Programmatic Policies Increase the Clientelistic Goods Received by Policy Beneficiaries: Evidence from Snow Subsidies in Japan*

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December 3, 2020

Abstract

How do programmatic policies impact incumbent performance in clientelistic settings? The literature is mixed, with findings suggesting increases in electoral support, negligible effects on support, and effects among incumbents at some levels of government, but not others. We help to explain this inconsistency by pointing to a confounder: the fact that incumbents in clientelistic settings have incentives to offset a potentially *negative* impact of a programmatic policy by funnelling more clientelistic goods toward policy beneficiaries, making the net effect of these policies ambiguous. We examine this in Japan (1980-2005), which has unusually good data on the amounts of money different types of voters receive in exchange for their vote. Helpfully, voters also differ in their eligibility for a programmatic policy awarded on the basis of snowfall. Our evidence—fixed effect regressions, quasi-experiments and survey analysis—supports our claim. This work suggests new avenues for theory and inference in clientelistic settings.

*We thank Joan Barceló, Muhammet Bas, Nisha Bellinger, Bruce Bueno de Mesquita, Christina Davis, Kentaro Fukumoto, Yusaku Horiuchi, Andy Harris, Kosuke Imai, Ko Maeda, Lucia Motolinia, Megumi Naoi, Yoshikuni Ono, Mark Ramseyer, Frances Rosenbluth, Alastair Smith, Daniel M. Smith, Susan C. Stokes, Jeffrey Timmons, Hikaru Yamagishi, participants of the NEWJP conference at Dartmouth College (August 26-27 2019), and the faculty of New York University Abu Dhabi (February 5 2020) for helpful suggestions. We also thank Yutaka Tsujinaka and Choe Jae Young for generously sharing data.

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In many countries, incumbents make the distribution of government resources contingent on how someone votes, a practice known as clientelism. Why some countries exhibit more clientelism than others is a question of enormous substantive importance. Recent work zeroes in on the effects of 'programmatic policies', which bestow benefits on people meeting a set of formalized, objective, non-manipulable criteria, such as income beneath a certain threshold (e.g. Imai, King and Rivera, 2019; Correa and Cheibub, 2016; Layton and Smith, 2015; Linos, 2013; Manacorda, Miguel and Vigorito, 2011). In contrast to clientelistic goods, which are given to voters on the condition they vote for the incumbent, programmatic policies cannot be withdrawn if the beneficiary *stops* voting for the incumbent. Examples include cash transfers (Zucco, 2013; Diaz-Cayeros, Estevez and Magaloni, 2009; Labonne, 2012), training programs (Blattman, Emeriau and Fiala, 2018) and computer vouchers (Pop-Eleches and Pop-Eleches, 2012). Leveraging the fact that many countries in which the incumbent-voter bond is clientelistic enact programmatic policies, researchers have studied whether those on the receiving end of these policies were more likely to vote for the incumbent in the next election. The idea is that if they were, it would mean that such policies have the potential to replace the clientelistic bond between incumbent and voter with a *non*-clientelistic bond. Enacting more of these policies, then, could not only alleviate poverty, but also pave the way toward the jettisoning of clientelism altogether.

We offer an alternative hypothesis about the effects of programmatic policies in clientelistic settings. We posit that if an incumbent is using government resources to buy votes, her first response to a programmatic policy may be to *increase* the amount of these resources ('clientelistic goods') offered to beneficiaries. Why? If we take two similar groups of voters and give one of them a programmatic policy, then it is reasonable to expect that the price of their votes will increase. The premise of this hypothesis is that it costs more to buy the votes of wealthier voters (e.g. Stokes, 2007). If the incumbent did not *need* the votes of beneficiaries, she could respond to this price increase by redirecting her vote-buying toward non-beneficiaries, whose votes are cheaper. But in a situation where ignoring beneficiaries risks imperiling an incumbent's chance of re-election, then provided she has the resources to do so, she may decide to pay the higher price of beneficiaries' votes, so as to be able to continue with the clientelistic mode of competition she has relied on until now.

Evaluating this hypothesis is difficult because the clientelistic exchange of goods and votes is rarely observed directly. Researchers may know that money flows from incumbent to voter at the time of elections, but rarely observe *how much* each voter receives for her vote. This makes it tricky to evaluate whether incumbents have responded to the enactment of a programmatic policy by adjusting the amounts of clientelistic goods provided. But being unable to observe the amounts of clientelistic goods flowing to different types of voters means that researchers have to assume that incumbents have *not* responded to the policy's enactment in this manner. Yet by definition, a clientelistic setting is one in which incumbents *use money to buy votes*. The fact that clientelistic exchanges can persist through sizeable transformations in a country's demographics, wealth, and political system, suggests that many incumbents do tailor the clientelistic goods on offer to retain people's interest in the exchange.

