. The set-aside amount must be supported by a majority of party members. After the set-aside is determined, legislators bargain over the remaining transfers.

At each bargaining stage, legislators within each political party determine the distribution of spending across their constituents under majority rule. Legislators are identical in ability and voting power, but the majority party controls a larger share of the government budget than the minority party.[5] We therefore invoke existing bargaining models to assume that each legislator within a party expects to receive transfers with the same *ex ante* expected value. A legislator's vote over a set-aside in the first bargaining stage therefore must take into account the extent to which the proposing group could affect the party's majority status in the next legislative session.

The key result of the model is that a constituency group that loses its legislative representative will generally see positive transfers. However, these transfers are typically increasing in the probability that the group's support will be pivotal in securing a legislative seat in the next election. Within a multi-member district, losing the support of a larger constituency

[4]Groups can be "large," in the sense that its members may be broken up into sub-groups who live in different districts.

[5]One interpretation of this assumption is that parties are strong or disciplined and can exclude non-members from pork.

group results in the loss of a larger number of voters. This in turn makes a large coalition and the pork benefits thereof more difficult to achieve. A similar intuition holds for single-member districts, where (holding the strength of the opposition's candidate constant) a larger constituency group can receive better pork allocations from the party when its incumbent is incapacitated.

The second half of the paper exploits several features of Japanese politics during the second half of the twentieth century to help identify the effect of constituency group size on distributive benefits. As in other multi-member district systems that forced co-partisans to compete against each other, Japanese Diet members during this period would often carve out geographically defined electoral bailiwicks known as *jiban*.[6] Directing resources from the national treasury were often considered to be crucial for Diet members to cultivate their *jiban* (e.g. Fukui and Fukai, 1996). The location of *jiban* supporting a candidate competing against a co-partisan in the same district is often readily apparent in the electoral outcomes (Curtis, 1971; Hirano 2006; Tatebayashi 2004).

Jiban were usually organized by candidates' constituency organizations, known as *koenkai*. Similar to constituency groups in various clientelist systems, the *koenkai* would involve local leaders and mobilize large blocs of voters by cultivating connections with local associations within the *jiban*. Krauss and Pekkanen (2010, p. 30) describe *koenkai* as "permanent formal-membership organizations, or overlapping sets of networks of organizations, devoted to supporting an individual politician and heavily involved in electoral mobilization." *Koenkai* were known to be transferred from Diet members to their successors, but as we describe below, *koenkai* varied in the amount of electoral support they could deliver consistently across elections. The inter-candidate transfer of the *koenkai* support and the variation in the size of the bloc of voters each *koenkai* could reliably mobilize is consistent with the description of the constituency groups in the model.

To identify the influence of constituency groups separate from the Diet members they elect, we exploit the large number of Japanese legislators who passed away midterm but were not necessarily replaced. These cases provide arguably exogenous shocks to representation in

[6]In Brazil and Ireland, which also have multi-member district systems, candidates are also known to cultivate connections with geographically defined constituency organizations (e.g. Ames, 2001; Sacks, 1976).

the legislature but not to the influence of constituency groups, as the *koenkai* would continue to organize voters in the deceased candidates' *jiban*.[7] Thus, the model would predict that the ability of the *jiban* to support a candidate in the next election would determine whether it would continue to receive benefits despite not having a representative in the legislature.

We find evidence that transfers to constituency groups which are more likely to help secure a seat in future elections are less affected by the passing away of the group's representative than groups which are less likely to help secure a seat in future elections. This is consistent with the second intuition from the model and suggests that Japanese legislators are willing to forgo benefits to their own "core" areas in order to satisfy constituency groups which have a reasonable claim to providing "swing" seats in the next election.[8]

The unique features of the Japanese case that allow us to test the predictions from the theoretical model raise concerns about the external validity of the findings. In the conclusion we provide some discussion of how the patterns of indirect representation may differ in other contexts.

2. The Model

Our model considers the distribution of public spending over two legislative sessions or periods, indexed by t. Between the sessions there is a partisan election. The legislature represents $I \geq 1$ (odd) electoral districts, each represented by $J \geq 1$ (odd) legislators, where the size of the legislature satisfies $L \equiv IJ \geq 3$. Each legislator and election candidate belongs to one of two parties, denoted P_1 and P_2. As is standard in models of legislative bargaining, each legislator maximizes his/her total allocation of transfers.[9] Following the standard in models of political competition, parties maximize the number of seats won.[10]

[7] Hirano (2011) also exploits the fact that Japanese legislators who pass away midterm are not replaced to estimate the relationship between individual representatives and pork distribution. That paper does not examine how the strength of constituency groups may affect the distribution of public expenditures.

[8] This result can also be considered a variant of an ongoing debate over whether political parties devote resources to "swing" versus "core" areas (e.g. Cox and McCubbins, 1986; Lindbeck and Weibull, 1987; Dixit and Londregan, 1995; Hirano, Snyder and Ting, 2009). By devoting resources to the "core" areas of deceased legislators, the party is maximizing its chances to secure a majority of seats.

[9] Allowing legislators standing for election to care about winning office would not change the results.

[10] The objective of seat-share maximization is equivalent to the maximization of resources to be divided in the subsequent legislative session.

The key feature of the model is that each legislator may become incapable of participating in the legislative process. This may be due to death or an illness that prevents participation until after the election. At the beginning of period 1, one legislator is chosen randomly from each party, according to any distribution over party members. With probability $\gamma > 0$, that legislator is incapacitated for the session, with no replacement.[11] No incapacitation takes place in period 2. Let m_p^t denote the number of party P_p representatives available in the legislature to bargain in period t.

In each session t, the main outcome of interest is the division of public funds, which can be targeted toward individual legislators. The size of the "pie" to be distributed is given by $1 + r(m_1^t) + r(m_2^t)$, and thus depends on the distribution of seats in the legislature. The function $r : [0, L] \to \Re_+$ maps a party's size to a "bonus" that can be distributed among its legislators. We assume that $r(m) = 0$ (> 0) for $m < \theta$ $(\geq \theta)$ and some integer θ satisfying $0 < \theta < L$. Further, $r(m)/m$ is weakly increasing in m, so that (i) the per capita value of the bonus is non-decreasing in the party's size; and (ii) the majority party receives a higher per capita bonus than the minority. The size bonus is meant to capture procedural or allocative efficiencies that might follow from larger legislative coalitions. For example, $\theta = (L + 1)/2$ implies perks from majority status, due perhaps to a party's control over the legislative agenda.[12] The final distribution is represented by the $I \times J$ matrix $\mathbf{x}^t$, where element x_{ij}^t is the allocation to the j-th legislator in district i and $\sum_{i=1}^{I} \sum_{j=1}^{J} x_{ij}^t \leq 1 + r(m_1^t) + r(m_2^t)$.

The legislature determines a budget allocation by a bargaining process that includes all legislators who are present in the legislature (i.e., not incapacitated). Each party P_p has exclusive rights to bargain over its bonus $r(m_p^t)$. The remaining "dollar," which cannot be appropriated by either party due to technological constraints, weak discipline, or institutional constraints, is allocated to each party on a proportional basis for their internal bargaining process. In effect, each party specifies its *ex ante* expected portion $m_p^t/(m_1^t + m_2^t) + r(m_p^t)$

[11] We introduce this probability simply to incorporate the cases of zero, one and two incapacitations within a single model.

[12] One interpretation of the bonus is that it represents geographic spillovers in government spending that can be better captured by constituents of large coalitions. Constituents of such a party are more likely to be geographically continuous. Thus larger coalitions may enlarge the set of projects that can be feasibly proposed. This is especially relevant with multi-member districts, where legislators might have more difficulty excluding non-party members.

of the public budget independently.

We are agnostic about the details of the bargaining game within each party, simply because many bargaining games predict equal *ex ante* expected payoffs in games where all players have equal voting weight.[13] This is true of the noncooperative models of Baron and Ferejohn (1989) and Morelli (1999), and also of power indices based on cooperative game theory, such as Shapley and Shubik (1954) and Banzhaf (1968). Thus when there are no incapacitated legislators the bargaining process implies an *ex ante* expected period t transfer level of:

$$\frac{1}{L} + \frac{r(m_p^t)}{m_p^t} \tag{1}$$

When a party has an incapacitated legislator, it can respond by bargaining with its members over the division of pork. In particular, a party can propose a "set-aside" allocation to its members. This allocation is represented by the $I \times J$ matrix $\mathbf{y}_p$ and may promise a positive level of funding to any constituency, including that of an incapacitated legislator. This proposal is then voted on against the status quo set-aside of $\mathbf{0}$ by all party members according to majority rule; thus, a party cannot simply impose the set-aside on its members. If $\mathbf{y}_p$ is approved, then party P_p's total allocation is reduced by $y_p = \sum_i \sum_j y_{pij}$ and each surviving legislator's period 1 expected bargaining share is reduced accordingly to:

$$\frac{1}{m_1^1 + m_2^1} + \frac{r(m_p^1) - y_p}{m_p^1}.$$

Obviously, any set-aside must satisfy the budget constraint $\mathbf{x}^1 \geq \mathbf{y}_1 + \mathbf{y}_2$.

The election that takes place between policy-making periods links legislators and parties with their constituencies. In the election, each party runs J candidates in each district. These candidates include all incumbents as well as possible replacements for opposition legislators and incapacitated legislators. Denote by C_{pij} the j-th party P_p candidate in district i. In each district i, candidates compete over a continuum of non-strategic voters of measure 1.

Each candidate's electoral support is determined in large part by a candidate-centered interest group. To represent such groups, each candidate is associated exogenously with

[13]Consequently, the results of the bargaining process do not depend on the assumption that parties are allocated m_p^t/L of the fixed portion of the budget on a proportional basis. Identical results would be obtained if each party P_p bargained over its exclusive share $r(m_p^t)$, and then the entire legislature bargained over the remaining dollar.

a player G_{pij} and a portion ρ_{pij} of district i's voters. A group that was associated with an incapacitated legislator is simply associated with that party's replacement candidate for that legislator. We assume that $\rho_{pij} > 0$ for all p, i and j, and $\sum_p \sum_i \sum_j \rho_{pij} < 1$, and order districts so that ρ_{pij} is decreasing in j. Like their associated legislators, groups maximize transfers. This leaves $\rho_i^0 = 1 - \sum_p \sum_i \sum_j \rho_{pij}$ as the measure of district i voters who are not affiliated with a group. Note that each party's candidates are identical up to changes in their district and their group support.

Each group can affect its legislator's behavior through its decision g_{pij} over whether to support its candidate. The form of this strategy depends on whether a group's legislator is incapacitated. When its legislator is not incapacitated, the group simply chooses g_{pij} at the election stage. If the group supports its candidate ($g_{pij} = 1$), then candidate C_{pij} receives the votes of all ρ_{pij} of its associated members. If the group does not support its candidate ($g_{pij} = 0$), then its voters do not vote.[14] While we do not model a spatial dimension to voter choices, each group's voters might plausibly represent ideologically homogeneous citizens who will either vote for their preferred party's candidate or stay home. Thus the group's role is a combination of motivating turnout and coordinating votes in favor of its candidate.

