A Tournament Theory of Pork Barrel Politics: The Case of Japan

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Abstract

How do politicians motivate voters to turn out and support them? We posit that incumbents construct tournaments between groups and distribute rewards to groups based on the levels of electoral support provided. We test our propositions in Japan, where incumbents can discern relative levels of support provided by municipalities in their districts and influence spending in ways that reward certain municipalities over others. Using new data on approximately 3,300+ Japanese municipalities in 1980 to 2000, we show that when municipalities are ranked according to their levels of support for Liberal Democratic Party winners in their district, those at higher ranks get larger rewards, the difference in size of the reward increases at higher ranks, and those in districts where municipalities vary more in size also receive larger rewards. Our findings support the theory and help explain other features of Japanese politics, including why pork tends to flow to relatively unsupportive districts.

Keywords

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Introduction

How can incumbents motivate voters to turn out and support them when the likelihood of any voter influencing an election's outcome is virtually nil? Literature in political economy, comparative politics, and American politics offers one answer to this question: with "pork," where pork is typically defined as club goods that benefit everyone in a particular, identifiable set of voters (e.g., Cox & McCubbins, 1986; Dahlberg & Johansson, 2002; Diaz-Cayeros et al., 2016; Ferejohn, 1974; Golden & Picci, 2008; Harris & Posner, 2018; Huber & Ting, 2013; Nichter, 2008; Ramseyer & Rosenbluth, 1993; Stein & Bickers, 1994; Stokes, 2005; Tavitz, 2009; Weingast, 2014). Because incumbents usually have access to money with which to build new schools or hospitals, fix roads, extend train lines, or provide other geographically focused projects, this work holds that they are likely to employ that access to enhance their chances of staying in office. Despite a plethora of studies, however, there exists little consensus on questions such as *to whom* pork is delivered (core supporters, on-the-fencers, or opposition-inclined voters) and *when* it is delivered (before elections as an inducement or after elections as a reward). We introduce and test a new theory, formalized in Smith and Bueno de Mesquita (2012) and Smith et al. (2017), for how savvy incumbents allocate pork to win elections. The theory not only settles disagreement over these two questions but also sheds light on puzzling features of our test case, the politics of Japan in the period 1980–2000.

The theory, whose tenets we sketch out in more detail in the next section, posits that whenever incumbents can discern the relative levels of electoral support provided by groups in their districts and influence resource allocations in ways that disproportionately benefit certain groups over others, they will have incentives to pit those groups against each other in a tournament over which is most supportive. In this tournament, prizes are awarded to groups in accordance with their position in a ranking constructed on the basis of electoral support. The prizes, moreover, are calibrated so that the difference in size of the prize received by the first- and second-place getter is larger than the difference in size of the prize received by the second- and third-place getter, and so on. This strategy, inspired by work in economics on how employers can motivate their employees by proposing a contest for a prize for the most productive worker (Lazear & Rosen, 1981), works by increasing the amount of influence each voter has over the size of their group's prize. The possibility that one's vote could make a difference between winning a larger prize or having to settle for a smaller one has the effect of motivating voters in all groups to turn out and support the incumbent even when voting is costly and voters know their vote will almost certainly not influence the outcome.

The theory holds that under this tournament, pork will be delivered to groups (not individuals), after elections (not before), and toward the more electorally supportive groups within a district. Its predictions about allocations *across* districts, however, highlight a variable that has not, at least to our knowledge, been recognized in previous work: the relative *sizes* of the groups from which electoral support is discernible. Just as employers find it difficult to pit employees working different jobs against each other in a tournament over who is most productive, incumbents in districts comprised of groups of asymmetric sizes find it difficult to pit those groups against each other in a tournament over which is most supportive. As vote-buying is illegal, incumbents in a democracy cannot make their use of a tournament explicit; so voters will wonder: Will the "most supportive group" be defined as the one supplying the *most votes* to the incumbent or the *largest vote share*? For reasons we explain in more detail below, in districts comprised of asymmetrically sized groups, uncertainty over which metric incumbents will use to rank the groups translates into diminished incentives to turn out and support the incumbent. Incumbents in those districts, then, have incentives to offset these diminished incentives with larger prizes. This means that in a tournament, larger prizes go to the more supportive groups within a district, but across districts, they go to the least supportive districts. This is because those districts are comprised of asymmetrically sized groups.

To test the theory, we turn to the case of Japan, 1980–2000. Our incumbents are Liberal Democratic Party (LDP) Members of Japan's House of Representatives (HOR), our groups are municipalities, and our prizes are discretionary transfers for projects in the municipality, which we call "pork." We selected the Japanese case because it satisfies the three conditions for a tournament (groups are identifiable, levels of electoral support are discernible, and groups can be rewarded), uncertainty over who would win any one of the seven HOR elections held during this time was relatively low, the secondary literature provides evidence consistent with a tournament, districts varied in the number and relative sizes of the municipalities comprising them, and Japan's 1994 electoral reform redrew district boundaries, enabling us to observe the same municipality in different districts (facing different "competitors") before and after 1994. We conclude our study in 2000 because mergers mean that many municipalities after 2000 do not correspond to those before 2000 (e.g., Horiuchi et al., 2015).

Besides supplying characteristics that enable rigorous tests of the theory's predictions, the theory can explain features of Japanese politics that have befuddled scholars. One is why, given that there is "a solid consensus among students of Japanese politics about the centrality of pork barrel politics in both parliamentary (Diet) and local elections in Japan" (Fukui & Fukai, 1996,

p. 268), there is little evidence that places delivering more electoral support for the LDP receive more pork. In fact, studies typically demonstrate a *negative* correlation between pork and levels of electoral support for the LDP, whether across districts or prefectures, measured in vote or seat shares (e.g., Hirano, 2011; Horiuchi & Saito, 2003; McMichael, 2018; Meyer & Naka, 1998, 1999; Saito, 2010). The tournament offers an explanation for this: It *expects* that LDP incumbents receive their highest levels of electoral support in districts comprised of relatively evenly sized municipalities. Because uncertainty over how municipalities will be compared with each other has fewer consequences in those districts, incumbents can offer less (in terms of pork) and get more (in terms of support). In districts comprised of asymmetrically sized municipalities, in contrast, uncertainty over metric means that incumbents must offer more but will still get less. Hence, pork tends to flow to the least electorally supportive districts.

A second question is why LDP incumbents continue to deliver pork after Japan's 1994 electoral reform. The reform, which replaced multi-member districts (MMDs) with a combination of single-member districts (SMDs) and proportional representation (PR), eliminated the need for majority-seeking parties to run more than one candidate in each district. Some studies hold that this freed LDP politicians from having to generate personal sources of appeal, of which pork is one, and pushed them to adopt a more efficient electoral strategy of running on party platforms comprised of positions on programmatic goods (Carey & Shugart, 1995; Catalinac, 2015; Cox, 1990; Estevez-Abe, 2008; Noble, 2010; Rosenbluth & Thies, 2010; Shinada, 2006). Others disagree and identify features of Japan's new system such as dual candidacy and the "best-loser" provision, which encourage candidates to remain focused on pork (Christensen & Selway, 2017; Krauss & Pekkanen, 2010; McKean & Scheiner, 2000). We offer another reason why pork continues: The reform did not alter the ability of incumbents to discern the relative levels of support from municipalities and influence allocations to those municipalities.

How a Tournament Works

The theory we test was inspired by the paradox of voting, which points out that voting is costly and the probability that any voter will influence the outcome is negligible. For the average voter, then, the costs of voting outweigh the benefits (e.g., Fedderson, 2004; Geys, 2006). A vast literature posits that by virtue of their access to government resources, incumbents will have incentives to offset those costs with pork. There are several unresolved questions in this literature. One concerns *to whom* pork is distributed. Cox and McCubbins (1986) make the case that incumbents will target core supporters

on the grounds that less pork is sufficient to motivate them (see also Tavitz, 2009), whereas Dixit and Londregan (1996) argue that incumbents will be better off using pork to entice voters who might be on the fence to support them. Empirical studies have tended to support the latter claim (e.g., Dahlberg & Johansson, 2002; Nichter, 2008; Stokes, 2005; Ward & John, 1999).

A second question concerns *when* pork is distributed. Most studies imply that pork is allocated before elections, "so that voters will have the provision of goods and services fresh in their minds when they head to the polls" (Golden & Min, 2013, p. 86). However, the secret ballot prevents incumbents from verifying how individuals vote, which gives voters incentives to pocket the pork and vote the way they please. Reflecting this, studies have documented a weak relationship between receiving pork from an incumbent and voting for that incumbent (e.g., Brusco et al., 2004; Samuels, 2002; Stein & Bickers, 1994). Accounts of the inner workings of political machines in the United States, in contrast, suggest that bosses used pork after elections to reward neighborhoods that supplied them with more votes (Allen, 1993). This is feasible when incumbents know how much support they got from each neighborhood and can reward them, but leaves unanswered questions such as how neighborhood residents are motivated to contribute to what is a collective good that all benefit from, regardless of whether they made the effort to contribute (e.g., Morton, 1991).

With these questions in mind, Smith and Bueno de Mesquita (2012) and Smith et al. (2017) offer a game-theoretic model for how incumbents can use pork allocations to offset the costs of voting, thereby guarding against the possibility that voters will decide to stay home on election day. We sketch out its main tenets here and refer readers to the aforementioned articles for more detail.