The case of Japan gives us traction over this important question. In Japan, groups of voters (municipalities) are embedded in clientelistic exchanges with incumbents affiliated with Japan's ruling party, the Liberal Democratic Party (LDP) (Catalinac, Bueno de Mesquita and Smith, 2019). The good LDP incumbents use to buy votes is national treasury disbursements (NTD). Because data on NTD has been publicly available since 1977 (Saito, 2010), researchers are able to observe *how much* each municipality receives in exchange for its votes. Helpfully, Japanese municipalities also differ in their eligibility for a programmatic policy (a snow subsidy) in a manner exogenous to these clientelistic exchanges. If we are correct that programmatic policies increase the price of beneficiaries' votes, requiring incumbents who want to continue buying them to increase the amount of clientelistic goods delivered, we will observe municipalities that receive the snow subsidy receiving more clientelistic goods in exchange for their votes than municipalities that do not. Fixed effect regressions and a geographic regression discontinuity (GRD) design confirm this. Supplementary analyses show it is unlikely our findings can be explained by an alternative theory.

For comparativists, the takeaway is that research on the impact of programmatic policies on votes for the incumbent in clientelistic settings must examine whether incumbents have responded to the policy's enactment by adjusting the volume of clientelistic goods funnelled to beneficiaries. If they did so, measuring the policy's impact will be trickier than previously acknowledged. In our case, incumbents decided to pay the higher price of beneficiaries' votes. Under different circumstances, incumbents may respond differently. In addition to finding ways

to measure the amounts of clientelistic goods flowing to different types of voters, future work should formalize the range of choices incumbents have and derive conditions under which they are likely to choose each one.

1 Theory

We begin with definitions of key concepts. Our definitions are drawn from the literature, but clarifying them is important. Consider an incumbent with goods to distribute. She can distribute them in a clientelistic or non-clientelistic manner. For a good to be distributed in a clientelistic manner, it must be *tied* to the recipient's vote, meaning the incumbent transfers the good on the condition the voter votes for her and when the voter stops voting for the incumbent, the good is withdrawn. For a good to be distributed in a non-clientelistic manner, the reverse is true: the good must *not* be tied to a recipient's vote. Other criteria determines who receives it, such as age, occupation, family size, income level or geographic location. It is awarded to all voters meeting that criteria, regardless of whether or not they voted for the incumbent (Nichter, 2018; Hicken, 2011; Kitschelt and Wilkinson, 2007).

What distinguishes goods distributed in a clientelistic manner from goods distributed in a non-clientelistic manner is not the nature of the good itself, but the *criteria* used to distribute it (Kuo, 2018; Stokes et al., 2013; Hicken, 2011). In fact, the same good can be tied to how someone votes in some contexts but not in others. Weitz-Shapiro (2014) uses the example of food stamps. If the incumbent delivers food stamps to everyone meeting a certain criteria, and is unable to withdraw them in the event a recipient does not vote for her, they are non-clientelistic. If the incumbent makes eligibility for food stamps dependent on how someone votes, reserving the option to withdraw them if the voter stops voting for her, they are clientelistic.

Earlier work on clientelism conceived of it as a relationship between individuals who knew each other personally (e.g. Scott, 1972). As countries modernized and social ties frayed, the literature continued the focus on individuals, but identified the importance of brokers, who sat between incumbents and voters and facilitated the clientelistic exchange (e.g. Hicken, 2011; Stokes et al., 2013). Beginning with Scheiner (2006) and Kitschelt and Wilkinson (2007), scholars began noticing that in the countries they studied, the relationship between incumbents and *groups of voters* also bore the hallmarks of clientelism: namely, the 'combination of particularistic targeting and contingency-based exchange' (Hicken, 2011). One factor thought to facilitate

this was how votes are counted (Kitschelt and Wilkinson, 2007). In many democracies, votes are counted in a smaller geographic unit within an electoral district, such as a precinct. This enables incumbents to discern their vote shares in each. If incumbents have discretionary goods that can be targeted at the same units, they may be able to tie the delivery of those goods to a unit's vote share.

When incumbents cultivate clientelistic exchanges with groups of voters, the good in the exchange is a club good (more or colloquially, 'pork'). By definition, club goods are granted to select groups of voters and once granted, their consumption is enjoyed by all group members. The mere presence of pork in a political system is not evidence of clientelism, however. Like other goods, pork can be distributed in a clientelistic or non-clientelistic manner. If the incumbent *ties* pork to a group's voting behavior, increasing it in response to increases in votes and decreasing it in response to decreases in votes, it is clientelistic. if an incumbent targets pork at certain groups in the *hope* it leads to more votes, but does not tie it to the group's voting behavior in the same way, it is not clientelistic (Hicken, 2011; Kitschelt and Wilkinson, 2007). By this definition, then, the bestowing of goods on a party's core supporters or swing voters qualifies as clientelistic only if it is made *conditional* on how those people vote.