When its legislator is incapacitated, a group can bargain with its party.[15] We implement this by allowing G_{pij} to commit to a support strategy. Thus $g_{pij}(x^1_{pij})$ becomes a "contract" that is announced prior to the realization of $\mathbf{x}^1$. In equilibrium, this contract becomes the basis for the party's set-aside allocation $\mathbf{y}_p$. While this assumption probably represents a best case for what groups can achieve, it is also perhaps the most straightforward way to model the groups' electoral influence without the complexity of an explicit repeated game.[16]

[14]The results of the model are substantively similar if some of these voters split their votes evenly across the party's remaining candidates. However, such a model would require the analysis of many more cases.

[15]This raises the question of why groups do not bargain with a party when their legislators are not incapacitated. One answer is that this would result in lower transfers for most legislators. Another is that even for legislators who might benefit from doing so, in a repeated setting, seat-maximizing parties would have incentives to limit such opportunistic behavior by groups or their legislators. We therefore simplify the model by assuming that groups cannot choose to bargain when their legislators are not incapacitated, and in effect incorporate repeat play or overlapping generations considerations in a finite-period model. Relatedly, Alesina and Spear (1988) and Harrington (1992) develop models in which parties act as long-term organizations that help politicians commit to electorally advantageous policies that are not in their short-term interests.

[16]For a model of how voters can maintain re-election "contracts" in a repeated election setting, see Snyder and Ting (2008).

In addition to group support, vote totals are determined by a random partisan tide $\tau \in [0,1]$, where τ is distributed according to some continuous cdf $F(\tau)$. In district i, the tide assigns proportion $\tau\rho_i^0$ of voters evenly across party P_1's candidates, and similarly assigns proportion $(1-\tau)\rho_i^0$ evenly amongst P_2's candidates. Each district then sends its top J vote-getters to the period 2 legislature.

The game begins with an initial configuration of legislators representing each district. For consistency with the election model, we assume that incumbents and replacements for incapacitated legislators are associated with strictly larger support groups (i.e., the highest ρ_{pij}) than non-incumbents. The sequence then proceeds as follows.

1 *Incapacitation.* In each party, Nature chooses one legislator according to some distribution. With probability γ, this legislator is incapacitated.

2 *Voting Contracts.* For any incapacitated legislator, its group G_{pij} announces $g_{pij}(x^1_{pij})$.

3 *Party Allocation.* Each party P_p with incapacitated legislators proposes a set-aside $\mathbf{y}_p$. Each such allocation is voted against the allocation $\mathbf{0}$ by legislators in P_p.

4 *Legislative Bargaining 1.* In each party, legislators bargain, resulting in $\mathbf{x}^1$.

5 *Elections.* Groups associated with non-incapacitated legislators choose support levels g_{pij}. Nature determines τ and election winners are determined.

6 *Legislative Bargaining 2.* In each party, legislators bargain, resulting in $\mathbf{x}^2$.

We derive the unique subgame perfect equilibrium in pure strategies. Thus, given the game history at the relevant stage, groups associated with non-incapacitated legislators choose the optimal support level. When there is an incapacitated legislator, his/her associated group announces a transfer-maximizing voting contract, his/her party proposes a seat-maximizing set-aside allocation, and surviving legislators vote on this allocation . We treat the two legislative bargaining stages as reduced forms in the manner described above and therefore do not derive explicit bargaining strategies.

3. Theoretical Results

We first develop some notation and terminology for describing electoral outcomes. In any district i, each party P_1 candidate C_{1ij}'s vote share is:

$$g_{1ij}\rho_{1ij} + \frac{\tau\rho_i^0}{J},$$

and likewise, each party P_2 candidate C_{2ij}'s vote share is:

$$g_{2ij}\rho_{2ij} + \frac{(1-\tau)\rho_i^0}{J}.$$

These expressions imply that in each district i, there exists a set of *tide cutpoints* $\mathcal{T}_i = \{\tau_i^j\}$, which are the minimum values of τ at which exactly j (respectively, $J-j$) candidates from party P_1 (respectively, P_2) are elected when $g_{pij} = 1$ for each group. According to $F(\tau)$, $F(\tau_i^j)$ is the probability that district i elects at most $j-1$ party P_1 candidates, or equivalently at least $J-j$ party P_2 candidates. By construction, if candidate $C_{pij'}$ is elected, then any candidate C_{pij} must also be elected if $j < j'$ and $g_{pij} = g_{pij'}$. However, depending on ρ_i^0 and the distribution of group sizes, it is possible that a party will have fewer than J electable candidates when all groups support their candidates. This occurs if a party is electorally "weak" in a district. Thus, $\mathcal{T}_i$ may contain up to J interior elements. When candidate j from party P_1 in district i cannot be elected for any τ, we let $\tau_i^j = 1$. It will also be convenient to let $\tau_i^{J+1} = 1$.

Aggregating across all districts, it is straightforward to construct a set of "national" tide cutpoints $\mathcal{T} = \{\tau^n\}$ at which a total of n (respectively, $L-n$) party P_1 (respectively, P_2) candidates are elected. For each τ^n $(n = 1, \ldots, L)$ there is a unique τ_i^j for some district i and candidate j for which $\tau^n = \tau_i^j$. Analogously to the single-district case, we also let $\tau^{L+1} = 1$. It is clear that for all n, $\tau^{n+1} \geq \tau^n$, or equivalently that the number of seats won by P_1 is increasing in τ. The set $\mathcal{T}$ induces a distribution over the number of seats won by party P_1, where $F(\tau^n)$ is the probability that P_1 wins at most $n-1$ seats. Its probability of attaining a majority is simply $1-F(\tau^{(L+1)/2})$, and its expected number of seats is $\sum_{n=1}^{L}[F(\tau^{n+1}) - F(\tau^n)]n$. Figure 1 illustrates district- and nation-wide tide cutpoints.

[Figure 1 here.]

The derivation of an equilibrium is simplified by the observation that groups not associated with incapacitated legislators (and hence unable to write contracts) maximize their

candidate's vote share by supporting their candidate. This strictly increases both their candidate's probability of attaining office, as well as the size of their party's coalition. According to our assumptions on $r(\cdot)$, this implies a higher expected level of transfers in period 2, and hence all such groups have a weakly dominant strategy of supporting their candidate; $g^*_{pij} = 1$.

3.1. A Baseline — No Incapacitation

Suppose first that $\gamma = 0$, so that no legislator can be incapacitated. This allows us to isolate the effects of the election on future legislative outcomes. Since groups do not withhold support for their candidates, neither party has any incentive to propose a positive set-aside allocation, and hence $\mathbf{y}^*_p = \mathbf{0}$. Thus, in the bargaining process legislators receive the *ex ante* expected transfer levels given by (1) in both periods. Depending on the realization of τ, the size and identity of the majority party may change, and so an incumbent legislator in party P_1 with tide cutpoint τ^n has an expected payoff of:

$$\frac{1}{L} + \frac{r(m_1^1)}{m_1^1} + \frac{1 - F(\tau^n)}{L} + \sum_{k=n}^{L} \left[F(\tau^{k+1}) - F(\tau^k)\right] \frac{r(k)}{k}. \tag{2}$$

The first two terms of (2) represent the transfers expected in period 1. The third term is the expected share of period 2 transfers that is independent of party size. This is simply each legislator's vote share in the legislature, multiplied by the probability of election. The final term is the expected impact of the party's size, as higher realizations of τ will result in higher shares of the bonus $r(m_1^2)$. Since this term would be affected by a group withholding its support for its party's candidate, it will figure prominently in the subsequent discussion.

3.2. Example

To build intuition, we first present a simple example illustrating the bargaining power of a constituent group. Suppose that $\theta = (L+1)/2$, so that only the majority party receives a size bonus. Consider some three-member district i with tide cutpoints $\mathcal{T}_i = \{\tau_i^1, \tau_i^2, \tau_i^3\}$, and suppose that a party P_1 legislator is incapacitated. Let his/her associated group be G_{1i1}; i.e., the group with the largest population under its control. Finally, let the distribution of the partisan tide be uniform, so that $F(\tau) = \tau$.

We look for a voting contract between the group and the party that maximizes the set-

aside transfer allocation y_{1i1}, subject to the party being willing to designate exactly y_{1i1} in $\mathbf{y}_1$. In return, the group will choose $g_{1i1} = 1$. To derive the value of the set-aside, suppose that the group chooses $g_{1i1} = 0$. What effect does this have on the number of seats that party P_1 wins in the election? Candidate C_{1i1} now must receive the lowest vote total in party P_1. This induces new sets of tide cutpoints $\mathcal{T}_i' = \{\tau_i^{j'}\}$ for district i, and $\mathcal{T}' = \{\tau^{n'}\}$ for the entire electorate. Outside of district i, the electoral prospects of each candidate are unaffected by the incapacitation. Thus, any difference between the elements in $\mathcal{T}$ and $\mathcal{T}'$ must lie only in the cutpoints associated with district i.

In district i, the tide that would have secured two seats if all groups supported their candidates, τ_i^2, is now sufficient to win only one: this tide implies that C_{1i2} (the P_1 candidate backed by P_1's second-largest group) would still beat C_{2i3} (the P_2 candidate backed by P_2's smallest group). More generally, each new cutpoint satisfies $\tau_i^{j'} \in (\tau_i^j, \tau_i^{j+1})$ for all j, when τ_i^j and τ_i^{j+1} are interior. Note that the updated electoral prospects (and hence tide cutpoint) for candidate C_{1i3} would be the same if either G_{1i1} or G_{1i2} did not support its candidate: in both cases, C_{1i3} must beat the second-strongest P_2 candidate in order to achieve office.

Suppose that $\tau_i^3 < 1$ and $\tau_i^{3'} = 1$, so that party P_1 cannot win three seats in the district after G_{1i1} withholds support (i.e., P_2's largest group cannot be beaten by a strong P_1 tide alone). There are several cases in which party P_1 does not do worse as a result of the incapacitated legislator. For $\tau < \tau_i^1$, it wins zero seats in both worlds. Likewise, for $\tau \in (\tau_i^{1'}, \tau_i^2)$ it wins one, and for $\tau \in (\tau_i^{2'}, \tau_i^3)$ it wins two. Otherwise, P_1 loses one seat when G_{1i1} withholds support. In expectation, this results in one less seat for party P_1 with probability $\sum_{j=1}^{J}(\tau_i^{j'} - \tau_i^j)$. Figure 2 illustrates the corresponding new configuration of national cutpoints.

[Figure 2 here.]