Consider an incumbent who needs to win enough votes in her district to enter Parliament. All districts contain groups that can mobilized for the purpose of collecting votes, but a group that might be particularly prone to mobilization is the municipality. Incumbents can discern how much electoral support they received from each municipality in their district and influence allocations in ways that reward certain municipalities over others. We focus on municipalities in what follows, but the theory applies to any group meeting these criteria.

The theory holds that a savvy incumbent will have incentives to set up a tournament between the municipalities in her district. Concretely, she will observe the vote totals returned by each municipality in her district, rank municipalities according to the share of voters who turned out to support her, and work the hardest to secure pork for the most supportive municipality, less hard for the second-most supportive municipality, and so on. If that effort involves lobbying the bureaucracy for projects, then on average more lobbying will lead to more projects. This leads to the expectation that after

elections, the amount of money awarded for projects will follow the rank order in which municipalities delivered support to the incumbent. To elicit the most support, furthermore, incumbents have incentives to decrease their effort levels in a *convex* fashion. This means they will make the difference between the amount of effort exerted for the first- and second-most supportive municipalities, respectively, larger than the difference between the amount of effort exerted for the second- and third-most supportive municipalities, and so on. The expectation is thus that the difference in amount of money received by the first- and second-place getters will be larger than the difference in amount received by the second and third, and so on.

To illustrate why this trumps alternative strategies with which pork could be allocated to municipalities, let us consider what would happen if an incumbent decided to distribute pork in a manner *proportional* to the size of the contribution each municipality made to her reelection. In this scenario, the incumbent would use the raw number of votes supplied by Municipality A (say, 75,000) to calculate the share of her votes that came from Municipality A (say, 35%). Then, she would devote the same proportion (35%) of her time to securing pork for Municipality A. The problem with this strategy is that voters know that if they decide to stay home on election day, the amount of pork their municipality receives will only be slightly less than if they had voted. If many voters were to make the same calculation, the incumbent would receive substantially lower levels of support than could have been realized with a tournament. Ranking municipalities based on performance, awarding prizes on the basis of rank, and calibrating those prizes such that the amounts being fought over are larger at higher ranks mean that small differences in electoral support can translate into large differences in rewards. The chance that one's vote could make the difference between winning a larger prize or having to settle for a smaller one has the effect of motivating voters in all municipalities to turn out and support the incumbent, even when voters know their chance of influencing the election's outcome is negligible. This leads to the following hypotheses:

> **Hypothesis 1:** The amount of money a municipality receives for projects follows the rank order in which it delivered electoral support to the incumbent.
> **Hypothesis 2:** The relationship between rank and transfers within a district is convex, meaning that increases in rank at the top of the ranking net a municipality more money than increases in rank in the middle or bottom of the ranking.

The theory also expects that tournaments will be easiest to administer when municipalities are the same size. To understand why, it helps to first clarify

that incumbents are extremely unlikely to make the fact that they are pitting municipalities against each other explicit. Using government resources to buy votes is illegal in a democracy and attempting to hold voters accountable for their behavior is antithetical to its tenets (Stokes, 2005). Instead, the contract incumbents form with the municipalities in their districts is an implicit one. Such implicit contracts form the basis of most theories of special interest politics. For instance, Grossman and Helpman's (2001) seminal work posits that politicians offer schedules relating the size of a group's campaign contributions to the size of the policy concessions they offer. This implicitness creates ambiguities in how municipalities will be ranked in a tournament.

Incumbents who do not make their use of a tournament explicit cannot easily signal which metric they will use to rank municipalities. Voters may wonder whether municipalities will be ranked according to the raw number of votes cast for the incumbent or the share of a municipality's voters who voted for the incumbent. This matters because how municipalities are ranked determines the amount of influence voters have over the size of their municipality's prize. If the "raw number of votes" metric is used, voters in small municipalities know that their municipality is likely to be at the very bottom of the ranking. Because the amounts of money being fought over at the bottom are low, their influence over the size of their municipality's prize is also low. Voters in large municipalities know they are likely to place first under this metric, but they also know that their municipality is likely to place first regardless of whether they personally make the effort to vote. Thus, their influence over the size of their municipality's prize is similarly diminished. Under the "vote share" metric, on the contrary, voters in small municipalities know that their vote has a greater marginal impact on their municipality's position in the ranking than a vote casts in a large municipality.

A key insight is that when the municipalities in a district are the same size, an incumbent who uses the "raw number of votes" metric to rank municipalities arrives at the same ranking as an incumbent who uses "vote share." To see this, consider District A, which is comprised of two municipalities, each of 50,000 voters. One municipality supplies 31,000 votes for the incumbent and the other supplies 30,900. Comparing them according to the "number of votes" metric shows that the first municipality supplied 50.1% of the incumbent's votes, while the latter supplied 49.9%. Comparing them according to the "vote share" metric shows that 62% of voters in the first municipality voted for the incumbent, while only 61.8% of voters in the second municipality did. No matter which metric is used, even though the vote output is close, the ranking of municipalities is the same: The first municipality wins. Key to motivating electoral support in this setting is the fact that a few hundred votes can change the ranking, and hence substantially change the transfers to each

municipality. Given that such a few votes can have such a big influence on the allocation of prizes, politicians can motivate people to vote with relatively small prizes. Furthermore, the prize motivates voters in both municipalities. Those in the former are motivated to maintain their first-place ranking, while voters in the latter are motivated to catch up.

When municipalities are asymmetrically sized, in contrast, the two metrics no longer produce the same ranking. Consider District B, which is also comprised of two municipalities: one with 80,000 voters and the other with 40,000. Let us assume that 35,000 voters in the first municipality voted for the incumbent, compared with 31,000 in the second. Under the "number of votes" metric, the former municipality wins the tournament by 4,000 votes. If the "vote share" metric is used, in contrast, the latter municipality wins (78% vs. 44%). The fact that incumbents cannot clarify which metric they will use to rank municipalities, and the fact that different metrics produce different rank orders, complicates voters' ability to calculate how many votes would be necessary to change the ranking. The lack of neck-and-neck competition to determine rankings diminishes their incentives to turn out and support the incumbent. Hence, in comparison with their counterparts in more symmetric districts, incumbents in districts comprised of asymmetrically sized municipalities either have to accept lower levels of electoral support, offer larger prizes, or, as our evidence suggests, a combination of both. This leads to the following hypothesis:

> **Hypothesis 3:** Municipalities in districts comprised of asymmetrically sized municipalities receive more money for similar levels of electoral support relative to municipalities in districts comprised of more evenly sized municipalities.

The theory offers answers to the unresolved questions introduced earlier. The tournament is compatible with the secret ballot because incumbents need only to be able to discern how *groups* vote, not individuals. Because pork is used as a reward *after* votes are tallied, incumbents need not worry about voters pocketing the pork and voting the way they please. While pork is delivered to groups, not individuals, group leaders can be less concerned about free-riding because the onus is on the incumbent to set a large-enough prize to motivate group members to turn out and vote for her. Within districts, the theory holds that incumbents will be delivering the largest prizes to the groups that are the most supportive. This is observationally equivalent to targeting pork at one's "core supporters." Looking across districts, however, the pattern reverses. Because larger prizes are needed to motivate voters in districts comprised of asymmetrically sized municipalities, the theory expects

that incumbents will be delivering the largest prizes to districts that are relatively unsupportive. This is observationally equivalent to targeting pork at "marginal districts."

Case of Japan

We selected Japan because it satisfies the conditions for a tournament, offers characteristics that enable rigorous tests of the theory, and exhibits puzzling features not readily explained by existing theories. The theory holds that incumbents will seek to administer tournaments between groups in their districts when groups are identifiable, levels of electoral support are discernible, and groups can be rewarded. Japan satisfies these criteria. Votes in elections are counted and reported at the level of the municipality (Fukumoto & Horiuchi, 2011; Horiuchi, 2005). In our period of study, there were approximately 3,300 municipalities, of which more than 99% were contained within a single district used to elect Members of Japan's HOR (Hirano, 2006; Horiuchi & Saito, 2003; Yokomichi, 2007). By law, Japanese municipalities are required to provide a range of public services, including road construction, fire protection, compulsory education, sewerage, waste disposal, welfare benefits, and clean drinking water, yet can raise only about one third of the funds to do so from taxation (Fukui & Fukai, 1996; Saito, 2010; Scheiner, 2005, 2006). They depend for much of the remainder on transfers from the central government, some of which are allocated in a discretionary manner under "national treasury disbursements" ("kokko shishutsukin," or NTDs; Yamada, 2016).[1] In 1990, the Japanese government spent approximately 3.2 trillion yen on transfers in this category. This amounted to 0.74% of gross domestic product (GDP), 4.1% of the government's budget, and 3,840 yen (US\$\$30) per person (Saito, 2010, p. 117).