Programmatic policies, on the other hand, are a subset of *non*-clientelistic goods. Non-clientelistic goods are bestowed on voters irrespective of who they vote for. Recipients could support the opposition and the programmatic policy would continue unabated. Where programmatic policies differ from other non-clientelistic goods is also in the criteria governing their distribution. To qualify as 'programmatic', a good's distribution must be subject to formalized, publicly-available, non-manipulable rules (Stokes et al., 2013). If unemployment benefits or cash transfers are governed by such criteria, they are programmatic. Because government funds for construction projects usually leave room for incumbent manipulation, they would not usually qualify as programmatic. However, if they are not *tied* to a group's voting behavior, nor should they be classified as clientelistic.

How will a programmatic policy impact clientelism? This question has garnered enormous scholarly interest in recent years because of the widespread adoption of programmatic policies in clientelistic settings. The success of one such policy in Mexico, a cash transfer aimed at alleviating poverty, led to the adoption of similar policies in more than fifty other countries (World Bank, 2014). Political scientists have focused on examining what is now known as

the 'programmatic incumbent support hypothesis' (Imai, King and Rivera, 2019). This holds that because a programmatic policy gives beneficiaries something for nothing, it will increase the probability they vote for the incumbent (Correa and Cheibub, 2016; Tobias, Sumarto and Moody, 2014; Diaz-Cayeros, Estevez and Magaloni, 2009). The precise reason varies: for Zucco (2013) and Linos (2013), it is because beneficiaries engage in retrospective evaluation and vote for the incumbent because she has improved their livelihood (see also Blattman, Emeriau and Fiala, 2018). For Manacorda, Miguel and Vigorito (2011), it is because they use the policy to infer incumbents' redistributive preferences. For Layton and Smith (2015, 859-60), it is because beneficiaries develop a 'psychological attachment to the state and national politics' and gain 'something immaterial' from voting for the incumbent. For Finan and Schechter (2012, 864), it is because voters gain 'pleasure in increasing the material payoffs of the politician who has helped them', while for Bechtel and Hainmueller (2011), it is because they are grateful.

The findings in this work are inconsistent. In some settings, policy beneficiaries voted for the incumbent in larger numbers (Labonne, 2012; Pop-Eleches and Pop-Eleches, 2012). In other settings, their voting behavior was indistinguishable from non-beneficiaries (Imai, King and Rivera, 2019; Blattman, Emeriau and Fiala, 2018; Correa and Cheibub, 2016). The same programmatic policy was found to have increased votes for members of the incumbent party in presidential elections but not in legislative elections (Zucco, 2013) and vice versa (Tobias, Sumarto and Moody, 2014). In other settings, policy beneficiaries cast more votes for the incumbent in elections held immediately after the policy's enactment, but not later on (Bechtel and Hainmueller, 2011; Diaz-Cayeros, Estevez and Magaloni, 2009).

We offer an alternative hypothesis about the impact of programmatic policies, which we think can help make sense of these inconsistent results. Our hypothesis focuses on how a programmatic policy alters the value of the *clientelistic goods* beneficiaries receive for their vote. Consider two voters, both of whom are receiving clientelistic goods in exchange for their votes. If we give one of them a welfare-improving programmatic policy, then providing they are similar on other dimensions, the voter receiving the policy is likely to *lower* the value attached to the clientelistic goods she is receiving, relative to the voter who did not receive the policy.

An incumbent in this situation will realize that if she wants to continue using clientelism to get elected, she will have no choice but to *increase* the amount of clientelistic goods being offered to the beneficiary. Alternatively, she could jettison clientelism altogether. We think that in many

instances, she will do the former. Why? Hicken and Nathan (2020) point out that one of the reasons clientelism persists, even when the secret ballot prevents incumbents from monitoring whether those on the receiving end of their clientelistic goods actually vote for them, is because of the paucity of alternatives. If an incumbent is using clientelism to get elected, it means that it is more attractive than any alternative electoral strategy. An exogenously-imposed increase in price of beneficiaries' votes will make clientelism less attractive than it was before, but it could still be more attractive than any alternative. Whether it is or not will likely depend upon the *size* of the price increase. If the programmatic policy dramatically improved beneficiaries' welfare, requiring incumbents to deliver vastly more clientelistic goods, clientelism's attractiveness may decline to the point that it is outweighed by an alternative. Most programmatic policies cause modest improvements to a beneficiary's wellbeing, however, making it unlikely they would be sufficient to render clientelism less attractive than an alternative.