This reduction in expected seats has two effects on the amount and distribution of P_1's transfers in the second legislative session. First, there is a 'linear' reduction from expecting $\sum_{j=1}^{J}(\tau_i^{j'} - \tau_i^j)/L$ less in transfers from the non-bonus portion of the pie. This expression simply reflects P_1's expected seat loss and does not affect its per capita expected allocation.

Second, there is a lower expected per capita bonus $r(\cdot)$ from majority party status. This

loss depends on the location of τ_i^1. If $\tau_i^1 \geq \tau^\theta$, then the district is electorally unfavorable to P_1, and the party would be able to achieve a majority even if none of its district i candidates were elected. Thus, the loss of G_{1i1}'s support will result in P_1 legislators receiving a smaller size bonus, due to the increasing returns to a coalition's size.

In what follows we focus on the case where $\tau_i^1 < \tau^\theta$. This case is more interesting because the loss of G_{1i1}'s support implies that the tide cutpoint of τ^θ may no longer be sufficient for attaining a majority, and could therefore reduce the party's likelihood of even attaining a size bonus. To determine the set-aside demanded by G_{1i1}, consider the expected losses of a surviving P_1 member with tide cutpoint τ^n. Since there are no other incapacitations, all other groups support their candidates in the election. Thus each surviving P_1 legislator will lose only an expected share of the size bonus corresponding to the absence of C_{1i1}. Legislators not in district i will not lose any "non-majority" benefits, since G_{1i1}'s support does not affect his/her chance of election and C_{1i1}'s presence in the second legislative session does not affect his/her expected share of the non-majority dollar. Aggregating over possible realizations of τ, the expected period 2 loss for any such legislator is then:

$$\sum_{k=\max\{n,\theta\}}^{L} (\tau^{k'} - \tau^k) \left[\frac{r(k)}{k} - \frac{r(k-1)}{k-1} \right]. \tag{3}$$

This expected loss is weakly decreasing in n; that is, members representing "weak" districts have less to lose because their chances of reelection are low. Note that there is no expected loss in the event that $\tau < \tau^\theta$, since $r(\cdot)$ in this region is zero. As a result, (3) is constant for all legislators with $\tau^n < \tau^\theta$.

By contrast, a surviving district i legislator suffers the loss in the size bonus, but also benefits from the incapacitation because it bolsters his/her election chances. The expected period 2 loss for such a legislator with a new national tide cutpoint $\tau^{o'}$ is:

$$\begin{aligned} &\sum_{k=\max\{n,\theta\}}^{L} (\tau^{k'} - \tau^k) \left[\frac{r(k)}{k} - \frac{r(k-1)}{k-1} \right] - \sum_{k=o+1}^{n-1} (\tau^{k+1} - \tau^k) \left[\frac{r(k)}{k} + \frac{1}{L} \right] \\ &\quad -(\tau^{o+1} - \tau^{o'}) \left[\frac{r(o)}{o} + \frac{1}{L} \right]. \end{aligned} \tag{4}$$

Together, expressions (3) and (4) identify the per capita amount that each legislator is willing to lose in pork in period 1. The aggregate amount that G_{1i1} can demand is then

determined by the median of these values, multiplied by m_1^1 since party members expect equal *ex ante* shares of pork and would therefore contribute equally to G_{1i1}.

Characterizing the median surviving P_1 member's willingness to give up pork is simplified by the fact that under most conditions, that legislator must have a tide cutpoint below τ^θ. Since most legislators are not in district i, this implies that a majority of P_1 members would vote in favor of a set-aside allocation y_{1ij}^* that gives up exactly the amount in (3) (in per capita terms) to G_{1i1}.

G_{1i1}'s optimal voting contract therefore forces the median P_1 survivor to be indifferent between (i) setting aside y_{1ij}^* for the group and bargaining over a smaller pie in the first session, and (ii) bargaining over the entire party pie in the first session and risking a smaller pie in the second. Thus the group is able to prevent party members from completely appropriating the transfers that the incapacitated legislator would have enjoyed. Note that the group's ability to commit to this voting scheme is critical, as it would have simply supported its candidate in a setting without commitment.

The amount of transfers that a group can recover depends on the functional form of $r(\cdot)$. If $r(\cdot)$ is sufficiently high, then an electorally influential group such as G_{1i1} may even receive more in the first legislative session than it would have expected in the presence of its legislator. This can happen because the set-aside y_{1ij}^* does not depend on P_1's majority status, but rather its future electoral prospects. Thus if P_1 is the minority party and τ^θ is low, then it will have relatively little to allocate among its members in period 1 but high expectations of future transfers. While a group such as G_{1i1} can extract a great deal in this environment, such circumstances are probably unlikely in practice.

3.3. Main Results

We can generalize the logic of this example straightforwardly to reach the main results. Propositions 1 and 2 establish the latent power of constituent support in the electorate. As noted previously, they represent an ideal case for what groups can achieve when they are able to act in a cohesive manner. The results are general in several ways. Most notably, they hold for multi- and single-member districts. They also hold independently of the probability of incapacitation (γ) as well as the probability distribution over who is incapacitated.

Both results hold under a very mild condition on the size of the party coalition of the incapacitated legislator. The condition is that if an incapacitated legislator is from party P_p, that party's size in the legislature (m_p^1) must be small enough to ensure that its median voter's tide cutpoint is below τ^θ. When the size bonus requires a majority ($\theta \geq (L+1)/2$), the condition requires only that the minority party control at least $J+2$ seats, which is a trivial number in a legislature with I districts and IJ total seats. We note without proof that the result often holds even in the absence of this condition.

Proposition 1 links the electoral influence of a group to the amount that its constituents can expect if its legislator becomes incapacitated under multi-member ($J > 1$) districts.

Proposition 1 *(Multi-member districts) For any party p and district i, if $m_p^1 < 2(\theta-1)-J$, then y_{pij}^* is weakly decreasing in j for incapacitated legislator C_{pij}.* ■

Proof. All proofs can be found in the Appendix. ■

The second result applies to single-member districts. When $J = 1$, Proposition 1 makes no prediction because it varies the relative standing of a group within a district. Proposition 2 directly varies the size of the incapacitated legislator's constituency group, holding constant the size of his/her opposition candidate's constituency group.[17]

Proposition 2 *(Single-member districts) For $J = 1$, any party p and district i, if $m_p^1 < 2\theta - 3$, then y_{pi1}^* is increasing in ρ_{pi1} for incapacitated legislator C_{pi1}.* ■

Interestingly, if the gain in the size of an incapacitated incumbent legislator's constituency group came instead at the expense of the opposing candidate's constituency group, then the result would be reversed. In this case, the incumbent's party would have an easier time defeating the opposition using the partisan tide alone. Thus, for an electoral system composed of single-member districts, the theory generates sharply contrasting predictions about the effects of group size and the distribution of voters.

The implication of Propositions 1 and 2 is that across a range of electoral systems and parameter configurations, we expect larger drops in pork spending where incapacitated leg-

[17] Proposition 1 cannot be written in terms of group sizes, since the absence of a larger group's support could actually benefit the electoral prospects of a party's remaining candidates under some circumstances.

islators are backed by "weak" constituency groups. Importantly, they suggest that legislative constituents and their implicit bargaining power play a central role in determining legislative transfers. This contrasts with a substantial literature on elections and legislative policy-making (e.g., Austen-Smith and Banks 1988; Chari, Jones and Marimon, 1997; Milesi-Ferretti, Perotti and Rostagno, 2002) in which the electorate assumes the less direct role of selecting legislators.

We note that it is possible to achieve similar results even if we relax the assumption of at most one incapacitation in each party. Allowing multiple incapacitations would complicate the model considerably by raising issues about the bargaining game between groups and the party. However, under the simple assumption that groups could unify their demands through a central negotiator and distribute their party's set-aside as a weakly increasing function of group size, the basic relationship in Proposition 1 would continue to hold.

It is finally worth observing that our assumptions on $r(\cdot)$ have two non-trivial effects. First, the comparative statics will typically not be linear in ρ_{pij}. Within a party, the ability to attain the size bonus confers a "jump" in per capita benefits. Large groups will generally be able to claim large set-asides due to their influence on achieving the bonus, while smaller groups receive less. Second, even electorally weak groups receive positive benefits, because the per capita bonus implied by $r(\cdot)$ is increasing in party size. One can imagine instead that majority status instead confers a fixed benefit r to the party. This would imply that beyond a minimum majority coalition, the per capita benefit of majority status would actually decline. In this environment, a group may not be able to extract anything from the party unless it were essential for achieving a majority. The results under this assumption would be similar, though considerably more cumbersome.

4. Evidence From Japanese Legislators Who Pass Away Midterm

In this section we use data on Japanese elections and public finance to examine the implications of Proposition 1. We test whether there is a significant drop in pork spending where incapacitated Japanese Lower House members are backed by "weak" constituency groups. Before discussing the specification and results, we discuss three features of Japanese politics that are relevant for our research design.

4.1 Features of Japanese Politics Relevant for our Identification Strategy

The research design we employ exploits three unique features of Japanese politics which were present during the period 1977 to 1992: (i) candidates for the Diet relied on electoral support from organized constituency groups; (ii) representatives were believed to have influenced the distribution of intergovernmental transfers; and (iii) Lower House Diet members were not necessarily replaced when they were incapacitated.

4.1.1 Groups Attached to Candidates: Jiban

Under Japan's multi-member district single non-transferable vote electoral system, Japanese politicians' electoral support tended to be concentrated in bailiwicks known as *jiban*. The multi-member district system is known to provide strong incentives for candidates to focus on narrow sub-constituencies within the districts (e.g. Myerson, 1993). This was especially true of candidates who were competing against co-partisans in the same district (e.g. Hirano, 2006). Candidate-specific *jiban* were important in helping to divide votes among co-partisans.

LDP candidates' *jiban* tended to be geographically concentrated around their hometowns (e.g., Hirano, 2006).[18] Highly organized personal support organizations, known as *koenkai*, were in charge of maintaining the candidate's support in the *jiban* (e.g., Bouissou, 1999; Curtis, 1971; Krauss and Pekkanen, 2010). Diet members employed numerous staff members to manage the different *koenkai* branches scattered across various municipalities within the *jiban*. *Koenkai* often served as an umbrella organizations for different sub-organizations that would target specific constituencies within the *jiban*.

Although *jiban* existed to support specific politicians, in many cases *jiban* support was passed along to successive candidates either as a whole or in parts. In describing the *jiban* of a prefectural assembly member, Curtis (1971, pp. 49-50) writes:

> When Sato entered the Prefectural Assembly he "inherited" the *jiban* of Aragane Keiji and when he left he "transferred" it to his chosen successor Shuto Kenji ... It is implicit in such procedures that the supporters of a politician have a

[18]Not all *jiban* were necessarily geographically oriented. Some may have been more policy oriented (McCubbins and Rosenbluth, 1995; Tatebayashi, 2004).