As explained above, the tournament theory is a theory for how incumbents can maximize their chances of winning the next election. But it only works when voters believe the incumbent is likely to win. Provided that she can overcome any visceral response to voting for an incumbent whom she may dislike, a savvy voter will reason that given she will be governed by the incumbent anyway, she may as well use her vote to increase the probability the incumbent makes her municipality a priority when it comes time to lobby for projects. When voters are less certain about who will win, in contrast, they have another factor to consider in deciding whom to vote for: the influence their vote holds over who wins. It follows that incumbents will have more success in converting voting into a tournament when everyone believes the incumbents are likely to win. In Japan, voters have been governed by the LDP for all but four of the past 64 years. Of the 21 HOR elections since the

LDP's formation in 1955, it has emerged victorious from all but two. It is safe to assume that relative to voters in other industrialized democracies, Japanese voters would have been susceptible to being organized into a tournament.

Indeed, the secondary literature in Japanese politics furnishes a wealth of evidence consistent with the tournament theory. LDP politicians typically adopt personalistic campaign strategies, whereby they rely on the vote mobilization efforts of an assiduously cultivated personal group of supporters called a "koenkai" (e.g., Fukui & Fukai, 1996, 1999; Hirano, 2006, 2011; McMichael, 2018; Reed, 1986; Saito, 2009, 2010; Scheiner, 2005, 2006; Tamada, 2009). They use the promise of central government money to convince municipal and prefectural politicians, as well as other community leaders, to join their koenkai and assist in vote mobilization. Between elections, they spend their time helping identify projects for which a municipality should seek funding and facilitating meetings with bureaucrats so that the case can be made (Saito, 2010). As a result, "Japanese voters are mobilized at election time mainly by the lure of the pork barrel, only marginally by policy issues and even less by ideals and visions" (Fukui & Fukai, 1996, pp. 268–270).

Several studies explicitly claim that Japanese voters are made to compete against each other for "pieces of a limited pie" (Reed, 1986, p. 153) and "pork from the national treasury" (Fukui & Fukai, 1996, p. 278). Sone and Kanazashi (1989), for example, provide a vivid description of the "business exchange" that existed between former LDP Prime Minister Tanaka Kakuei and the municipalities in his district, whereby his koenkai would record the number of votes cast for Tanaka in each municipality and "make them compete" for public works projects and government transfers (pp. 110–111). Saito (2010) makes a similar claim and provides evidence that LDP politicians use fiscal transfers to buy votes (p. 104). He cites a senior LDP politician who suggested in 2003 that the governor of Aichi take a step back from lobbying for new projects because his prefecture's performance in the last election was not up to par. Scheiner (2006) also observed that LDP politicians are "known to halt subsidies for political reasons," which include supporting opposition candidates and provide anecdotes to this effect. These accounts make it likely we will observe a tournament.

Other features of the Japanese case help us construct nuanced tests of our hypotheses. First, municipalities, classified as cities, special wards, towns, or villages, respectively, vary greatly in size.[2] Second, the districts used to select HOR Members vary greatly in the number and relative sizes of the municipalities that comprise them. Together, this enables us to examine whether incumbents deliver larger prizes to districts containing asymmetrically sized municipalities. Third, Japan's 1994 electoral reform

resulted in the redrawing of the boundaries of all districts. The fact that we observe the same municipality in different districts before and after 1994 enables us to examine whether municipalities shuffled into districts comprised of more asymmetrically sized municipalities after reform received larger prizes for similar levels of electoral support.

Who Receives Pork in Japan

While our focus is on evaluating whether politicians behave the way the theory expects in the real world, answering this question in Japan also affords us the opportunity to shed new light on puzzling features of its politics. One question that has befuddled scholars is as follows: Who receives pork? In spite of claims in the literature that LDP politicians reward supporters and punish opponents, "the empirical data on transfers does not support this claim" (McMichael, 2018, p. 855). Research on the period we study reveals no evidence that districts returning larger LDP vote shares or electing more LDP representatives relative to seats available received more transfers (Saito, 2010). In fact, several studies depict *negative* relationships between transfers and the proportion of LDP-held HOR seats in a district (Horiuchi & Saito, 2003) and prefectural assembly (akin to a state legislature; McMichael, 2018), respectively. Turning to municipalities, Saito (2010) found no evidence that municipalities returning LDP vote shares that were larger than their district's average received more transfers (pp. 121–124). Relatedly, Reed (2001) found no evidence that LDP politicians thought to be prominent in construction influenced spending on construction in their districts, Meyer and Naka (1998, 1999) found that LDP governments spent less on transfers when they had more LDP politicians in the HOR, and Hirano (2011) found that only LDP politicians elected via narrow margins influenced transfers to their supporters.

As explained above, the tournament theory *expects* a negative correlation between electoral support for the LDP and transfers across districts. Because tournaments are harder to administer when districts are comprised of asymmetrically sized municipalities, incumbents will have to spend more to get less. In districts comprised of relatively evenly sized municipalities, in contrast, they will find they can spend less to get more. While the more supportive municipalities within a district receive more transfers, the *overall* amount of transfers delivered to districts is also influenced by the degree of heterogeneity in municipality size. More supportive municipalities in districts characterized by greater asymmetry in municipality size will receive more transfers than more supportive municipalities in districts characterized by less asymmetry.

Why Pork Continues After Japan's 1994 Electoral Reform

A second question is why LDP politicians continue to deliver pork after Japan's 1994 electoral reform. Until 1994, Japan used an electoral system ("SNTV-MMD" or single non-transferable vote in MMDs) that required the LDP to run multiple candidates in each district. Being unable to rely on their party's platform was thought to be a major factor in driving LDP politicians to focus on pork (Carey & Shugart, 1995; Myerson, 1993; Ramseyer & Rosenbluth, 1993). In 1994, the coalition that had wrested control in 1993 replaced SNTV-MMD with a system that combines SMDs with PR.[3] While SMDs are by nature geographically focused, they eliminate the need for the LDP to run multiple candidates in a district. Some scholars anticipated that LDP politicians would reduce their focus on pork and embrace an electoral strategy of relying on the party label (e.g., Estevez-Abe, 2008; Rosenbluth & Thies, 2010).

The evidence for this is mixed. Studies of the attention LDP politicians paid to pork found evidence of a decline after 1994 (e.g., Catalinac, 2015; Noble, 2010; Shinada, 2006). A study examining the geographic distribution of votes also found that LDP politicians collected votes from a wider geographic area after 1994 (Hirano, 2006). On the contrary, Christensen and Selway (2017) concluded that LDP politicians "have continued their long history of particularistic policies and pork barrel politics" after reform (see also Bawn & Thies, 2003; Krauss & Pekkanen, 2010; McKean & Scheiner, 2000). These studies highlight the fact that the new system tolerates dual candidacy, which enables the LDP to make candidates who lost their SMDs compete to obtain a PR seat. In interviews we conducted in 2017, LDP politicians with experience of the old system indicated that while they did spend less time on pork after reform, they still spent time on pork, and their time was spent much like it was under the old system: helping municipalities get projects approved.[4]

We offer another reason: The 1994 reform did little to alter the ability of LDP incumbents to discern relative levels of support from municipalities and influence allocations to those municipalities. While further analysis is needed, we suggest that until votes are counted differently and the transfer system is abolished or restructured to be insulated from politics, we are likely to observe a continued focus on pork. Scheiner (2006) made a related point when he argued that because the reform did nothing to change municipalities' fiscal dependence on the government, local politicians will continue to affiliate with the LDP, hindering the ability of opposition parties to mount an effective challenge to the LDP and prolonging single-party dominance.

Data

We compiled new data on the approximately 3,300 municipalities that existed in Japan between 1980 and 2000. One set of variables captures voting behavior in the municipality in the seven HOR elections held during this time. Of particular interest are the number of votes cast for LDP winners and the number of eligible voters. We used the JED-M Sosenkyo data, which aggregates returns reported by local election commissions (Mizusaki, 2014). We also used this to calculate the number of eligible voters in each district, which we use, with district magnitude, to measure the apportionment of seats. Other variables capture annual amounts of central government transfers received by municipalities. The main way in which HOR Members help municipalities is by lobbying the bureaucracy to have their projects approved. In lieu of data capturing lobbying, which does not exist (Saito, 2010, p. 85), we examine what we expect to be the *cumulative output* of their lobbying activities: annual amounts of discretionary transfers (NTD). In all analyses that follow, we use per capita NTD (hereafter, "transfers"). Following Hirano (2006, 2011), we use data from the Nikkei NEEDs (Economic Electronic Databank System).[5]

A third set of variables include per capita income, population, fiscal strength, proportion of residents employed in primary industries, proportion of residents aged 15 and below, proportion of residents aged 65 and above, and population density.[6] These variables have previously been shown to influence discretionary transfers (NTD). The "fiscal strength" of a municipality reflects the proportion of the cost of services that a municipality can finance with its own taxes. Scholars typically include these variables to account for the possibility that they may also influence discretionary transfers (e.g., Hirano, 2006; Horiuchi & Saito, 2003). If discretionary transfers are partially need-based, we would expect municipalities that are poorer, rural, have fewer people, have more dependents, have more farmers, and that can fund fewer of their services through taxation would receive more transfers. We used data from the Nikkei NEEDs. The fourth set of variables captures characteristics of the politicians contesting our seven elections. Of particular interest are the terms served and whether or not independent winners joined the LDP after the election. For this, we rely on Reed and Smith (2015).