To our knowledge, studies of the impact of programmatic policies in clientelistic settings have no considered this possibility. Practically-speaking, this means that researchers are studying the impact of a programmatic policy on votes for the incumbent in a setting where they *know* another variable impacts votes for the incumbent – the incumbent's effort to *buy votes* – yet have not measured this variable or theorized about how it could be interfering with inferences they are trying to draw. Our hypothesis leads us to expect that the voting behavior of policy beneficiaries will be influenced not only by the policy, but also by the extra clientelistic goods they receive.

2 Case of Japan

To test our hypothesis, we turn to Japan. The LDP has been in power for 61 of the past 65 years.[1] A vast literature documents the intensity with which LDP politicians pursue pork-barrel projects for their constituents (McMichael, 2018; Christensen and Selway, 2017; Catalinac, 2016; Krauss and Pekkanen, 2010; Scheiner, 2006; Hirano, 2006; Horiuchi and Saito, 2003). One of the first to suggest LDP politicians used pork clientelistically was Sone and Kanazashi (1989), who described how prominent LDP politician Tanaka Kakuei recorded his vote shares in each municipality and made it known that any efforts to lobby the bureaucracy for money would

[1] It was out of power between 1993 and 1994, and 2009 and 2012, respectively. Since 1999, it has been in a coalition with a small party.

be conditional on a municipality's vote share. Scheiner (2006) credits the fiscal dependence of municipalities on the central government as pulling local politicians into clientelistic relationships with their national-level LDP counterparts, wherein they traded their efforts to mobilize votes for money for their communities (see also Yamada, 2016). Saito (2010) analyzed two central government transfers to municipalities: local allocation tax (LAT), awarded according to a need-based formula, and 'national treasury disbursements' (NTD), awarded at the discretion of bureaucrats for the purpose of funding projects. He found that municipalities delivering vote shares for the LDP that exceeded their district's average received NTD allocations that also exceeded their district's average (Saito, 2010, chapter 5).

A recent study offered a new theory for how LDP incumbents use pork to buy votes (Catalinac, Bueno de Mesquita and Smith, 2019). The study reasoned that because votes in Japanese elections are counted at the level of the municipality, virtually all municipalities are contained within a single electoral district,[2] the average municipality is highly dependent on the central government for revenue, and the LDP (almost) always wins, individual LDP incumbents were well positioned to cultivate clientelistic exchanges with the municipalities in their districts. Their analyses, conducted on the 1980-2000 period, revealed robust evidence in support of their theory. The amount of per capita NTD municipalities received in the years after the seven LH elections held during this time was a function of the share of a municipality's eligible voters who voted for their LDP incumbent(s), relative to other municipalities in the same district. When a municipality increased its vote share for its LDP incumbent, it received more money. When its support dropped, it received less.[3]

Hicken and Nathan (2020) note that many exchanges labelled as 'clientelistic' in the comparative politics literature are better characterized as 'clientelism-adjacent' (not truly clientelistic) on the grounds that incumbents usually lack a means of *monitoring* whether those on the receiving end of their clientelistic goods cast their ballots as instructed and *punishing* those who renege, respectively. In our case, the clientelistic exchanges are not with individual voters, but with groups of voters. And they do not involve the granting of clientelistic goods prior to elections, to *elicit* a given vote share, but the withholding of these goods until *after* the incumbent

[2]The percentage of municipalities that spanned more than one district was 0.09% in the 1980-1993 HOR elections, 0.45% in the 1996 and 2000 elections, 1% in the 2003 election, and 3.6% in the 2005 election (Mizusaki, 2014).

[3]According to their theory, LDP candidates who *win* the election mete out rewards and punishments. This is one reason why this study's results differed from those of Saito (2010, chapter 5), who included votes cast for losing LDP candidates.

has verified the group's performance. Thus, incumbents can monitor and punish, respectively. This type of clientelistic exchange becomes possible, Catalinac, Bueno de Mesquita and Smith (2019) argue, when incumbents have reputations for winning elections and rewarding municipalities for their performance after elections, which helps voters trust that should they perform, they will be rewarded. Because these exchanges are iterated, contingency-based, and involve the exchange of valued goods, they are clientelistic (Nichter, 2018; Hicken, 2011).

2.1 The Snow Subsidy

In 1962, the Special Measures Act Concerning Countermeasures for Heavy Snowfall Areas (*Gosetsu Chitai Taisaku Tokubetsu Sochi Ho* in Japanese, henceforth referred to as the 'Snow Act') was enacted. Originating as a private member bill bearing the signatories of 101 HOR Members, the Snow Act was one of a number of laws passed in the early 1960s that established government support for areas of Japan that were considered disadvantaged.[4] Historically, heavy snowfall had presented a major obstacle to industrial development and the improvement of living standards in snowy regions of Japan. It hindered economic activity, paralyzed traffic, isolated communities, and facilitated depopulation. The Snow Act aimed to minimize this damage.