> loyalty to that politician which takes precedence over personal feelings toward the new candidate they are being asked to support, and that they will be able to deliver their "hard votes" to the candidate of their choice.

Conventional wisdom is that Japanese legislators cultivate support in their *jiban* by providing constituency services and by acting as a "pipeline" to the national treasury (e.g. Fukui and Fukai, 1996).[19]

We are primarily interested in the variation in the ability of *jiban* to increase the probability of a specific candidate being elected. Ideally we would like to employ some independent measures the size and organization of the different *jiban*. Unfortunately, such a measure, at least to our knowledge, does not exist. Thus, we measure *jiban* strength using the electoral history of the candidates supported by each *jiban*. We consider a *jiban* to be "strong" if it has a good track record for winning elections. *Jiban* are classified as being "weak" when its candidates lose an election or receive the fewest votes among the elected candidates more than once in the 10 years before or after the legislator passes away. We also only focus on *jiban* that support multiple candidates across time – i.e. *jiban* which are passed on from one candidate to another across Lower House elections. Without variation in *jiban* candidates, it is difficult to separate *jiban* strength from candidate-specific popularity, which of course may be related. We also consider *jiban* to be weak if they are passed on but survive for less than five years.

Jiban are identified using Steven Reed's data set of district-level electoral returns for the Japanese Lower House which includes an indicator variable for candidates' *jiban* affiliations.[20] To examine whether these *jiban* represent stable constituency groups, we can compare the correlation in the municipality vote shares for candidates from the same versus different *jiban* across consecutive elections. Candidates from the same *jiban* should have a high correlation in their municipality vote shares across elections, especially relative to the other candidates who do not share the same *jiban*. In other words, when a candidate inherits a *jiban*, the dis-

[19]Ramseyer and Rosenbluth (1995, pp. 8-9) write, "To even out its votes, the LDP uses its control over government to build its candidates' personal support networks. LDP candidates foster these networks through a combination of government dispensed 'pork', cash, and in-kind gifts, as well as bureaucratic intervention services."

[20]Steven R. Reed, *The Japan MMD Data Set*.

tribution of his/her electoral support across municipalities should resemble the distribution of electoral support of the candidate who was previously supported by the same *jiban*.

The correlations presented in Table 3 are consistent with our expectations if the *jiban* variable is an indicator for a stable constituency group. Even when a new candidate inherits the support of a *jiban*, his/her support is highly correlated with the vote shares of the candidate who was previously supported by the *jiban*. In fact, the correlation is much higher than the average of the highest correlation among co-partisans in the same district from different *jiban*. As we expected, the correlation in municipality vote share between candidates sharing a "weak" *jiban* is lower than the correlation between candidates sharing a "strong" *jiban*.

Figure 3 illustrates the geographic concentration in Akita 2nd district for the 1983 and 1986 Lower House elections. After losing the 1983 election Nemoto Ryutaro retired and, according to the Reed Dataset, passed his *jiban* on to Minorikawa Hidefumi. As the figure illustrates, the distribution of Minorikawa's electoral support in 1986 is positively correlated with the distribution of Nemoto's electoral support in 1983. The other candidates who remain the same in both elections also appear to have drawn support from the same geographically defined electoral bases.

[Figure 3 here.]

We identify the location of a candidate's *jiban* using his/her municipality level vote share in the election prior to his/her passing away. The vote share threshold we use to classify a municipality as being part of a *jiban* depends upon the magnitude of the district. In the five- and six-member districts, we consider a municipality to be part of a candidate's *jiban* if she receives more than 20% of the vote. In the three- and four-member districts, the thresholds for being part of a *jiban* are 30% and 25%, respectively. As will be discussed below, the results are somewhat sensitive to the vote share thresholds used to identify the *jiban*. In the specification below, we assume that *jiban* strength does not vary within legislative sessions.

In this paper we do not explore the determinants of *jiban* strength. On average the municipalities in a "weak" *jiban* have different characteristics than the "strong" *jiban*. The "weak" *jiban* tend to include municipalities that are poorer, have more employees in primary

industries, and have smaller populations than the "strong" *jiban*. This is not surprising since having municipalities with larger populations as part of one's *jiban* will secure more votes. These characteristics tend to be relatively stable over time.

One likely contributor to the strength of a *jiban* is the number and type of local politicians that are affiliated with the *koenkai* supporting the *jiban*.[21] Local politicians not only campaign for the Diet member but also bring their own personal support networks into the Diet member's *koenkai*. Thus these local politicians often determine the size of *jiban* and help insure that the *jiban* continues to mobilize the same constituents even when it is passed on to another Diet member. Further research should attempt to explain the determinants of *jiban* strength, but that is beyond the scope of this paper.

4.1.2 Politicized Government Transfers: Kokko Shishutsukin

Popular perception is that LDP Diet members were notorious for bringing government transfers back to their constituents, especially during the period prior to the 1994 electoral reforms.[22] As Curtis (1992, p. 229) writes, "For the local politicians ... the Diet member's key function is to provide what the Japanese like to call a "pipe" to the central government's pork-barrel." Similarly Fukui and Fukai (1996) write, "For much of the postwar period, but especially from the mid-1950s to the early 1990s, the role and performance of Diet members in pork barrel politics made or broke their political careers." This role for legislators is often part of the explanation for why Japanese politics is so candidate-centered and why the LDP has been able to control the Diet for most of the post World War II period (e.g. Scheiner, 2006).

The empirical evidence that legislators have significant influence over these central-to-municipality transfers is mixed.[23] Hirano (2011) exploits the non-replacement of incapac-

[21] We thank an anonymous reviewer for raising this point.

[22] In describing the activities of former prime minister Nakasone, Thayer (1969, p. 94) writes "Nakasone is called upon by the towns and villages to assist them in obtaining funds from the government for the construction of new facilities or the repair of existing facilities .... Each of these projects in the countryside stands as concrete testimony of the effectiveness of Nakasone as a member of the Diet. The secretaries are not at all hesitant about pointing these landmarks out."

[23] A number of studies that correlate transfers with the share of seats held by the LDP in a particular region suggest that each additional LDP politician affects the allocation of transfers. Doi (2001) finds a positive correlation between transfers aggregated at the prefectural level and the LDP's share of Lower House Seats in a prefecture. Meyer and Naka (1998) also find a positive correlation between transfers and LDP seat share

itated Japanese legislators to estimate the impact of individual representation on the distribution of intergovernmental transfers. That study finds little evidence that, on average, losing an LDP Lower House representatives has much influence over these distributive benefits. However, there is some evidence that representation in the legislature may affect intergovernmental transfers to constituencies which elect an LDP representative by a narrow margin.

This study focuses on the allocation of central-to-municipality government transfers between 1977 and 1992, during which time there were five elections for the Lower House of the Japanese Diet (1979, 1980, 1983, 1986 and 1990).[24] These central-to-locality transfers make up a large amount of total government expenditures. Roughly 60% of general tax revenue goes to the national government and 40% goes to the local government. However, roughly 60% of government expenditures are at the local level and 40% are at the national level (Shirai, 2005).[25]

About 90% of central government grants are transferred to localities in the form of *chiho kofuzei* (local allocation tax or LAT) or *kokko shishutsukin* (national treasury disbursements). The LAT is an unconditional, or non-earmarked, grant given to localities according to a formula based on the localities' needs. The national treasury disbursements are conditional grants distributed by the central government which are used to fund several types of programs including compulsory education, disaster relief, health and welfare, and construction.

We focus primarily on the national treasury disbursements since the popular perception is that these transfers are more likely to be politicized.[26] Previous studies find some evidence that representatives of the ruling Liberal Democratic Party have substantial influence on national treasury disbursements (Doi, 2001; Kobayashi, 1991). LAT has traditionally been

at the national level. However, Horiuchi and Saito (2003) find a negative relationship between transfers and seat shares using municipality level data.

[24]Because of the political changes in 1993, we limit the sample to period 1977 to 1992. In 1993, the LDP lost control of the government for the first time after several members defected from the party.

[25]Mochida (2001) shows that among OECD countries, Japan is unique in terms of high degree of government transfers from the central government to localities and the high proportion of local to total government expenditures.

[26]Yonehara (1993, 176) writes, "Most of the national specific-purpose disbursements are allocated among local governments at the discretion of the national government; there are only a few formula disbursements. Therefore, every local government seeks to obtain specific-purpose disbursements to the maximum extent possible."

perceived as being less open to political intervention on a year-to-year basis since it is based on a formula. Thus, we should not observe a change in LAT allocations after a legislator passes away. These data come from the *Nikkei NEEDS* Database.

4.1.3 Exogenous Shocks to Representation: Deceased Diet Members

For the entire post World War II period until 1996, Japanese Lower House Diet members were elected by a multi-member district, single non-transferable vote electoral system. For the period we examine between two to six Lower House members were elected from each district. Voters were given one non-transferable vote – i.e. a vote that is cast for one specific candidate.

One of the unique features of this system is that Lower House members were not necessarily replaced when they were incapacitated (i.e., passed away) midterm. Under this system, representatives who passed away would only be replaced if they died shortly after being elected or if more than one member passed away in the district.[27] Thus, a constituency group whose Lower House representative passes away midterm could be without a representative in the legislature for one or more years.

Data on legislators' deaths were gathered from various issues of the *Seiji Handobukku*, the *Kokkai Binran*, and the *Asahi Shimbun*. Between 1977 and 1992, sixty-seven Diet members passed away while in office. Forty-seven of these Diet members were affiliated with the Liberal Democratic Party (LDP). Fourteen were affiliated with the Japan Socialist Party. The remainder were affiliated with the Democratic Socialist Party (5) or the New Liberal Club (1).