Operationalizing Our Variables

Our data are yearly observations (where t indicates the year) of electoral districts (d), municipalities (m), and candidates (c). Let $n_{d,t}$ represent the number of municipalities within district d in year t. In the five HOR elections in our sample that were held under the old electoral system (in 1980, 1983, 1986, 1990, and 1993, respectively), between 511 and 512 Members were elected in

between 129 and 130 MMDs.[7] The average MMD elected four Members and contained 34 municipalities. In the two HOR elections held under the new electoral system (in 1996 and 2000, respectively), 300 Members were elected in SMDs. The average SMD contained 19 municipalities until the 2000–2003 period, after which it contained 13.

Measuring Electoral Support at the Municipal Level

Let $v_{c,m,t}$ represent the number of votes for candidate c in municipality m at time t. This is available for $t \in E = \{e_1, e_2, \ldots\} = \{1980, 1983, \ldots\}$, the years in which elections were held. Let $P_{m,t}$ represent the voting population of municipality m at time t. We define $VS_{c,m,t} = v_{c,m,t} / P_{m,t}$ as the vote share captured by candidate c in municipality m as a proportion of the voting population of municipality m. It is also useful to define the following indicator functions. Let $w_{c,t}$ indicate whether candidate c won a seat in district d at time t. Let $LDP_{c,t}$ indicate whether candidate c was a member of the LDP at time t. We created two variables capturing the amount of electoral support municipality m supplied to the LDP incumbent(s).[8] First, we calculated:

$$\text{Best LDP VS}_{m,t} = \max_{c \in m} \left\{ LDP_{c,t} w_{c,t} VS_{c,m,t} \right\}. \tag{1}$$

This takes the $VS_{c,m,t}$ scores of the universe of LDP winners in district d at time t and, for each municipality, records its maximum. As an illustration, if there were three LDP winners in district d at time t and they captured 0.6, 0.1, and 0.05 of the votes available in municipality m, respectively, municipality m's Best LDP VS$_{m,t}$ score would be the maximum of these or 0.6. This records how much support municipality m gave to the LDP winner it supported the most. Second, we calculated:

$$\text{Sum LDP VS}_{m,t} = \sum_{c \in m} \left\{ LDP_{c,t} w_{c,t} VS_{c,m,t} \right\}. \tag{2}$$

This takes the $VS_{c,m,t}$ scores of the universe of LDP winners in district d at time t and, for each municipality, records the sum of its scores. Continuing with the above example, municipality m's Sum LDP VS$_{m,t}$ score would be the sum of the $VS_{c,m,t}$ scores of the three LDP winners or 0.75. This captures how supportive municipality m was for all the LDP winners in a district. With a single LDP winner, Best LDP VS$_{m,t}$ and Sum LDP VS$_{m,t}$ are identical.

Creating Rank Order Variables

For districts that returned LDP winners in an election held at t, we take the Best LDP VS$_{m,t}$ scores of the municipalities in district d at time t and rank

them so that the least supportive municipality (with the lowest $\text{Best LDP VS}_{m,t}$ score) gets 0 and the most supportive municipality (with the highest $\text{Best LDP VS}_{m,t}$ score) gets 1. To do this, we take the $\text{Best LDP VS}_{m,t}$ scores of the municipalities in each district-year and rank them from lowest to highest, so that the lowest is 0 and the highest is $n_{d,t} - 1$. Then, we divide this number by $n_{d,t} - 1$, which standardizes the index across districts from 0 to 1. We do the same for $\text{Sum LDP VS}_{m,t}$.

Measuring Electoral Support at the District Level

Next, we created analogous measures at the district level. Let $v_{c,d,t}$ represent the number of votes for candidate c from district d at time t. Let $p_{d,t}$ represent the voting population of district d at time t. We define $VS_{c,d,t} = v_{c,d,t} / p_{d,t}$ as the vote share for candidate c in district d as a function of district d's voting population. Thus, $VS_{c,d,t}$ is the proportion of the voting population in district d who voted for candidate c. We calculated:

$$\text{Winning LDP VS}_{d,t} = \frac{\sum_{m \in d} \sum_{c \in m} \left\{ LDP_{c,t} w_{c,t} v_{c,m,t} \right\}}{\sum_{m \in d} p_{m,t}}. \tag{3}$$

This is the share of votes available in district d that were captured by the LDP winners in district d at time t.

Measuring Symmetry in Municipal Size at the District Level

Finally, to capture the heterogeneity in municipality size within districts, we construct a standardized Herfindahl Index, $HI_{d,t}$. $HI_{d,t}$ uses variation in the populations of municipalities in a district to capture the degree to which a district's population is concentrated in a single municipality or spread out evenly across multiple municipalities. We calculated:

$$HI_{d,t} = \frac{\sum_{m \in d} \left(\frac{p_{m,t}}{p_{d,t}} \right)^2 - \frac{1}{n_{d,t}}}{1 - \frac{1}{n_{d,t}}}, \tag{4}$$

where the squared terms represent the fraction of voters in a district who reside in each of the municipalities comprising it. The other terms normalize

the index across districts so that if voters are evenly spread across municipalities in a district, $\text{HI}_{d,t} = 0$. In contrast, if voters are concentrated in a single municipality, $\text{HI}_{d,t} = 1$.

Within Districts, Increases in Rank Increase Transfers

First, we turn our attention to Hypothesis 1: Do municipalities placing higher in the ranking receive more money after the election? Table 1 presents fixed effects regression models for the logarithm of per capita transfers received by municipalities in the years following the seven HOR elections held between 1980 and 2000 as a function of their level of support for the LDP and ranking, prior transfers, and other controls. Models 1 and 3 use $\text{Best LDP VS}_{m,t}$, which is the largest of the vote shares provided by the municipality to winning LDP candidates at time *t*. Models 2 and 4 use $\text{rank}(\text{Best LDP VS}_{m,t})$, which is a ranked version of this variable.[9] All specifications control for the amount of transfers received before the election: Models 1 and 2 include the log of per capita transfers received by the municipality the year *of* the election, while Models 3 and 4 include the log of per capita transfers received by the municipality the year *before* the election.[10] All specifications also include municipality fixed effects, which control for time-invariant features of a municipality that can influence transfers, and district-year fixed effects, which control for features of a district in a given election that can influence transfers.[11] Our inclusion of district-year fixed effects means that we are effectively looking at variance in the amounts of transfers received by municipalities *within* their districts. We report robust standard errors clustered on the municipality.

The positive, significant coefficients on $\text{Best LDP VS}_{m,t}$ and rank $(\text{Best LDP VS}_{m,t})$ indicate that within districts, increases in electoral support for a winning LDP candidate increase transfers. The coefficients on the variables measuring prior transfers are also positive and highly significant, demonstrating that there is a path-dependent nature to transfers. This is not surprising given that transfers can be awarded for projects that take more than a year to complete (e.g., Saito, 2010). Furthermore, because prior transfers will be influenced by prior levels of electoral support for the LDP and voting patterns can be persistent, we anticipate a strong relationship between past and future transfers. The persistence of voting patterns (and the inclusion of municipality fixed effects) tends to diminish the estimated impact of the level of electoral support on transfers. If we exclude municipality fixed effects or past levels of transfers, then the coefficients on $\text{Best LDP VS}_{m,t}$ and

Table 1. Transfers After HOR Elections, 1980–2000, Are Regressed on the Level of Support the Municipality Provided to Winning LDP Candidates (Models 1 and 3) and the Rank of the Municipality Within Its District (Models 2 and 4).

Outcome (Transfers to Municipalities)	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
Best LDP VS$_{m,t}$	0.123**		0.187***	
	(0.0437)		(0.0541)	
Rank(Best LDP VS$_{m,t}$)		0.0300*		0.0456**
		(0.0139)		(0.0173)
Log (Transfers$_{m,t}$)	0.458***	0.458***		
	(0.00987)	(0.0103)		
Log (Transfers$_{m,t-1}$)			0.208***	0.204***
			(0.0116)	(0.0120)
Fiscal Strength$_{m,t}$	−0.0185	−0.0227	−0.128	−0.157
	(0.0574)	(0.0623)	(0.0795)	(0.0884)
Dependent Population$_{m,t}$	0.502	0.377	0.928*	0.698
	(0.290)	(0.297)	(0.384)	(0.380)
Agriculture$_{m,t}$	−0.161	−0.240	−0.0489	−0.150
	(0.276)	(0.285)	(0.409)	(0.427)
Log (Population$_{m,t}$)	−0.228*	−0.247*	−0.311**	−0.404***
	(0.100)	(0.111)	(0.113)	(0.120)
Log (Per Capita Income$_{m,t}$)	0.0207	0.0597	0.0593	0.138
	(0.0551)	(0.0587)	(0.0794)	(0.0856)
Population Density$_{m,t}$	−0.0558	−0.0318	−0.134*	−0.0779
	(0.0628)	(0.0713)	(0.0564)	(0.0643)
Observations	22,223	20,246	19,063	17,086
District-year fixed effects	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes
R^2	.42	.42	.31	.30

On average, increases in support lead to more transfers. Robust standard errors clustered on municipality in parentheses. HOR = House of Representatives; LDP = Liberal Democratic Party.
*$p < .05$. **$p < .01$. ***$p < .001$.

rank(Best LDP VS$_{m,t}$) are substantially (typically 3–5 times) larger. All four models also include controls for municipality fiscal strength, population, per capita income, proportion of the population that is dependent, proportion employed in agriculture, and population density. Most of these are

statistically insignificant in the presence of municipality fixed effects. The exception is population: On average, increases in population are associated with fewer per capita transfers.