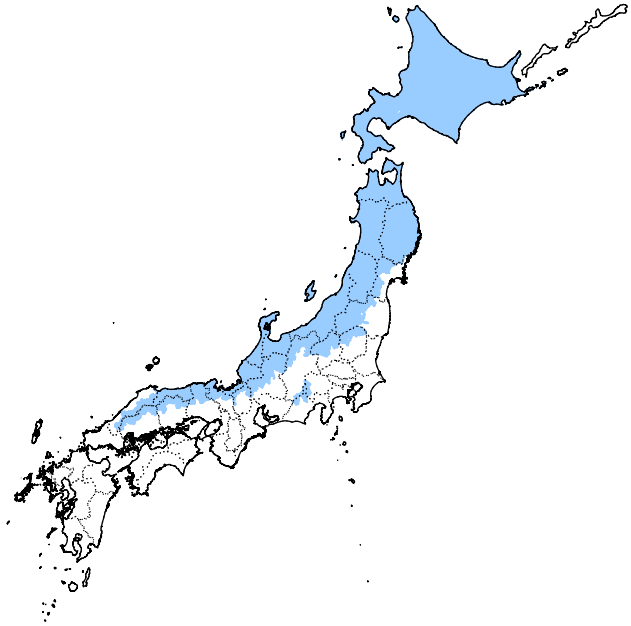
It established four main benefits for municipalities designated as 'heavy snowfall' municipalities. First, they would receive extra central government money to cover the costs of maintaining roads, buildings and heating systems and providing education, medical infrastructure, and public livelihood assistance. This extra money would be paid through the need-based formula mentioned above (LAT). Second, when constructing roads or school buildings in revenue-sharing arrangements with the central or prefectural governments, a larger share of the cost would be shouldered by the upper-tier government. Third, they were permitted to issue special local bonds to finance measures to deal with snow, such as widening roads, investing in snow removal equipment such as snowplows or snow-melters, and implementing disaster-prevention measures. Fourth, their residents were granted special tax benefits, including reduced car, income, and property taxes, as well as home renovation assistance.[5]

[4]Others include the Mountain Villages Development Act, the Peninsular Areas Development Act, the Remote Islands Development Act, and the Special Measures Act for the Promotion and Development of the Amami Islands, as well as others in Naoi (2015, 54-55).

[5]Examples of these benefits are available at: https://www.pref.niigata.lg.jp/sec/chiikiseisaku/1200330044375.html.

The Snow Act and related ordinances stipulate that a municipality can be designated a 'heavy-snowfall municipality' if more than two-thirds of its area qualifies as a 'heavy-snowfall area', in which the height of accumulated snow over the preceding thirty-year period exceeded $5,000$ cm (164 feet) per year.[6] For municipality m, the 'height of accumulated snow' is given by calculating the average height of accumulated snow on a given day of the year, adding this to the average height of accumulated snow on the next day, and so on, for all the days in which the municipality had accumulated snowfall. Intuitively, if 50 cm of snow fell on the first day of winter and remained piled up for the next 100 days without any new snow falling, this municipality would have experienced $5,000$ cm of accumulated snow that year. Figure 1 presents a map of Japan. The shaded area shows the heavy-snowfall municipalities, which tend to be concentrated in the northwest. As of 1980, when our study begins, approximately 30% of Japanese municipalities had received this designation. Together, they make up approximately 50% of land in Japan.

Figure 1: The blue shaded areas depict areas that, as of 2016, had been designated 'heavy-snowfall' areas under the rules of the 1962 Snow Act.



As we explained above, the marker of a programmatic policy is not whether it was introduced to benefit a certain group (all distributive policies, even programmatic ones, have this intent),

[6]Data from weather stations across Japan is used to define heavy snowfall areas. There are several additional ways municipalities can become eligible, which are detailed in Online Appendix A.

but whether, once introduced, its distribution is subject to a set of formalized, publicly-available rules that cannot be manipulated by incumbents (Stokes et al., 2013). The snow subsidy meets this criteria: the rules governing eligibility are formalized and publicly-available on the government's website, together with the list of municipalities that have qualified.[7] Without having access to the full set of reports issued by weather stations in the thirty years prior to each municipality's designation, we cannot discern whether these rules were followed when designations were decided. However, even if incumbents had been able to manipulate *initial* designations, two pieces of evidence suggest they were not manipulating designations during our period of study (1980-2005). One, the group of qualifying municipalities remained identical during this time, barring changes that occurred in the early 2000s as a result of municipal mergers.[8] Two, geocoded data made available by the government at approximately five-year intervals between 1980 and 2016 reveal that the location of the border separating heavy-snowfall areas from non-heavy snowfall areas (visible in Figure 1) was identical. The fact that no municipality received the designation during our period of study, even after 1992, which marked thirty years since the passage of the Act, suggests that incumbents were not manipulating eligibility.[9]