One factor that we need to be concerned with is the degree to which the deceased legislator resembles the remaining Diet members. Table 1 compares the deceased Diet members to the general population of Japanese legislators at that time. The deceased LDP Diet members are older than the average Diet member but are younger than the average retiring LDP member. Also LDP members who pass away in office tend to be more senior than the average Diet

[27] A few papers have also used the passing of politicians as an exogenous shock to estimate the effect of representation on public policy (Jones and Olken, 2005; Roberts 1990). Jones and Olken (2005) examine how the death of leaders affected national economic conditions. Roberts (1990) examines how the death of senator Henry "Scoop" Jackson affected the stock prices of companies related to his home state of Washington.

member but less senior than the average retiring representative. The deceased legislators appear to be passing away approximately one legislative session before they would normally retire. Perhaps most importantly, the age of LDP Diet members who pass away in office is still younger than the average life expectancy for a Japanese male during this period.[28]

Another concern is that the timing of the deaths may not be exogenous. Table 2 lists the causes of death for the Diet members between 1970 and 1995. With the possible exception of suicide/murder and heart failure/heart attack, most of the causes of death are presumably uncorrelated with policy decisions. The main substantive findings discussed below do not appear to be significantly affected by excluding these potentially endogenous cases.[29]

4.2 Specification

To examine the relationship between *jiban* strength of incapacitated Japanese legislators and central-to-local transfers, we estimate the following model:

$$S_{i_e mt} = \alpha_{i_e m} + \omega_t + \delta_1 D_{i_e t-1} + \delta_2 J_{i_e m} D_{i_e t-1} + \delta_3 J_{i_e m} W_{i_e} D_{i_e t-1} + \delta_4 X_{i_e t} + \epsilon_{i_e mt} \qquad (5)$$

where $S_{i_e mt}$ is per capita central-to-local government transfers directed to district i, municipality m and year t of legislative session e. $D_{i_e t-1}$ is an indicator variable for whether a representative in district i is incapacitated at time $t-1$ of legislative session e. Thus, if a legislator passes away at $t-1$, then this indicator is equal to one from t until the next election.[30] $J_{i_e m}$ is an indicator variable for whether municipality m is part of the incapacitated incumbent's core support area (i.e. *jiban*) in the election to legislative session e. W_{i_e} is an indicator variable for whether the *jiban* of incapacitated incumbent in district i of legislative session e was "weak." $X_{i_e t}$ are other time varying covariates which are believed to affect central-to-local government transfers. We also interact $D_{i_e t-1}$ with a variable indicating the partisan affiliation of the candidates to determine whether the LDP candidates have greater influence over the distribution of public expenditures as popularly perceived.

[28] According to the Ministry of Health, Labour and Welfare, the average life expectancy for a Japanese male was 71.7 in 1975, 74.8 in 1985, and 76.4 in 1995.

[29] Legislators who pass away in office may have some unobserved attribute that affects their ability to deliver pork which is not present in legislators who do not pass away in office (e.g. those who work harder at providing pork to their constituents die at an earlier age). This potentially limits the generalizability of our findings.

[30] We assume that legislators influence the subsidies distributed in period t through their activities at time $t-1$.

The municipality level fixed effect, $\alpha_{i_e m}$, varies by legislative session. This takes into account municipality and district characteristics that influence transfers but do not vary substantially between elections.[31] Allowing fixed-effects to vary in this way should also take into account political changes that occur following each election, such as the partisan composition and seniority of the district's representatives.[32] The estimated effects are identified with only a subset of these observations since those who pass away just before an election year do not provide any additional information for the analysis.[33]

One concern is the potential connection between the measure of *jiban* strength and public expenditures since *jiban* strength is a function of electoral outcomes. Thus, we exclude the electoral outcome for the first election after a legislator passes away when calculating *jiban* strength. As a further robustness check, we also measure *jiban* strength only using elections prior to when the legislator passes away. As discussed below, this measure yields substantively similar findings.

We also include an indicator variable for whether the *jiban* was never passed on. There are multiple reasons why a *jiban* may not be passed along across candidates, including: (i) the *jiban* does not publicly specify a clear successor; (ii) the *jiban* is "weak" so it cannot recruit a candidate; (iii) the *jiban* may divide its support among several candidates; (iv) the *jiban* is organized to support only one particular candidate. Thus, it is likely that *jiban* which are not passed on include a mixture of "strong" and "weak" *jiban*.

We also include three additional covariates that are commonly included in analyses of Japanese government transfers: (i) the proportion of the work force engaged in primary industries (i.e., agriculture, forestry, fishery and mining); (ii) the proportion of the population

[31] Since $J_{i_e m}$ and W_{i_e} are assumed not to vary within a legislative session, the effect of these variables are captured in the municipality fixed effects.

[32] There is an issue of what year the fixed-effect should start for each legislative session. Since the fiscal years start on April 1, the negotiations for the budget begin as far back as the summer in the previous fiscal year and budgets are submitted to the Diet in the few months before the March 31 deadline. Several supplemental budgets are introduced as late as the fall of the fiscal year. Thus, if an election occurred after October of fiscal year t, the newly elected representatives are assumed to affect the public expenditures in fiscal year $t + 1$.

[33] The analysis presented in this paper makes a strict assumption that any impact of a deceased legislator in legislative session e will disappear in the election year to legislative session $e + 1$. The assumption is that the newly elected representatives will immediately be able to compensate for the previous absence of a representative. The results do not appear to be sensitive to relaxing this assumption.

considered to be dependent (i.e. those under the age of 15 or over the age of 65); (iii) the fiscal strength of the municipality (required revenue/required expenditures). These data also come from the *Nikkei NEEDS* database.[34] Since the time of death is assumed to be exogenous, our main variables of interest should be uncorrelated with observable and non-observable factors that may potentially influence both government transfers and electoral outcomes. However, including these variables may improve the efficiency of our estimates. Excluding these variables does not affect the main substantive findings.

4.3 Results

The main results are presented in Table 4. The results in the first column provide no statistically significant evidence that, on average, national treasury disbursements to either LDP or non-LDP *jiban* declined after the *jiban*'s representative passed away. As expected there is no evidence that LAT are affected by losing a representative. This is consistent with Hirano (2011).

The second and third columns provide evidence that LDP legislators supported by "weak" *jiban* have a statistically significant decline in national treasury disbursements. On average, there is approximately an 8 percent decline in the targeted transfers. However, there is no similar statistically significant decline in LAT to deceased legislators supported by "weak" *jiban*. The lack of association between deceased LDP legislators and LAT is what we expect given the common perception that LAT allocations are more closely tied to a formula.[35]

In Table A3, we examine three alternative measures of *jiban* strength. In the first column, *jiban* strength is determined by the last election. If a representative came in last place in the election, then he/she may be considered to have a "weak" jiban during the next legislative session. The measure used in the second column satisfies the criteria described in Subsection 4.1.1 with the exception that the first election after a representative passes away

[34]The first two variables are not available on a year-to-year basis but rather on a 5-year basis. Our understanding is the *Nikkei NEEDS* database simply linearly imputes the missing years.

[35]In Table A1, we present the results when we estimate equation (5) without including the three additional covariates. The results are substantively similar to the main results in Table 4. In Table A2, we present the results from focusing only on those districts with a deceased representative. Again the substantive findings do not appear to be significantly affected. Excluding year fixed effects does affect the statistical significance, but we know that the total amount of national treasury disbursements does appear to trend over the period we are examining.

is not dropped. Finally, the measure in the last column uses the same criteria described in Subsection 4.1.1 but only includes the elections in the fifteen years prior to when the representative passes away. The results in Table A3 suggest that the substantive findings remain statistically significant for each of these measures.

The results are somewhat sensitive to the vote thresholds used to identify the *jiban*. In Table A4, we present the results varying the vote share thresholds used to classify a municipality as being part of a *jiban*. In first column, municipalities in the five- and six-member districts are considered to be part of a candidate's *jiban* if that candidate receives more than 15% of the vote. In the three- and four-member districts, the threshold for being part of a *jiban* are 25% and 20% respectively. The threshold increases by 2% in the subsequent columns. The estimates in the table demonstrate how the significance of the main finding presented Table 4 declines as the vote share thresholds used to identify the *jiban* are increased or decreased by 5 or more percentage points.

A potential concern is that we may not be able to separate the effects of effort versus group strength. Candidates with "weak" *jiban* may simply be exerting more effort. While this explanation is possible, we find it less plausible since the legislators supported by "strong" *jiban* would have to be exerting no effort on behalf of their constituents but still receiving the *jiban* support. Furthermore, we might expect the candidates who came in last place in the election before passing away to have the strongest incentive to exert effort. The coefficient on an indicator variable for the core area of last place winners who pass away is negative but not statistically significant when the "weak" *jiban* indicator is also included. The coefficient on the interaction with the "weak" *jiban* indicator remains statistically significant.[36]

5. Conclusions

Local constituency groups have long been known to influence electoral outcomes in a variety of political contexts. A large literature in comparative politics highlights the connection

[36]It is possible that "weak" *jiban* may attract certain types of representatives that differ in their ability or effort to extract pork. "Weak" *jiban* may attract representatives who exert more effort to deliver pork to their constituents. Thus, the effect is more noticeable when they are incapacitated. Our research design does not rule out this potential alternative interpretation of the findings.

between the electoral support for these local organizations and the distribution of targeted benefits (e.g. Kitschelt and Kselman, 2010; Stokes, 2005; Scott 1969). While distributive policies are described as reflecting the interests of these constituency groups, the literature is less clear about the mechanism by which the local interests enter the policy-making process and, in particular, the role of elected representatives in bargaining on behalf of these interests.

We provide a theoretical framework and empirical evidence for examining the relationship between constituency groups, legislators and the allocation of government transfers. The motivating argument is that rather than being determined solely by the effort or characteristics of legislators, these transfers reflect the underlying strength of the legislators' constituents.

The above discussion suggests that when constituency groups are linked to specific candidates, the interests of these groups may still be represented even without formal representation in the legislature. However, this is not necessarily true for all groups. The groups that have the greatest influence over the number of expected seats a political party attains are also the groups that are most highly valued by the parties. Representation of these groups' interests appears to be less dependent upon whether they have an elected representative present in the legislature.

Our empirical findings suggest that the presence of informal structures within the electorate, such as *jiban*, can have welfare implications. While these structures have long been known to exist in Japan, there has been little evidence to link these structures to policy outcomes. This is the first paper, at least to our knowledge, to demonstrate how the *jiban's* interests could be directly represented in the policy-making process even in the absence of electorally accountable representatives indirectly representing the *jiban's* interests in the legislature.

Although we examine the model's predictions using empirical evidence from the Japanese case, the theoretical results are not specific to Japanese politics. However, we should note that Japan has several features that more closely resemble the electoral and policy-making process described in the model as compared to other democracies. In particular, during the period under investigation, Japan was a parliamentary democracy governed by a sin-

gle dominant political party with a highly centralized intra-party policy-making process. One could imagine that the direct representation of constituency groups' interests will be more complicated in party systems where the policy-making process is more fractionalized or ideologically divided. In these systems, especially ones with coalition governments, it may be more difficult for policy makers to agree upon the set-aside amounts for particular constituency groups. Whether this is in fact the case is an open theoretical and empirical question.

The Japanese case is also relatively unique in having an electoral system that provides strong incentives for representatives to cultivate separate personal constituency organizations within electoral districts. The theoretical results for SMD electoral systems also apply to non-MMD/SNTV electoral systems, as long as local organizations mobilize cohesive voting blocs that are not sensitive to partisan tides. One concern is that the constituency groups in other electoral systems will not be as cohesive or provide a significant enough bloc of votes that are not tied to partisan tides. The conventional wisdom is that the magnitude of the personal vote is connected to electoral institutions (e.g. Carey and Shugart, 1995). Bawn, Cox and Rosenbluth (1999) find that partisan tides had a smaller impact on electoral outcomes under Japan's MMD/SNTV system compared to democracies with more party-centered electoral systems. Krauss and Pekkanen (2010) find that even within Japan, the *koenkai* underlying candidates' *jiban* have weakened to a certain degree after Japan moved to the more party-centered mixed member electoral system.