The findings in Table 1 support Hypothesis 1. However, they also show that the coefficients on $\text{Best LDP VS}_{m,t}$ and $\text{rank}(\text{Best LDP VS}_{m,t})$ are larger in Models 3 and 4, respectively, when transfers the year *before* the election are controlled for, than in Models 1 and 2, when transfers the year *of* the election are controlled for. This suggests that some of the redistributive effects of increases in electoral support occur within an election year. Given this, we conducted additional analyses designed to better isolate the effect of *changes* in electoral support on transfers.

Table 2 examines the effects of change in electoral support between two consecutive elections on change in per capita transfers received the year after those elections for municipalities present in the four HOR elections held between 1983 and 1993. To be precise, the dependent variable is:

$$\Delta \text{Log}\left(\text{Transfer}\right) = \text{Log}\left(\text{Transfer}\right)_{e_i+1} - \text{Log}\left(\text{Transfer}\right)_{e_{i-1}+1},$$
$$\text{for } i \in \{1983, 1986, 1990, 1993\}, \tag{5}$$

where the subscript $e_i + 1$ indicates the year after election i and the subscript $e_{i-1} + 1$ indicates the year after the previous election. In Model 1, the independent variable is:

$$\Delta_{e_i} \text{Best LDP VS} = \text{Best LDP VS}_{e_i} - \text{Best LDP VS}_{e_{i-1}}, \tag{6}$$

with analogous differences calculated for $\text{rank}(\text{Best LDP VS}_{m,t})$, $\text{Sum LDP VS}_{m,t}$, and $\text{rank}(\text{Sum LDP VS}_{m,t})$, respectively, which were the independent variables of interest in Models 2, 3, and 4 in Table 1, as well as for the same six municipality-level controls. Table 2 also includes municipality and district-year fixed effects. Whereas district-year fixed effects control for features of a municipality's district at election i that could influence the amount of transfers received, we also control for changes in four district-level characteristics that could also affect transfers. Increases in $\text{HI}_{d,t}$ are expected to bring about more transfers (our Hypothesis 3), as are decreases in the number of people in the district (in 100,000s) per seat available (Horiuchi & Saito, 2003; Saito, 2010). Changes in the number of LDP winners and number of LDP candidates could also influence both electoral support and transfers. Because Japan's 1994 electoral reform placed municipalities in different districts, which we exploit in our testing of Hypothesis 3, we limit our analyses in Table 2 to elections prior to reform. The online appendix shows that these results hold

Table 2. The Change in Transfers Received After Two Consecutive Elections Is Regressed on the Change in Level of Support Delivered (Models 1 and 3) and Rank Achieved (Models 2 and 4) in Those Elections for Municipalities in HOR Elections, 1983–1993.

Outcome (Change in Transfers to Municipalities)	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
Δ Best LDP VS$_m$	0.190**			
	(0.0676)			
Δ Rank(Best LDP VS$_m$)		0.0547*		
		(0.0219)		
Δ Sum LDP VS$_m$			0.206***	
			(0.0613)	
Δ Rank(Sum LDP VS$_m$)				0.0743***
				(0.0224)
Δ Fiscal Strength$_m$	−0.0423	−0.0470	−0.0381	−0.0435
	(0.0872)	(0.0883)	(0.0871)	(0.0882)
Δ Dependent Population$_m$	0.973	0.904	0.995	0.920
	(0.757)	(0.761)	(0.758)	(0.760)
Δ Agriculture$_m$	−0.419	−0.396	−0.402	−0.394
	(0.613)	(0.613)	(0.612)	(0.612)
Δ Log(Population$_m$)	−1.217**	−1.159**	−1.204**	−1.152**
	(0.374)	(0.374)	(0.374)	(0.373)
Δ Log(Per Capita Income$_m$)	−0.0738	−0.0436	−0.0705	−0.0421
	(0.129)	(0.134)	(0.129)	(0.133)
Δ Population Density$_m$	0.573*	0.530	0.571*	0.525
	(0.264)	(0.277)	(0.265)	(0.277)
Δ HI$_d$	0.685	0.708	0.642	0.674
	(0.865)	(0.865)	(0.873)	(0.870)
Δ People per Seat$_d$	−0.126	−0.139	−0.147	−0.136
	(0.523)	(0.522)	(0.527)	(0.526)
Δ Number of LDP Winners$_d$	−0.653	−0.637	−0.705*	−0.637
	(0.349)	(0.348)	(0.352)	(0.351)
Δ Number of LDP Candidates$_d$	−0.0673	−0.0968	−0.0763	−0.107
	(0.464)	(0.464)	(0.468)	(0.467)
Observations	12,657	12,488	12,657	12,488
District-year fixed effects	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes
R^2	.22	.22	.22	.22

On average, municipalities that increase their support and ranking from the previous election receive more transfers. Robust standard errors clustered on municipality in parentheses. HOR = House of Representatives; LDP = Liberal Democratic Party.
*$p < .05$. **$p < .01$. ***$p < .001$.

when we include the two elections after reform (Table A.3) and when we control for transfers the year of the election $(\text{Log(Transfer)}_{e_i})$ (Table A.4). We report robust standard errors clustered on municipality. The coefficients on our electoral support variables in all four models are positive and statistically significant, indicating that municipalities that increased (decreased) their rank relative to the previous election received more (fewer) transfers the year after the election. This lends strong support to Hypothesis 1.

Within Districts, Relationship Between Rank and Transfers Is Convex

Next, we turn to Hypothesis 2: Do increases in rank at the top of the ranking net a municipality more money than increases in rank in the middle or bottom of the ranking? The fact that the coefficients on our electoral support variables in the above analysis are positive and significant when the dependent variable is logged suggests that the relationship between rank and per capita transfers may be convex. To examine this further, we model the untransformed dependent variable (per capita transfers to municipalities the year after the same seven HOR elections) as a function of a municipality's rank in its district—captured by $\text{rank(BestLDP VS}_{m,t})$ and $\text{rank(SumLDP VS}_{m,t})$, respectively—and include quadratic and cubic transformations of its rank. We include municipality-level controls and district-year fixed effects.[12]

The results, including supplementary analyses using $\text{Best LDP VS}_{m,t}$ and restricting the analysis to the pre-electoral reform period, appear in Table A.5 of the online appendix. For each model, a joint hypothesis test reveals that the coefficients on the rank variables and their quadratic and cubic transformations are jointly significant. This is evidence that the relationship between rank and transfers within districts is convex. Figure 1 graphically demonstrates this result using the coefficients on $\text{Rank(Best LDP VS}_{m,t})$ (see Model 1 in Table A.5 of the online appendix). It shows that once a municipality is at the median or above in terms of electoral support (0.5–1), the returns to moving up the ranking increase at an increasing rate. For municipalities at the very top of the ranking, the returns to moving up are very large. A municipality that increases its $\text{Rank(Best LDP VS}_{m,t})$ from 0.95 to 1, for example, can expect to net itself an increase of 3,300 yen per capita (approximately US$28) in transfers after the election, which amounts to a 10% increase in its average per capita transfer. Among municipalities that are relatively unsupportive (those with rankings below 0.5), the impact of increases in rank on transfers is more muted and actually declines slightly.[13] This lends strong support to Hypothesis 2.
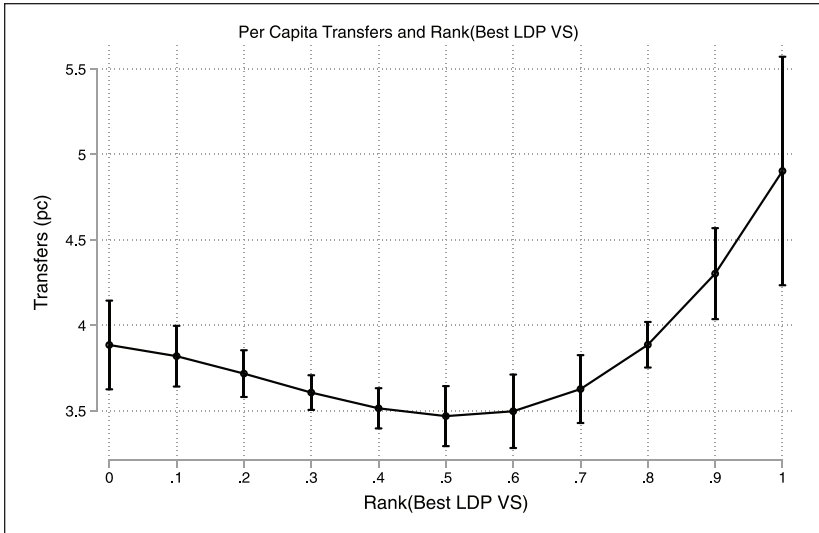
Figure 1. Predicted values and 95% confidence intervals from a regression of post-election per capita transfers received by municipalities on a cubic specification of Rank(Best LDP VS) , municipality controls, and district-year fixed effects. On average, the relationship between rank and transfers is convex. LDP = Liberal Democratic Party.