3 Research Design and Data

In Japan, then, municipalities are embedded in clientelistic exchanges with their LDP incumbents and differ in eligibility for a programmatic policy in a manner that is exogenous to those exchanges. Our hypothesis is that welfare-enhancing programmatic policies (the snow subsidy) increase the price of beneficiaries' votes, requiring that incumbents who want to continue buying their votes increase the amount of clientelistic goods (NTD) offered.

Using government resources to buy votes is antithetical to the tenets of democracy. For this reason, the clientelistic exchanges we have just described are not made public. We are therefore

[7]The criteria is available at: http://www.mlit.go.jp/kokudoseisaku/chisei/crd_chisei_tk_000010.html. More information about the Snow Act and related ordinances can be found in Online Appendix A.

[8]In the early 2000s, municipal mergers reduced the total number of municipalities by approximately 30% (Horiuchi, Saito and Yamada, 2015). When a heavy-snowfall municipality merged with a non-heavy snowfall municipality, the new municipality received the designation. Because merging decisions may have been influenced by a municipality's desire to receive the subsidy, including these municipalities could introduce post-treatment bias. Our results are unchanged statistically and substantively when we limit our analyses to the 1980-2000 period.

[9]While we are the first to study the snow subsidy, others viewed it as pork, either for under-employed farmers or construction workers (Saito, 2010; Horiuchi, Saito and Yamada, 2015) or for LDP incumbents from snowy areas, to buy their support for trade liberalization (Naoi, 2015). Even if the subsidy was targeted at voters disproportionately likely to support the LDP, its eligibility criteria confirms that it is programmatic.

unlikely to observe beneficiaries *announcing* that their votes are more expensive. Instead, we may observe them exhibiting a reduced willingness to vote for LDP incumbents. The implication is that incumbents can *increase* this willingness with more clientelistic goods.

Newspaper articles offer anecdotal evidence of this. In one, the president of a rice-growing company in a heavy-snowfall municipality was quoted as feeling less compelled to vote for the LDP incumbent because his community now had 'a bullet train, a highway, and underground pipes with nozzles that can melt snow' (*shosetsu paipu*) (Asahi Shinbun, 2000). In another, the head of a construction company in a heavy-snowfall municipality explained that construction companies depended on LDP politicians getting elected and funnelling public works contracts their way, but it was becoming harder and harder to convince residents in the area to vote for LDP politicians. Whereas residents used to understand the value of politicians who could build the roads necessary to ensure the area was not cut off from the rest of the country due to heavy snowfall, snow melters had solved the problem, reducing residents' enthusiasm for the LDP (Asahi Shinbun, 2001).

Saito (2010, chapter 6) offers further evidence. He shows that once a Japanese community receives large-scale infrastructure such as a bullet train or an airport, which cannot be rescinded once it has been integrated into the existing transportation system, voters' enthusiasm for LDP candidates wanes. He holds that this is because their demand for such infrastructure has been met, leaving them less willing to comply with expectations that they continue to vote LDP. Our hypothesis would expect waning enthusiasm for LDP candidates to occur in the event LDP incumbents had *not* counteracted this with more clientelistic goods.

To test our hypothesis, we look for evidence of the equilibrium that would obtain if it was correct. If the snow subsidy had increased the price of votes in beneficiary municipalities and incumbents had decided to pay this price, we would observe beneficiary municipalities receiving more NTD for their votes than otherwise-similar non-beneficiary municipalities. To investigate this, we built a comprehensive data set comprising voting behavior, NTD allocations, snow subsidy eligibility, and other geographic, demographic, and fiscal features of the 3,000+ Japanese municipalities that existed between 1980 and 2006 (the year after the 2005 election). For data on voting behavior, NTD allocations, and demographic and fiscal features of municipalities, we use the replication data for Catalinac, Bueno de Mesquita and Smith (2019), supplemented for

the post-2000 period with the raw data from JED-M and Nikkei NEEDs (Mizusaki, 2014).[10] For data on municipalities' eligibility for the snow subsidy and geographical location, we use data from Japan's National Land Numerical Information Service and Geospatial Information Authority. For more information about the data, as well as descriptive statistics of the variables used in our analyses, see Online Appendix B.