Nonetheless, as noted above, constituencies do tend to be organized into blocs of voters mobilized to secure allocations of government resources in a variety of ways across different clientelist democracies. In many settings, the constituency groups also consist of a patchwork of local civic associations, similar to the patchwork of associations that are part of a *jiban*.[37]

[37]In describing Latin American politics, Freidenberg and Levitsky (2006) write, "Major parties in Argentina, Brazil, Colombia, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Nicaragua, Paraguay, and Uruguay possess vast, deeply rooted, but predominantly informal, grassroots organizations. These organizations, which range from patronage and clientelistic networks to soup kitchens and soccer fan clubs, are frequently hidden from public view: they do not appear in party statutes and are rarely registered with party or state authorities. Nevertheless, they constitute the "meat" of many Latin American party organizations: they recruit activists, select candidates, raise money, maintain societal linkages, and, most importantly, deliver votes."

However, in many of these cases the associations are linked together through more informal networks or local party organizations as compared to the formal membership often required by *koenkai* (Kitschelt and Kselman, 2010). The next step in this research agenda will be to provide some metric for determining the extent to which constituency groups in other democracies also provide stable blocs of voters in a manner similar to the *jiban* in Japan. If such groups exist, then we can examine whether the variation in the strength of these groups in other political contexts also leads to variation in the direct representation of these groups in the allocation of distributive government benefits.

Finally, we should note that the results suggest a few policy implications. One concerns redistricting. The model suggests that even when voters are evenly represented in the legislature, those who are best able to become organized may yield disproportionate influence on the distribution of public spending. Equalizing legislative influence may therefore require district lines to be drawn to separate concentrated interests. Another policy implication concerns term limits. Efforts to reduce the influence of incumbent representatives by increasing turnover may have limited influence on the distribution of public expenditures when constituency interests remain cohesive. The more organized constituencies may continue to receive government resources irrespective of the seniority of their elected representative.

APPENDIX

Proof of Proposition 1. As noted in the text, groups without incapacitated legislators have a weakly dominant strategy of supporting their candidate. We therefore focus without loss of generality on party P_1 and assume that a party P_1 legislator occupying the $\tilde{j}$-th seat in district $\tilde{i}$ is incapacitated. Thus the group backing this legislator is $G_{1\tilde{i}\tilde{j}}$.

Notationally, let the set of national cutpoints when all P_1 groups support their candidates, given the support strategies of P_2 groups, be denoted by $\{\tau^n\}$. Likewise, let the set of national tide cutpoints under the same support strategies, with the exception that $g_{1ij} = 0$, be denoted $\{\tau^{n'}\}$. Note that $\{\tau^n\} \cap \{\tau^{n'}\} \supseteq \cup_{i \neq \tilde{i},j}\{\tau_i^j\}$; i.e., the incapacitation affects only tide cutpoints in district $\tilde{i}$.

For $G_{1\tilde{i}\tilde{j}}$, we derive the voting contract that induces the maximum payment from P_1 in $\mathbf{y}_1$. To do this, we find the maximum set-aside allocation $\mathbf{y}_1$ that a majority of non-incapacitated P_1 legislators would support.

We first claim that P_1 legislators not in district $\tilde{i}$ with tide cutpoints no higher than τ^θ are a majority of surviving P_1 legislators. This obviously holds if $m_1^1 \leq \theta$. For larger values of m_1^1, this holds if $\theta - J - 1 > m_1^1 - \theta + 1$, or $m_1^1 < 2(\theta - 1) - J$, as assumed.

Next, we derive the expected utilities of such legislators when $G_{1\tilde{i}\tilde{j}}$ withholds support. Consider a P_1 legislator not in district $\tilde{i}$ with tide cutpoint $\tau^n < \tau^\theta$. His/her expected utility is:

$$\frac{1}{m_1^1 + m_2^1} + \frac{r(m_1^1)}{m_1^1} + \frac{1 - F(\tau^n)}{L} + \sum_{k=1}^{L} \left[F(\tau^{k+1'}) - F(\tau^{k'})\right] \frac{r(k)}{k}. \tag{6}$$

Likewise, if P_1 proposes a set-aside allocation of y to $G_{1\tilde{i}\tilde{j}}$ and all P_1 groups provide support, then we can modify (2) to express this surviving legislator's expected utility as:

$$\frac{1}{m_1^1 + m_2^1} + \frac{r(m_1^1)}{m_1^1} - \frac{y}{m_1^1} + \frac{1 - F(\tau^n)}{L} + \sum_{k=1}^{L} \left[F(\tau^{k+1}) - F(\tau^{k})\right] \frac{r(k)}{k}. \tag{7}$$

This legislator is then indifferent between the two expected payoffs if the set-aside y allocated to $G_{1\tilde{i}\tilde{j}}$ in $\mathbf{y}_1$ satisfies:

$$\frac{y}{m_1^1} = \sum_{k=1}^{L} \left[F(\tau^{k+1}) - F(\tau^{k})\right] \frac{r(k)}{k} - \sum_{k=1}^{L} \left[F(\tau^{k+1'}) - F(\tau^{k'})\right] \frac{r(k)}{k} \tag{8}$$

$$
\begin{aligned}
&= \sum_{k=1}^{L} \left[F(\tau^{k+1}) - F(\tau^{k}) - F(\tau^{k+1'}) + F(\tau^{k'})\right] \frac{r(k)}{k} \\
&= \left[F(\tau^{L+1}) - F(\tau^{L+1'})\right] \frac{r(L)}{L} + \sum_{k=2}^{L} \left[F(\tau^{k'}) - F(\tau^{k})\right] \left(\frac{r(k)}{k} - \frac{r(k-1)}{k-1}\right) \\
&\quad + \left[F(\tau^{1'}) - F(\tau^{1})\right] r(1) \\
&= \sum_{k=\theta}^{L} \left[F(\tau^{k'}) - F(\tau^{k})\right] \left(\frac{r(k)}{k} - \frac{r(k-1)}{k-1}\right). \qquad (9)
\end{aligned}
$$

Note that the last line follows from the fact that $r(k) = 0$ for $k < \theta$.

Since P_1 legislators not in district $\tilde{i}$ with tide cutpoints below τ^{θ} are a majority of surviving P_1 legislators, the per capita set-aside that would induce indifference among surviving P_1 legislators is given by (9). We denote the total set-aside value y^{med}.

To establish the equilibrium set-aside and voting strategies, observe that a majority of non-incapacitated party P_1 legislators will vote in favor of any set-aside proposal satisfying $y_{1\tilde{i}\tilde{j}} \leq \min\{y^{med}, 1+r(m_1^1)/m_1^1\}$, if that proposal assures that $g_{1\tilde{i}\tilde{j}} = 1$. $G_{1\tilde{i}\tilde{j}}$ therefore optimally offers the contract: $g_{1\tilde{i}\tilde{j}} = 1$ iff $y_{1\tilde{i}\tilde{j}} \geq \min\{y^{med}, 1+r(m_1^1)/m_1^1\}$.

P_1 therefore proposes $\mathbf{y}_1^*$ with: $y^*_{1\tilde{i}\tilde{j}} = \min\{y^{med}, 1 + r(m_1^1)/m_1^1\}$ and $y^*_{1ij} = 0$ for all $(i,j) \neq (\tilde{i},\tilde{j})$. Expression (9) implies that a majority of surviving P_1 legislators prefer $\mathbf{y}_1^*$ to $\mathbf{y}_1 = \mathbf{0}$. As a result, $\mathbf{y}_1^*$ passes and all P_1 groups support their candidates in equilibrium. By symmetry, all P_2 groups support their candidates when all P_1 groups support their candidates. Thus there is a unique subgame perfect equilibrium in which all $g_{pij} = 1$ for all groups.

We now examine comparative statics on $y^*_{1\tilde{i}\tilde{j}}$. For each possible $\tilde{j}$, let $\tau^{n'}(\tilde{j})$ denote the n-th tide cutpoint given $g_{1\tilde{i}\tilde{j}} = 0$ and $g_{1ij} = 1$ for all $(i,j) \neq (\tilde{i},\tilde{j})$. Also, let $\mathcal{T}(\tilde{j}) \equiv \{\tau^{n'}(\tilde{j}) \mid \tau^{n'}(\tilde{j}) \neq \tau^{n}\}$ denote the set of tide cutpoints for electing n legislators that change if $G_{1\tilde{i}\tilde{j}}$ does not support its candidate.

We claim that $\mathcal{T}(\tilde{j}) \subseteq \mathcal{T}(\tilde{j}-1)$. To show this, observe first that tide cutpoints for electing each legislator not in district $\tilde{i}$ are independent of $\tilde{j}$. Next, in district $\tilde{i}$, the tide required to achieve office for candidate k is $\tau_{\tilde{i}}^{k-1'}$ for all $k > \tilde{j}$, and remains at $\tau_{\tilde{i}}^{k}$ for all $k < \tilde{j}$. Thus for any $\tilde{j}$, $\mathcal{T}(\tilde{j})$ contains only tide cutpoints satisfying $\tau^{n'}(\tilde{j}) \geq \tau_{\tilde{i}}^{\tilde{j}-1'}$. Furthermore, the set of induced tide cutpoints in $\mathcal{T}(\tilde{j})$ with a value of at least $\tau_{\tilde{i}}^{\tilde{j}-1'}$ is independent of whether the

group associated with candidate $1, \ldots, \tilde{j}$ withholds support. Since exactly one candidate does not have its group's support, the rank ordering of all such tide cutpoints is also independent of $\tilde{j}$, and hence for all $\tau^{n'}(\tilde{j}) \geq \tau_{\tilde{i}}^{\tilde{j}-1'}$, we have $\tau^{n'}(\tilde{j}) = \tau^{n'}(\tilde{j}–1) = \cdots = \tau^{n'}(1)$, which implies the claim.