Across Districts, Asymmetry in Municipality Size Increases Transfers

Next, we turn our attention to Hypothesis 3: Do politicians deliver larger prizes to districts where municipalities vary more in size? We adopt two strategies to evaluate this. First, Table 3 presents fixed effects regression models for the logarithm of per capita transfers received by districts in the years following the seven HOR elections held between 1980 and 2000 (Models 1 and 2) and the five before electoral reform (Models 3 and 4), respectively, as a function of $HI_{d,t}$, which captures the concentration of a district's voting population. All four models also include $Winning\ LDP\ VS_{d,t}$, which is the vote share captured by the district's winning LDP candidate(s), district-level versions of the controls present in Table 1, controls for the number of municipalities in a district and the number of people per available seat, and year fixed effects.[14] Models 2 and 4 contain district fixed effects. Because the boundaries of all districts were redrawn with electoral reform in 1994, districts before and after 1994 are not comparable. Nevertheless, we have a set of districts in the five HOR elections prior to reform (1980–1993) and another

Table 3. Transfers to Districts After HOR Elections, 1980–2000 (Models 1 and 2) and 1980–1993 (Models 3 and 4), are Regressed on the Degree of Asymmetry of Municipality Size $(HI_{d,t})$, Electoral Support, and Other Controls.

Outcome (Transfers to Districts)	Dependent variable: $\text{Log(Transfers)}_{t+1}$			
	1980–2000 elections		1980–1993 elections	
	Model 1	Model 2	Model 3	Model 4
$HI_{d,t}$	0.992***	0.527	1.245***	1.272
	(0.141)	(0.787)	(0.266)	(0.711)
Winning LDP VS$_{d,t}$	−0.326*	0.113	−0.258	0.0286
	(0.128)	(0.0638)	(0.217)	(0.0460)
Fiscal Strength$_{d,t}$	−0.206	−0.167	−0.231	−0.232
	(0.113)	(0.196)	(0.200)	(0.150)
Dependent Population$_{d,t}$	4.785***	3.688**	6.340***	1.130
	(0.881)	(1.146)	(1.668)	(1.084)
Agriculture$_{d,t}$	2.587*	3.332*	3.404*	−0.515
	(1.063)	(1.413)	(1.330)	(1.169)
Log(Population$_{d,t}$)	−0.137	−0.129	0.0804	−0.601***
	(0.157)	(0.153)	(0.149)	(0.165)
Log(Per Capita Income$_{d,t}$)	0.337*	0.407*	0.314	0.531***
	(0.150)	(0.185)	(0.222)	(0.112)
Population Density$_{d,t}$	0.0477**	−0.103**	0.0449	−0.0698***
	(0.0148)	(0.0393)	(0.0277)	(0.0202)
Log(Number of Municipalities$_{d,t}$)	0.254***	0.0316	0.208*	0.464
	(0.0608)	(0.287)	(0.0965)	(0.265)
People per Seat$_{d,t}$	−0.0200	−0.0106	−0.0730	−0.0322
	(0.0442)	(0.0295)	(0.0629)	(0.0282)
Observations	1,059	1,059	600	600
Year fixed effects	Yes	Yes	Yes	Yes
District fixed effects	No	Yes	No	Yes
R^2	.45	.55	.48	.75

On average, districts characterized by greater asymmetry in municipality size received more transfers. Robust standard errors clustered on the district in parentheses. HOR = House of Representatives.
*$p < .05$. **$p < .01$. ***$p < .001$.

set in the two HOR elections after reform (1996 and 2000). Model 2 thus contains fixed effects for these two sets of districts. We report robust standard errors clustered on district.

The positive, significant coefficients on $HI_{d,t}$ in Models 1 and 3 (without district fixed effects) show that districts characterized by greater asymmetry in municipality size received more transfers the year after these elections, even after controlling for other known determinants of transfers. The coefficients on Winning LDP VS$_{d,t}$ are negative (Models 1 and 3) and significant

(Model 1). This means that across districts, electoral support for the LDP is, if anything, negatively associated with transfers. This is consistent with what others have found (Horiuchi & Saito, 2003; McMichael, 2018; Saito, 2010). The results also show that increases in the number of people per available seat are not significant in the presence of $HI_{d,t}$, but the direction of its effect accords with prior work (Horiuchi & Saito, 2003; Saito, 2010). The coefficient on Log(Number of Municipalities$_t$) is positive and significant, which comports with Saito (2010), as is the coefficient on Agriculture$_{d,t}$. Substantively, a one standard deviation increase in $HI_{d,t}$ can be expected to increase the average district's per capita transfer by 16%. This is a larger increase than a one standard deviation increase in proportion of the district's population employed in agriculture, which is expected to increase the average district's transfer by 9%.

When district fixed effects are included (in Models 2 and 4), the coefficient on $HI_{d,t}$ remains positive, but loses significance. There are two possible interpretations of this. One is that Hypothesis 3 is not supported and other time-variant and time-invariant features of districts exercise a greater impact on transfers. Another is that $HI_{d,t}$ does not vary enough over time to estimate its effect on transfers independently of time-invariant features of the district that are captured with the fixed effect. Supporting this, the standard deviation in $HI_{d,t}$ for a single district over time is only 0.014, whereas across districts, it is 0.086. This may explain why the coefficient on $HI_{d,t}$ is significant in Models 1 and 3, but not in Models 2 and 4. This problem is likely to be particularly acute in Model 2 because just under half of our observations are from the 1996 and 2000 elections, which occurred after district boundaries were changed. It is unlikely that a district would have undergone enough change in $HI_{d,t}$ between two elections for us to estimate its effect independently of district fixed effects. Models 3 and 4, on the contrary, look at the same district over a 13-year period, where it is feasible that larger changes in within-district HI (due to population movements) would have occurred. Reflecting this, the coefficient in Model 4 is of a similar size to that of Model 3, whereas the coefficient in Model 2 is much smaller than that of Model 1.[15]

Given this, we adopt a second strategy to evaluate whether politicians deliver larger prizes to districts in which municipalities vary more in size. We leverage the fact that municipalities were shuffled into new districts (with correspondingly new $HI_{d,t}$ scores) in the wake of Japan's 1994 electoral reform. The fact that we observe the *same* municipality with *different* $HI_{d,t}$ scores before and after reform enables us to examine whether being placed into a district with greater asymmetry in municipality sizes is associated with receiving more transfers after the 1996 election. As we noted above, Japan's electoral reform created 300 SMDs out of 129 MMDs. To take Hachinohe

City (population 242,079) as an example, in the 1993 election, its other "competitors" in the tournament were another larger city (Aomori City, population 291,808), three smaller cities with populations in the 40,000 to 60,000 range, 21 towns, and 13 villages in Aomori 2nd District. In 1996, its competitors were six towns and four villages, the largest of which had a population of 19,064. While the *number* of competitors the city faced declined, the *variation* in their relative sizes increased. Its $HI_{d,t}$ score was 0.14 in 1993 and 0.48 in 1996.

We confined our analysis to municipalities that existed in the 1993 and 1996 elections, were in districts that elected an LDP winner,[16] and were moved into a district comprised of municipalities that were not a strict subset of those that had existed in the municipality's old district. This latter condition is important because when a new SMD is created from a subset of municipalities that comprised an old MMD, all municipalities in that SMD will have the same values for variables capturing changes in district-level characteristics such as HI. As we include fixed effects for both the 1993 and the 1996 districts in the following test, the effect of changes in other district-level characteristics will be absorbed by these fixed effects, unless the 1996 district contains municipalities drawn from different 1993 districts. There were 38 SMDs in 1996 that contained municipalities that were *not* drawn from a single MMD in 1993, leaving us with 341 municipalities in the following analysis.

Table 4 presents fixed effects regression models for the logarithm of per capita transfers received by a municipality the year after the 1996 election as a function of Δ HI. Positive Δ HI scores indicate that the municipality was shuffled into a district comprised of municipalities that were *more* asymmetrically sized than those in its old district. Models 1 and 2 control for the *change* in level of electoral support between the two elections, with $\Delta\,Sum\,LDP\,VS$ and $\Delta\,Rank(Sum\,LDP\,VS)$, respectively.[17] Models 3 and 4 control for the absolute level of electoral support the municipality provided the LDP in 1996, with $Sum\,LDP\,VS\,1996$ and $Rank(Sum\,LDP\,VS\,1996)$, respectively. In addition, all four models control for the log of per capita transfers received the year after the previous election (in 1994); the log of per capita transfers received the year of the election (in 1996); changes in the same six municipality-level characteristics we controlled for, in Tables 1 and 2, between 1993 and 1996; and features of a municipality's district in both 1993 and 1996 that could have influenced its transfers (with district fixed effects). Models 3 and 4 include an additional district-level control: change in the number of people per available seat in the municipality's district.[18]

The positive, significant coefficients on Δ HI in all four models indicate that municipalities shuffled into districts comprised of more asymmetrically

Table 4. Transfers After the 1996 Election Are Regressed on Changes in a Municipality's $HI_{d,t}$ Score, Support for the LDP, People per Seat, and Other Characteristics Between 1993 and 1996.