We conduct a series of fixed effect regressions and a geographic regression discontinuity (GRD) design on the municipalities in 'mixed' electoral districts in the nine LH elections held between 1980 and 2005. Comprising between 11% and 19% of districts in each election, mixed districts are those in which beneficiary municipalities *coexist* with non-beneficiary municipalities.[11] Restricting our analysis to observations in mixed districts and using district-year fixed effects enables us to compare the amounts of NTD received by beneficiary and non-beneficiary municipalities in the same district-year. Looking within districts is critical as district-level attributes also influence the price of votes. Catalinac, Bueno de Mesquita and Smith (2019), for example, found that votes are more expensive in districts where municipalities vary greatly in size. Saito (2010) and Horiuchi and Saito (2003) found that the price of votes is influenced by the number of LH representatives per voter and the number of local politicians, respectively.

4 Results

Our analyses rely on three variables. The dependent variable is the logarithm of per capita NTD received by municipalities in the fiscal years following the nine HOR elections held between 1980 and 2005. Our first independent variable of interest is 'Winning LDP Vote Share', which is the level of electoral support a municipality provided its LDP incumbent(s) in these nine elections. By 'level of electoral support', we mean the proportion of a municipality's eligible voters who voted for their district's LDP winner(s). Because districts were multi-member (electing between two and six winners) prior to 1994 and single member after 1994, districts could return more than one LDP winner prior to 1994. Our operationalization of these variables are identical to those in Catalinac, Bueno de Mesquita and Smith (2019).

[10] The data is here: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/HGILBY

[11] In elections held between 1980 and 1993, 25 of a total of 131-129 districts were mixed (19%). In elections held between 1996 and 2005, between 32 and 34 of a total of 300 districts were mixed (11%). Mixed districts exist in 14 of Japan's 47 prefectures: Miyagi, Fukushima, Tochigi, Gunma, Yamanashi, Nagano, Gifu, Shizuoka, Shiga, Kyoto, Hyogo, Shimane, Okayama, and Hiroshima.

Our second independent variable of interest is Snow Subsidy, a dummy variable that takes a value of '1' if the municipality receives the subsidy and '0' otherwise. The compound nature of benefits provided under the subsidy means we do not have data on the pecuniary amounts received by each beneficiary municipality. Our research design, then, is similar to Bechtel and Hainmueller (2011), who use a binary treatment variable to estimate the effect of receiving disaster relief allocations on vote shares in Germany. Like this study, we do not exploit variation in the amounts of subsidy received by beneficiaries (the intensity of the treatment), but variation in subsidy eligibility across beneficiaries and non-beneficiaries. Our analyses focus on examining whether votes are more expensive in beneficiary municipalities relative to non-beneficiary municipalities in the same district-year, not whether votes in beneficiary municipalities receiving more of the subsidy are more expensive than votes in beneficiary municipalities receiving less of the subsidy.

Table 1 presents fixed effect regressions in which the dependent variable is the per capita NTD received by municipalities in mixed districts in the years following the nine HOR elections held between 2000 and 2005. All models include district-year fixed effects and eight time-varying municipality-level attributes that could also influence NTD: namely, population, per capita income, population density, proportion of the population who are dependent and employed in agriculture, fiscal strength, area size, and altitude (Hirano, 2006; Horiuchi and Saito, 2003).[12] Because municipalities exhibit no variation in subsidy eligibility, we do not use municipality fixed effects. Robust standard errors are clustered on the municipality.

In Model 1, our independent variable of interest is Winning LDP Vote Share. Its coefficient is positive but not statistically significant. In mixed districts, then, municipalities that returned higher levels of Winning LDP Vote Share relative to other municipalities in the same district-year were not rewarded with more NTD after elections. This is in contrast to what Catalinac, Bueno de Mesquita and Smith (2019) find in other districts. However, it is consistent with our hypothesis that votes cost significantly more in beneficiary municipalities and incumbents are buying votes from both places. If this was the case, Winning LDP Vote Share is unlikely to exercise an independent effect on the amount of NTD municipalities receive because those amounts differ depending on whether the municipality receives the subsidy.

[12]LDP incumbents do not allocate NTD directly. This is done by central government bureaucrats. LDP incumbents influence the process by leaning on bureaucrats to fund certain projects over others. It is customary to control for other variables that might also be influencing bureaucrats' decisions.

Table 1: In mixed districts, municipalities returning higher levels of Winning LDP Vote Share in LH elections held between 1980 and 2005 did not receive more per capita NTD after these elections (Model 1). Instead, municipalities receiving the snow subsidy received significantly more NTD than municipalities not receiving it (Model 2), even when their Winning LDP Vote Share was the same (Model 3).