Now since $\tau^{n'} \geq \tau^{n}$ for all n, with the inequality strict for some n, the claim expression (9) then implies that y^{med} is weakly decreasing in $\tilde{j}$. We conclude that $y^{*}_{1\tilde{i}\tilde{j}'}$ is weakly decreasing in $\tilde{j}$ for incapacitated legislator $C_{1\tilde{i}\tilde{j}}$ within district $\tilde{i}$. ■

Proof of Proposition 2. As in the proof of Proposition 1, we focus without loss of generality on an incapacitated party P_1 legislator in district $\tilde{i}$. We show that $G_{1\tilde{i}1}$'s demand, given by expression (8), is increasing in $\rho_{p\tilde{i}1}$, holding $\rho_{p\tilde{i}1} + \rho_{\tilde{i}}^{0}$ constant. As in the proof of Proposition 1, the condition $m_1^1 < 2\theta - 3$ ensures that a majority of surviving P_1 members have tide cutpoints no higher than τ^{θ}. We consider two values of $\rho_{1\tilde{i}1}$, where $\hat{\rho}_{1\tilde{i}1} > \overline{\rho}_{1\tilde{i}1}$, inducing corresponding tide cutpoints $\{\hat{\tau}^{k}\}$ and $\{\overline{\tau}^{k}\}$ when $G_{1\tilde{i}1}$ supports $C_{1\tilde{i}1}$, and $\{\hat{\tau}^{k'}\}$ and $\{\overline{\tau}^{k'}\}$ otherwise.

First we show that $\sum_{k=1}^{L}\left[F(\tau^{k+1'}) - F(\tau^{k'})\right] r(k)/k$ is decreasing in $\rho_{p\tilde{i}1}$. We begin by showing that if $\hat{\tau}^{k'} \geq \overline{\tau}^{k'}$ for all k, then:

$$\sum_{k=1}^{L}\left[F(\hat{\tau}^{k+1'}) - F(\hat{\tau}^{k'})\right]\frac{r(k)}{k} < \sum_{k=1}^{L}\left[F(\overline{\tau}^{k+1'}) - F(\overline{\tau}^{k'})\right]\frac{r(k)}{k}. \tag{10}$$

Rearranging terms, this expression can be rewritten as:

$$\begin{aligned} 0 \;>\; & \sum_{k=1}^{L}\left[(F(\overline{\tau}^{k'}) - F(\hat{\tau}^{k'})) - (F(\overline{\tau}^{k+1'}) - F(\hat{\tau}^{k+1'}))\right]\frac{r(k)}{k} \\ = \; & \left[F(\overline{\tau}^{1'}) - F(\hat{\tau}^{1'})\right] r(1) + \sum_{k=2}^{L}\left[F(\overline{\tau}^{k'}) - F(\hat{\tau}^{k'})\right]\left(\frac{r(k)}{k} - \frac{r(k-1)}{k-1}\right) \\ & - \left[F(\overline{\tau}^{L+1'}) - F(\hat{\tau}^{L+1'})\right]\frac{r(L)}{L}. \end{aligned}$$

It is clear that since $r(k)/k$ is increasing in k and $F(\overline{\tau}^{L+1'}) = F(\hat{\tau}^{L+1'}) = 1$, the right-hand side of the above expression is negative when $\hat{\tau}^{k'} \geq \overline{\tau}^{k'}$ for all k. Thus, (10) holds.

Now it is sufficient to show that $\hat{\rho}_{1\tilde{i}1} > \overline{\rho}_{1\tilde{i}1}$ implies $\hat{\tau}^{k'} \geq \overline{\tau}^{k'}$ for all k. Note first that for all districts besides $\tilde{i}$, groups support their candidates in equilibrium. Thus the only tide cutpoint affected by a change in $\rho_{1\tilde{i}1}$ is $\tau_{\tilde{i}}^{1'}$. This implies that it is sufficient to show that

$\hat{\tau}_{\tilde{i}}^{1'} \geq \overline{\tau}_{\tilde{i}}^{1'}$. The condition for the P_1 candidate to win when its group withholds support is $\tau\rho_{\tilde{i}}^0 > \rho_{2\tilde{i}1} + (1-\tau)\rho_{\tilde{i}}^0$, or equivalently $\tau > 1/2 + \rho_{2\tilde{i}1}/(2\rho_{\tilde{i}}^0)$. Since the right-hand side of this expression is decreasing in $\rho_{\tilde{i}}^0$, $\tau_{\tilde{i}}^{1'}$ is increasing in $\rho_{1\tilde{i}1}$.

By an analogous argument, $\sum_{k=1}^{L}\left[F(\tau^{k+1}) - F(\tau^k)\right] r(k)/k$ is increasing in $\rho_{p\tilde{i}1}$. (This follows from the observation that $\hat{\tau}^k \leq \overline{\tau}^k$ for all k.) Thus $G_{1\tilde{i}1}$'s demand is increasing in $\rho_{p\tilde{i}1}$. ■

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Table 1
Characteristics of Deceased and Non-Deceased Diet Members
35th to 39th Lower House

	Deceased Diet Members		Retiring Diet Members		All Diet Members	
Lower House	Age	Terms	Age	Terms	Age	Terms
All LDP Diet Members						
34th	65.7	7.7	72.6	8.2	57.5	5.2
36th	68.1	9.4	69.6	10.5	56.8	5.6
37th	65.7	8.4	70.9	9.3	57.4	5.7
38th	68.2	7.7	71.6	9.4	56.8	5.5
39th	67.6	9.0	67.8	8.1	56.0	5.1
Non-LDP Diet Members						
34th	62.0	6.8	60.7	5.0	52.3	3.2
36th	57.7	4.4	61.8	6.2	54.2	4.4
37th	60.0	4.7	67.4	7.7	54.7	4.1
38th	64.7	6.3	63.3	7.0	56.1	4.8
39th	50.5	1.0	61.2	5.8	55.2	3.7

Table 2
Causes of Death Among Japanese
Lower House Legislators, 1970 to 1995

Cause of Death	# Cases
Heart Failure/Attack	32
Cancer	18
Respiratory Problem/Pneumonia	13
Liver Problem	13
Brain Hemorrhage/Embolism	5
Kidney Problem	5
Gastro-intestinal Problem	4
Suicide/Murder	3
Other	4

Table 3
Stability of LDP *Jiban* Support: Correlation Among LDP Candidates in Municipality Vote Shares Across Consecutive Elections, 1979 to 1990)

	Same *Jiban*	Same *Jiban*	Different *Jiban*	
	Same Person	Different Person	Minimum	Maximum
All	0.94	0.77	−0.53	−0.14
"Weak" *Jiban*	0.94	0.73	−0.52	−0.14
"Non-Weak" *Jiban*	0.94	0.88	−0.54	−0.14

Table 4
Transfers to Municipality Governments
1977 to 1992

	National Treasury Disbursements			Local Allocation Tax		
LDP Died	−0.01	−0.01	−0.01	−0.02	−0.02	−0.02
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
LDP Died *Jiban*	−0.02	0.04	0.07	0.01	0.03	0.02
	(0.04)	(0.05)	(0.06)	(0.03)	(0.03)	(0.05)
LDP Died *"Weak" Jiban*		−0.12*	−0.15*		−0.05	−0.04
		(0.06)	(0.06)		(0.04)	(0.05)
LDP *Jiban* Not Passed On			−0.10			0.02
			(0.09)			(0.05)
Non-LDP Died	−0.02	−0.02	−0.02	−0.00	0.00	0.00
	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
Non-LDP Died *Jiban*	−0.07	−0.07	−0.07	−0.02	−0.02	−0.02
	(0.12)	(0.11)	(0.12)	(0.04)	(0.04)	(0.04)
ln (Dep Pop / Pop)	0.78*	0.78*	0.78*	0.44	0.44	0.44
	(0.31)	(0.31)	(0.31)	(0.29)	(0.29)	(0.29)
ln (1st Tier Workers/Workers)	0.07	0.07	0.07	0.08	0.08	0.08
	(0.10)	(0.10)	(0.10)	(0.06)	(0.06)	(0.06)
ln (fiscal strength)	−0.32*	−0.33*	−0.33*	−1.19*	−1.19*	−1.19*
	(0.04)	(0.04)	(0.04)	(0.09)	(0.09)	(0.09)
Observations	48273			48230		

Municipality×legislative session fixed-effects and year fixed-effects are included in all regressions. Standard errors are clustered by district×legislative session.

* indicates statistical significance at the 5% level.

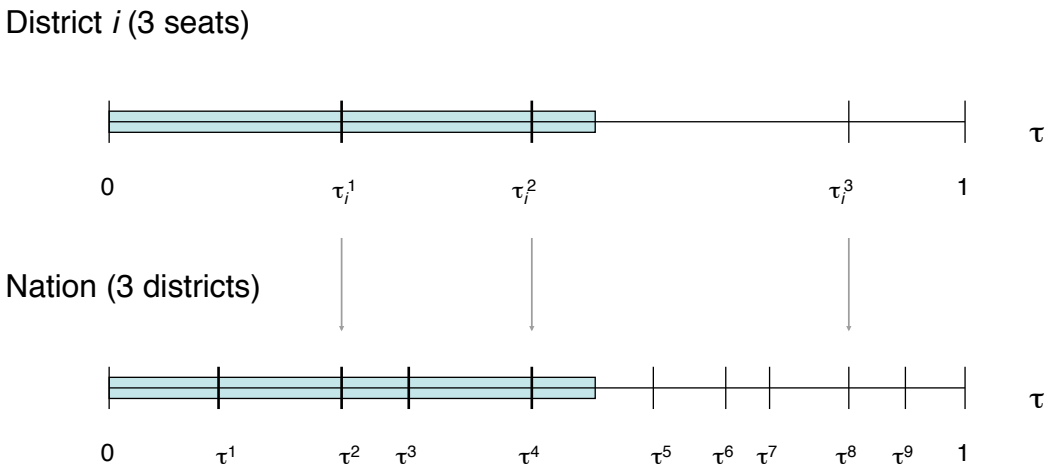

Figure 1: *District and National Tide Cutpoints.* The distribution of voters and group strengths across districts induces values of the national electoral tide τ that are necessary for the election of each candidate. This figure illustrates a nation with three three-member districts, and assumes that each group supports its candidate. The illustrated tide is sufficient to elect two party P_1 legislators in district i, and four party P_1 legislators nationally.

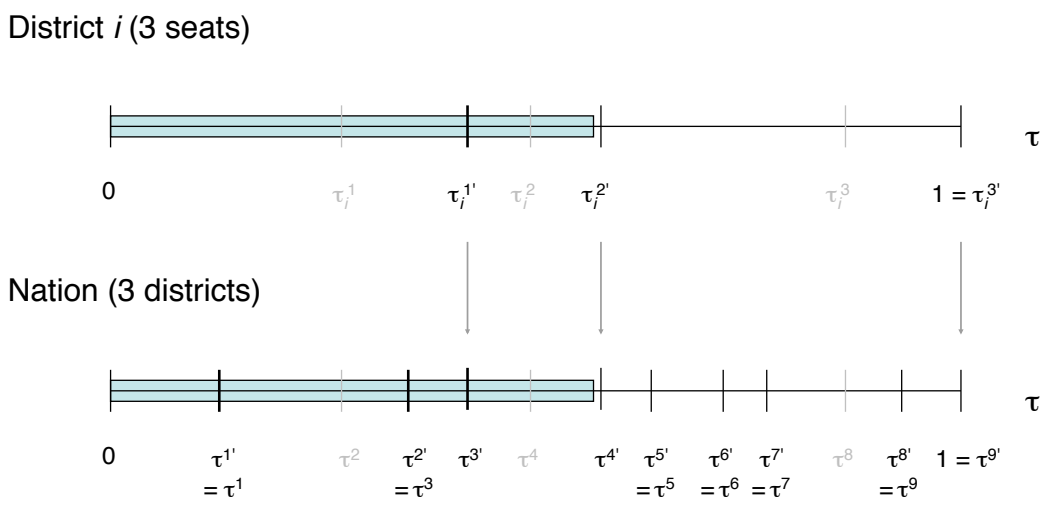

Figure 2: *Incapacitation and Tide Cutpoints.* The incapacitation of the strongest group in district i shifts each district i cutpoint upwards, but does not affect cutpoints in other districts. For some realizations of τ, this reduces the number of elected P_1 legislators by one. The tide from Figure 1 now elects only one party P_1 legislator in district i, and three party P_1 legislators nationally. The incapacitation of a smaller group would reduce P_1's expected seat share by a smaller amount.