Outcome (Transfers to Municipalities in 1996)	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4
ΔHI_d	1.531***	1.533***	9.074**	9.411**
	(0.0898)	(0.0931)	(2.673)	(3.290)
ΔSum LDP VS$_m$	−0.484			
	(0.286)			
ΔRank(Sum LDP VS)$_m$		−0.142		
		(0.110)		
Sum LDP VS 1996$_m$			−0.0260	
			(0.470)	
Rank(Sum LDP VS 1996)$_m$				0.0140
				(0.140)
Log(Transfers in 1994$_m$)	0.143**	0.141**	0.149**	0.149**
	(0.0384)	(0.0397)	(0.0428)	(0.0427)
Log(Transfers in 1996$_m$)	0.584***	0.585***	0.585***	0.585***
	(0.0875)	(0.0856)	(0.0846)	(0.0838)
Δ Fiscal Strength$_m$	−0.167	−0.157	−0.154	−0.154
	(0.838)	(0.833)	(0.850)	(0.846)
Δ Dependent Population$_m$	−10.71	−10.08	−11.73	−12.78
	(14.73)	(14.55)	(18.35)	(18.27)
Δ Agriculture$_m$	27.89*	26.05*	26.12*	25.96*
	(10.63)	(10.52)	(9.598)	(9.994)
Δ Log(Population$_m$)	−4.552	−4.568	−5.136	−5.475
	(5.558)	(5.466)	(6.345)	(6.363)
ΔLog(PerCapita Income$_m$)	−0.328	−0.277	−0.285	−0.291
	(0.751)	(0.767)	(0.781)	(0.776)
Δ Population Density$_m$	2.575**	2.589**	2.723**	2.791**
	(0.887)	(0.879)	(0.751)	(0.770)
Δ People per Seat$_d$			−2.086*	−2.183*
			(0.750)	(0.925)
Observations	341	341	341	341
District fixed effects 1993	Yes	Yes	Yes	Yes
District fixed effects 1996	Yes	Yes	Yes	Yes
R^2	.60	.60	.60	.60

Municipalities moved into districts characterized by greater asymmetry in municipality size received more transfers. Standard errors clustered on the 1996 district in parentheses.
LDP = Liberal Democratic Party.
*$p < .05$. **$p < .01$. ***$p < .001$.

sized municipalities, received more transfers the year after the 1996 election. None of the coefficients on the four variables capturing electoral support are significant, meaning that in the presence of Δ HI, neither more electoral support in 1996 nor greater changes in support from 1993 to 1996 are associated with receiving more transfers. In line with our findings above, the positive, significant coefficients on Log(Transfers in 1996) and Log(Transfers in 1994) show that municipalities that received more transfers after the 1993 election and in 1996 also received more transfers in 1997. In addition, all four models show that municipalities that experienced increases in proportion of population employed in agriculture and population density received more transfers. Models 3 and 4 show that municipalities in districts that experienced an increase in the number of people per seat received fewer transfers after the 1996 election. It also reveals that the significance of Δ HI holds even when Δ People per Seat are included. Substantively, the results in Model 1 show that if the average municipality experiences a one standard deviation increase in HI (0.18) between 1993 and 1996, it can expect a 28% increase in per capita transfers in 1997. This equates to approximately 9,400 yen (US$77) per person. This lends strong support to Hypothesis 3.

Alternative Explanations, Placebo Tests, and Further Validation of the Theory

We now consider whether alternative variables can better account for these results, conduct placebo tests, and respond to other potential concerns. First, can our findings about the importance of district-level asymmetry ($HI_{d,t}$) be explained by the fact that rural voters tend to support the LDP more than urban voters (Curtis, 1971; Saito, 2010)? Table A.7 of the online appendix reports fixed effect regression models for a municipality's support for winning LDP candidates (measured as both $\text{Best LDP VS}_{m,t}$ and $\text{Sum LDP VS}_{m,t}$) in the seven HOR elections held between 1980 and 2000 as a function of $HI_{d,t}$, municipality-level controls, district-level controls, and year fixed effects. The results show that municipalities that are more rural (measured either in proportion of population employed in agriculture or population density) exhibit systematically higher levels of support for the LDP. However, municipalities in asymmetric districts (higher $HI_{d,t}$ scores) exhibit systematically lower levels of support, even when controlling for ruralness. Furthermore, the impact of asymmetry is larger than the impact of ruralness. The model predicts that a one standard deviation increase in $HI_{d,t}$ reduces support for the LDP by 2%. Substantively, this effect is twice as large as the effect of a one standard deviation increase in both ruralness indicators (proportion employed in agriculture and population density) on support for the LDP. Across districts, then, $HI_{d,t}$

increases transfers, even as it pulls down electoral support for the LDP. Empirically, then, support for the LDP is negatively associated with transfers across districts. Yet within districts, electoral support for the LDP is positively associated with transfers.

Second, our theory posits that *all* LDP winners will attempt to pit the municipalities against each other in a tournament, whereas an alternative account might hold that it is only LDP politicians with certain characteristics who have the clout to do this. To evaluate whether the observed relationship between electoral support and transfers could be due to *senior* LDP politicians, we constructed our four electoral support variables— $\text{Best LDP VS}_{m,t}$, $\text{Sum LDP VS}_{m,t}$, $\text{rank}(\text{Best LDP VS}_{m,t})$, and $\text{rank}(\text{Sum LDP VS}_{m,t})$, respectively—using vote shares captured by senior LDP winners only.[19] The results (see Tables A.8–A.11 of the online appendix) show that increases in support for senior LDP winners also translated into more transfers after the election, but the results above are not dependent on their inclusion. To evaluate whether our results might be better explained by the level of electoral support the municipality provided the most *powerful* LDP politician in the district (defined as the politician with the largest district-level vote share), we reran Table 1 with a control for the vote share captured by this politician. The results (see Table A.12 of the online appendix) show that its coefficient is not significant in any model.

Third, can our findings be explained by incumbents having *preexisting ties* to certain municipalities in their districts, on account of factors such as hometown proximity, strength of party attachments, or the concentration of voters in certain occupations? In the presence of such ties, these municipalities may consistently return high levels of support for their LDP incumbent *and* receive a lot of transfers, but this is because of their special relationship with this incumbent, not because they are performing well in a tournament. To make sure the results in Tables 1 and 2 hold among highly supportive municipalities, which are the ones likely to have a special relationship with their LDP incumbent, we examine the effects of changes in electoral support between election i and election $i+1$ on transfers received the year after election $i+1$ for municipalities that ranked first and second on $\text{Rank}(\text{Sum LDP VS}_{m,t})$ in election i. The results, presented in Table A.13 of the online appendix, show that even the most supportive municipalities are not "insulated" from the tournament: If they drop in rank between two elections, they receive less money after the next election. This finding is even more notable given that, in the four pre-reform elections we examine, more than half of the municipalities that were ranked first or second in support remained in one of these places at the next election.

Fourth, under Japan's old electoral system, conservative-inclined independents who had failed to win the party's nomination often stood in the district anyway, usually with the support of an LDP faction not already represented. If

these candidates won, they would be welcomed into the party after the election (Reed, 2009). Reflecting Ariga's (2015) claim that these winners "should be regarded as de facto LDP candidates," we constructed versions of the same four support variables using the vote shares of both LDP *and* conservative-inclined winners. The results (see Tables A.8–A.11 of the online appendix) show that winning candidates who joined the LDP after the election made similar efforts to bestow resources on the municipalities that supported them.

Fifth, the theory holds that it is *winning LDP* candidates who are afforded the access that enables them to help municipalities get their projects funded, not winning candidates affiliated with *other parties* nor LDP candidates who *lost* the election. We constructed versions of the same four support variables using the vote shares captured by the universe of non-LDP winners in district d in the election held at t and the universe of LDP losers in district d in the election held at t, respectively. The results (see Tables A.8–A.11 of the online appendix) show that increases in support for winning candidates from other parties had no effect on transfers, whereas increases in support for losing LDP candidates negatively influenced the transfers a municipality received.

Sixth, studies show that Japan's 1994 electoral reform changed the allocation of transfers to municipalities (e.g., Hirano, 2006; Horiuchi & Saito, 2003; Saito, 2010). The reform also created more districts than had existed before. If the post-reform districts were systematically different in terms of $HI_{d,t}$ than the pre-reform districts, then one concern might be that any observed effects of $HI_{d,t}$ are effects of the reform. This might be a problem if our results were dependent upon observations from the post-reform period, but Models 3 and 4 in Table 3 reveal that they hold when examining the pre-reform period only. Figure A.1 of the online appendix plots the distribution of $HI_{d,t}$ before and after reform. There are slightly more districts comprised of evenly sized municipalities before reform and slightly more comprised of asymmetrically sized municipalities after reform, but the distributions are very similar. In addition, our inclusion of district-year fixed effects in Table 1 and controls for the number of people per available seat in Tables 2 to 4, respectively, rule out the possibility that our results can be explained by changes in malapportionment, the reduction of which was also a product of the reform.