Table A1
Transfers to Municipality Governments
Excluding Additional Covariates
1977 to 1992

	National Treasury Disbursements			Local Allocation Tax		
LDP Died	−0.00	−0.00	−0.00	−0.01	−0.01	−0.01
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
LDP Died *Jiban*	−0.03	0.02	0.05	0.01	0.00	−0.03
	(0.04)	(0.05)	(0.06)	(0.03)	(0.04)	(0.05)
LDP Died *"Weak" Jiban*		−0.11	−0.14*		0.01	0.04
		(0.06)	(0.06)		(0.03)	(0.05)
LDP *Jiban* Not Passed On			−0.07			0.08
			(0.09)			(0.05)
Non-LDP Died	−0.01	−0.01	−0.01	0.00	0.00	0.00
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)
Non-LDP Died *Jiban*	−0.08	−0.08	−0.08	−0.00	−0.00	−0.00
	(0.12)	(0.12)	(0.12)	(0.05)	(0.05)	(0.05)
Observations	50051			50008		

Municipality×legislative session fixed-effects and year fixed-effects are included in all regressions. Standard errors are clustered by district×legislative session.

* indicates statistical significance at the 5% level.

Table A2
Transfers to Municipality Governments
Restricting the Sample to Districts with Deceased Legislators
1977 to 1992

	National Treasury Disbursements			Local Allocation Tax		
LDP Died	−0.01	−0.01	−0.02	−0.01	−0.01	−0.01
	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)	(0.02)
LDP Died *Jiban*	−0.03	0.04	0.06	0.01	0.02	−0.01
	(0.04)	(0.05)	(0.06)	(0.03)	(0.05)	(0.07)
LDP Died *"Weak" Jiban*		−0.14*	−0.16*		−0.01	0.02
		(0.06)	(0.06)		(0.04)	(0.06)
LDP *Jiban* Not Passed On			−0.07			0.08
			(0.08)			(0.07)
Non-LDP Died	−0.00	−0.00	0.00	0.04	0.04	0.04
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Non-LDP Died *Jiban*	−0.08	−0.08	−0.17	−0.05	−0.05	−0.05
	(0.11)	(0.11)	(0.13)	(0.09)	(0.09)	(0.09)
Observations	3499			3492		

Municipality×legislative session fixed-effects and year fixed-effects are included in all regressions. Standard errors are clustered by district×legislative session.

* indicates statistical significance at the 5% level.

Table A3
Transfers to Municipality Governments
Varying the Measure of "Weak" *Jiban*
1977 to 1992

	Last Place Previous Election	+/− 10 Yrs Include Next Election	+/− 10 Yrs Exclude Next Election	Previous 15 Yrs
LDP Died	−0.01	−0.01	−0.01	−0.01
	(0.02)	(0.02)	(0.02)	(0.02)
LDP Died *Jiban*	0.01	0.09	0.07	0.10
	(0.04)	(0.06)	(0.06)	(0.07)
LDP Died *"Weak" Jiban*	−0.14*	−0.17*	−0.15*	−0.17*
	(0.06)	(0.06)	(0.06)	(0.07)
LDP *Jiban* Not Passed On		−0.11	−0.10	−0.12
		(0.10)	(0.09)	(0.10)
Non-LDP Died	−0.02	−0.02	−0.02	−0.02
	(0.03)	(0.03)	(0.03)	(0.03)
Non-LDP Died *Jiban*	−0.07	−0.07	−0.07	−0.07
	(0.12)	(0.12)	(0.12)	(0.12)
ln (Dep Pop / Pop)	0.79*	0.78*	0.78*	0.78
	(0.31)	(0.31)	(0.31)	(0.31)
ln (Prim Ind Workers/Workers)	0.07	0.07	0.07	0.07
	(0.10)	(0.10)	(0.10)	(0.10)
ln (fiscal strength)	−0.33*	−0.33*	−0.33*	−0.33*
	(0.04)	(0.04)	(0.04)	(0.04)
Observations	48273			

Municipality×legislative session fixed-effects and year fixed-effects are included in all regressions. Standard errors are clustered by district×legislative session.

* indicates statistical significance at the 5% level.

Table A4
Transfers to Municipality Governments
Varying the Threshold for *Jiban* Identification
1977 to 1992

	15-20 -25	17-22 -27	19-24 -29	21-26 -31	23-28 -33	25-30 -35
LDP Died	−0.02	−0.01	−0.01	−0.01	−0.01	−0.01
	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)
LDP Died *Jiban*	0.06	0.05	0.07	0.07	0.09	0.06
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)
LDP Died *"Weak" Jiban*	−0.09	−0.13*	−0.15*	−0.18*	−0.20*	−0.18*
	(0.05)	(0.05)	(0.05)	(0.07)	(0.06)	(0.08)
LDP *Jiban* Not Passed On	−0.07	−0.05	−0.10	−0.10	−0.15	−0.13
	(0.07)	(0.10)	(0.10)	(0.09)	(0.10)	(0.13)
ln (Dep Pop / Pop)	0.78*	0.78*	0.78*	0.78*	−0.78*	−0.78*
	(0.31)	(0.31)	(0.31)	(0.31)	(0.31)	(0.31)
ln (Prim Ind Work/Work)	0.07	0.07	0.07	0.07	0.07	0.07
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
ln (fiscal strength)	−0.33*	−0.33*	−0.33*	−0.33*	−0.33*	−0.33*
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Observations	48273					

Municipality×legislative session fixed-effects and year fixed-effects are included in all regressions. Standard errors are clustered by district×legislative session.

* indicates statistical significance at the 5% level.

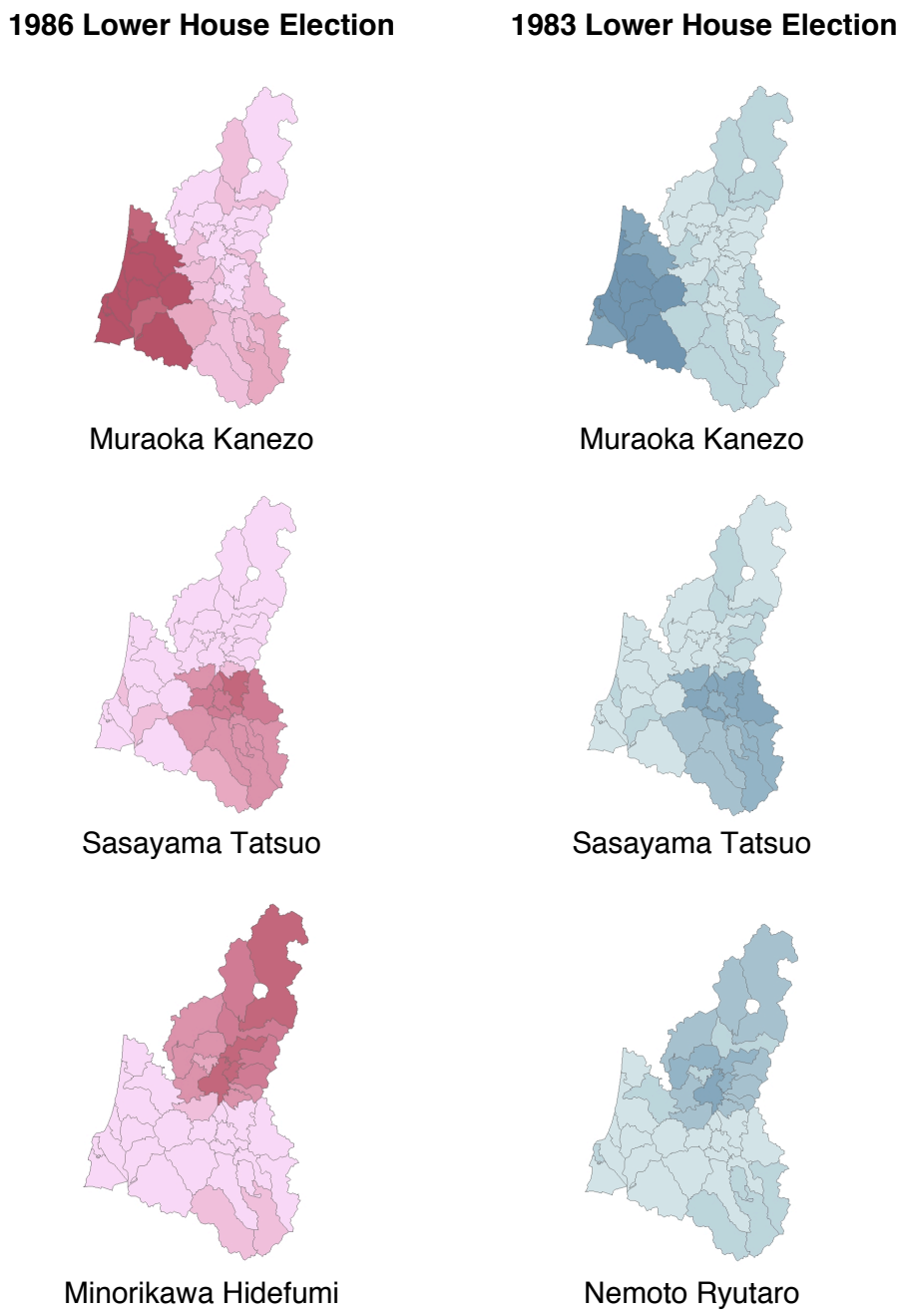

Figure 3: *Electoral Maps of Conservative Candidates in Akita 2nd District.* The right column of maps illustrates the location of the LDP candidates' support in the 1983 Lower House election. The left column illustrates the LDP affiliated candidates' support in the 1986 Lower House election. Darker colors indicate higher vote shares. Nemoto Ryutaro retired after the 1983 election and according to the Reed MMD data set passed his *jiban* on to Minorikawa Hidefumi.