Seventh, Table 1 shows that increases in $Best\,LDP\,VS_{m,t}$ are associated with more transfers the year after the election. This finding implies that $Best\,LDP\,VS_{m,t}$ scores are comparable before and after electoral reform. However, a low score before reform might indicate that a municipality had *divided* its votes among LDP winners. However, consistent with Hirano's (2006) finding, we found that municipalities tended to concentrate on supporting a single LDP candidate. For each municipality at time t, we constructed:

$$\text{LDP Vote Concentration}_{m,t} = \frac{\sum_{c \in m} \left(\text{LDP}_{c,t} w_{c,t} \text{VS}_{c,m,t} \right)^2}{\left(\sum_{c \in m} \text{LDP}_{c,t} w_{c,t} \text{VS}_{c,m,t} \right)^2}. \tag{7}$$

If a municipality *concentrates* its votes on a single LDP winner, its LDP Vote Concentration$_{m,t}$ score is 1. If it *divides* its votes equally among two LDP winners, its LDP Vote Concentration$_{m,t}$ score is 0.25. We found that the mean LDP Vote Concentration$_{m,t}$ score for municipalities prior to reform was 0.59, which implies that a second LDP candidate receives no more than 40% of the votes of the first. Furthermore, the vote concentration is even higher in municipalities that provide very high vote shares for LDP winners. Table A.2 of the online appendix also shows that our results are not dependent upon this indicator and hold with Sum LDP VS$_{m,t}$. Collectively, these additional checks strengthen confidence in our findings.

Conclusion

We have shown that key features of elections and resource allocations in a major industrialized democracy are consistent with a theory positing that incumbents motivate voters to turn out and support them by administering tournaments between groups, in which prizes are allocated based on the relative levels of electoral support provided. We assembled new data on voting behavior, central government transfers, and economic and demographic variables for 3,300+ municipalities in existence in Japan in the period 1980–2000. Using this, we demonstrated that when the municipalities in a district are ranked according to their level of electoral support for winning LDP candidates, those at higher ranks get larger rewards, with the difference in size of the reward increasing at higher ranks. We also find that municipalities in districts comprised of municipalities that vary more in size also receive larger rewards. This evidence provides an encouraging basis upon which to investigate whether incumbents organize elections and allocate resources in this fashion in other democracies.

An in-depth consideration of the ramifications of our findings for the politics of Japan, our test case, is beyond the scope of this article. Nevertheless, our findings do offer new explanations for at least two interesting features of Japanese politics. One is why LDP politicians continue to deliver pork after Japan's 1994 electoral reform. We suggest that another reason they do so is because the reform did little to alter their ability to discern the levels of support provided by the different municipalities in their districts and influence

transfers in ways that disproportionately benefit certain municipalities over others. The second puzzle is why LDP politicians do not steer pork toward districts that are more supportive. We find that incumbents tend to receive their highest levels of support in districts comprised of relatively evenly sized municipalities. In those districts, they can offer less and get more. Their counterparts in districts comprised of asymmetrically sized municipalities, however, need to offer more, but get less. Hence, pork flows to districts that are relatively less supportive, but within districts, it flows to the most supportive municipalities.

We suggest several future directions for Japanese politics scholars. One is to examine the relative weight that ought to be accorded the tournament strategy relative to other factors in explanations of LDP dominance. Scholars interested in this question would do well to consider whether LDP politicians are administering tournaments in other elections, such as the House of Councillors, where other relevant groups are nationally organized, and prefectural assemblies, where some members are elected in districts comprising a single municipality and others are elected in districts comprising multiple municipalities. Whether the empowerment of the LDP leadership in recent years has led to a prioritization of less asymmetrically sized districts, on account of the fact that smaller prizes are required to win them, should be examined, as should whether the LDP affords its coalition partner since 1999, the Komeito, the access to resources that would enable its incumbents to administer a tournament.

Our findings can also push the field toward a greater understanding of puzzles illuminated by others (e.g., Horiuchi et al., 2015; Saito, 2010): namely, why the LDP encouraged municipal mergers in the 2000s and why electoral support for the LDP tends to decline after places receive large-scale infrastructure projects. We suggest that savvy incumbents may have understood that in a period of intense budgetary pressure, equalizing the sizes of municipalities in their districts would enable them to provide smaller prizes, yet continue to be elected. We also suggest that if investment in infrastructure brings about sizable population shifts, as people relocate closer to the airport or train station, then infrastructure may increase the asymmetry in municipality sizes within districts, which would produce lower levels of electoral support for the LDP.

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Notes

1. There are two main types of government-municipality transfers: national treasury disbursements (NTDs) and local allocation tax (LAT) (Bessho, 2016; Ishihara, 1986). In 2002, 16% of the average municipality's revenue came from NTD and approximately the same amount came from LAT (Yamada, 2016). Because LAT is calculated using a formula designed to equalize fiscal capacity across municipalities, we expect that incumbents will find it more difficult to influence LAT (Hirano, 2011; Meyer & Naka, 1999; although see McMichael, 2017). Our analysis focuses on NTD. While NTD can be used to fund projects concerning welfare, disaster prevention, education, and so on, one study found that 40% of it went toward construction projects such as roads, bridges, parks, harbors, and housing (Yonehara, 1986).
2. In 1980, the largest municipality where votes were counted was Sakai City in Osaka prefecture (population 797,206) and the smallest was Aogashima Village, located on a small island off the coast of Tokyo (population 185).
3. In 1993, the Liberal Democratic Party (LDP) captured a plurality of seats but lost control of government. It returned just 10 months later in a coalition.

4. Interviews with Mihara Asahiko, LDP-affiliated HOR (House of Representatives) Member first elected in 1986 (May 30, 2017, Tokyo, Japan) and Mori Eisuke, LDP-affiliated HOR Member first elected in 1990 (June 8, 2017, Tokyo, Japan).

5. A description of the data is available at http://www.nikkei.co.jp/needs/contents/regional.html. For towns and villages, NEEDs uses official reports (specifically, "Shichoson Betsu Kessan Jyokyo Shirabe"), and for cities and special wards, data are collected by the *Nikkei* newspaper. Data are collected after the fiscal year (from April 1 until March 31) and the period in which municipalities "settle their accounts" (April to May).

6. The first three variables are measured annually. The second three are measured in censuses carried out every 5 years. For the off-years, we took the value in the census year closest to the off-year. Population density is used as a measure of urbanness and was constructed by dividing municipal population by municipality size (in km^2). Because our size variable is available from 1998, we assigned municipalities with identical names and government codes in previous years to the sizes they had in 1998. Summary statistics pertaining to these variables are in Table A.1 of the online appendix.

7. In our data, "year" refers to the fiscal year, which runs from April 1 to March 31. Technically, the 1990 HOR election, which was held on February 18, occurred during the 1989 fiscal year.

8. For simplicity, in what follows we write $c \in m$ to represent the set of candidates competing in each municipality.

9. The results using $\text{SumLDPVS}_{m,t}$ and $\text{rank}(\text{SumLDPVS}_{m,t})$ are reported in Table A.2 of the online appendix. The number of observations differs across the models. The latter models exclude the 1980 election because we do not have transfer data for 1979. Models 2 and 4 have fewer observations than Models 1 and 3 because we cannot rank municipalities in terms of $\text{BestLDPVS}_{m,t}$ unless an LDP candidate wins in a district. Such events were extremely rare prior to 1994, but more common in 1996 and 2000.

10. In most cases, the appropriate control is the year before the election. However, when elections are held early in a fiscal year, transfers in the same year will likely be influenced by levels of support in those elections. In those cases, controlling for transfers in year t would reduce our estimates of the effect of electoral support on transfers.

11. Note that the effects of variables specific to the district-year, such as the number of people per seat or $\text{HI}_{d,t}$, cannot be estimated separately in this regression.

12. We do not include municipality fixed effects because municipalities do not move around much in the ranking. Most of the movement that occurs is among municipalities at the top.

13. This may reflect the fact that municipalities at the very bottom of the ranking are highly supportive of opposition-aligned winners. It is possible that very experienced members of the opposition also have influence over transfers.

14. We do not control for prior transfers because $\text{HI}_{d,t}$ varies so little between elections when district boundaries are the same. This means that if our theory is correct, $\text{HI}_{d,t}$ will have also influenced prior transfers. Including prior transfers as a

control would thus absorb some of the potential effects of $\text{HI}_{d,t}$ on transfers. Table A.6 of the online appendix reports the regressions with $\text{Log(Transfers}_{d,t})$. The coefficients on $\text{HI}_{d,t}$ remain positive and significant in Models 1 and 3, but are of a smaller size.

15. In Model 4, the coefficients on population and population density are negative and significant, indicating that as more people enter a district, it receives fewer per capita transfers. One might be concerned that if such population changes were pronounced enough for their effects to be estimated separately from a district fixed effect, then those changes would also result in changes in $\text{HI}_{d,t}$, rendering its lack of significance problematic for Hypothesis 3. However, increases in a district's population would only result in changes to $\text{HI}_{d,t}$ if people moved *disproportionately* into certain municipalities over others within a district. If people moved or the population increased in rough proportion to the existing distribution of municipality sizes, a district's $\text{HI}_{d,t}$ score would exhibit little change even with this migration.

16. There were seven districts without an LDP winner in 1993 and 121 in 1996.

17. As we confine our analysis to municipalities that elected at least one LDP candidate in both elections, $\Delta\,\text{Sum LDP VS}$ scores are generally positive. Indeed, less that 10% of municipalities experienced a decline in Sum LDP VS.

18. Note that changes in, for example, the number of seats available, the number of LDP winners, and the number of LDP candidates are controlled for with fixed effects for a municipality's 1993 district. For each municipality in our sample, the change in these three variables is calculated by taking the number in 1993 and subtracting 1, which is constant across all municipalities in the 1993 district.

19. LDP politicians are defined as "senior" if they have won at least five elections on the grounds that they begin receiving leadership posts in their fifth terms (Krauss & Pekkanen, 2010, p. 157).

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