	Post-Election Per Capita Transfers (log)		
	(Model 1)	(Model 2)	(Model 3)
Winning LDP Vote Share	0.150		0.133
	(0.126)		(0.125)
Snow Subsidy		0.087**	0.086**
		(0.035)	(0.035)
Fiscal Power	0.361***	0.352***	0.355***
	(0.099)	(0.098)	(0.098)
Proportion Dependent	1.266***	1.316***	1.304***
	(0.458)	(0.459)	(0.458)
Proportion in Agriculture	−0.217	−0.229	−0.232
	(0.340)	(0.340)	(0.340)
Population (log)	−0.069	−0.074	−0.073
	(0.166)	(0.165)	(0.165)
Income Per Capita (log)	−0.177	−0.187	−0.179
	(0.160)	(0.158)	(0.160)
Population Density (log)	−0.105	−0.098	−0.093
	(0.169)	(0.168)	(0.168)
Area Size (log)	0.118	0.113	0.115
	(0.166)	(0.165)	(0.165)
Altitude (log)	−0.004	−0.009	−0.008
	(0.016)	(0.016)	(0.016)
District-Year Fixed Effects	Yes	Yes	Yes
N	6,446	6,446	6,446
R^2	0.143	0.145	0.145

Note: *p<0.1; **p<0.05; ***p<0.01. Robust standard errors clustered on the municipality.

Model 2 lends credence to this interpretation. The independent variable of interest is Snow Subsidy. Its coefficient is positive and statistically significant. This means that beneficiary municipalities received more NTD after elections than non-beneficiary municipalities in the same district-year. Its estimated effect is 0.087, meaning that beneficiary municipalities received a per capita NTD allocation that was 9% larger than their same-district non-beneficiary counterparts. Model 3 adds Winning LDP Vote Share to this specification. The coefficient on Snow Subsidy remains positive and significant and its effect size is similar to that of Model 2. The coefficient on Winning LDP Vote Share remains positive and insignificant. This means that beneficiary

municipalities received more NTD after elections than non-beneficiary municipalities in the same district-year, even when the vote shares they returned for their LDP incumbent(s) was the *same*.

4.1 Geographical Regression Discontinuity Design

These specifications compare same-district beneficiary and non-beneficiary municipalities. Because it is difficult to control for all possible ways in which these sets of municipalities differ from each other, they are vulnerable to omitted variable bias. To further assess whether subsidy eligibility causes municipalities in mixed districts to receive more NTD, we can make use of the fact that the Snow Act creates a natural border separating beneficiary and non-beneficiary municipalities. This border, visible in Figure 1, arises because the municipalities experiencing heavy snowfall are clumped together in the northwest. Because snowfall determines a municipality's eligibility for the subsidy, which determines the location of the border, we can implement a GRD design (Keele and Titiunik, 2015, 2016).

The identifying assumption of a GRD design is that when a border is (arguably) exogenously drawn, researchers can, providing certain conditions are met, treat units that are close to but on opposite sides of the border as identical on all dimensions relevant to their outcome of interest apart for the fact that some are in the 'treated' zone and others are in the 'control' zone. After verifying that these conditions are met, researchers can attribute differences in their outcome of interest to the causal effect of being treated.

In our application, we continue to look at beneficiary and non-beneficiary municipalities in the same district-year, but we limit the comparison to beneficiary and non-beneficiary municipalities in the same district-year that are located very close to the border and thus, each other. Concretely, we take the universe of municipality-years in mixed districts and calculate the distance between their centroids and the nearest location on the border. Then, we set a very narrow bandwidth of distance to the border and restrict our observations to the municipality-years that fall within this range. With this sample, we estimate this local linear regression:

$$y_{mdt} = \alpha_{dt} + \tau S_{mdt} + f(D_{mdt} < 0) + f(D_{mdt} \geq 0) + \epsilon_{mdt} \tag{1}$$

where the unit of analysis is municipality m in district-year dt. The outcome is as above (the logarithm of per capita NTD received by municipality m in district dt in the year after the election). α_{dt} denotes fixed effects by district-year. D_{mdt} is the running variable, a one-dimensional

distance between the centroid of municipality m and its nearest point on the border (beneficiary municipalities receive positive values and non-beneficiary municipalities receive negative ones).[13] $f(\cdot)$ represents a polynomial function of distance to the border estimated separately for the municipalities on both sides. S_{mdt} is a dummy variable for subsidy eligibility. τ captures the local average treatment effect (LATE) of the snow subsidy at the threshold (border). Following standard practice, observations are weighted by their distance to the border using triangular kernel weighting and standard errors are clustered on municipality. We use a range of bandwidths between $\pm 4,000$ and $\pm 15,000$ (in meters) to select our observations and report the LATE estimated with all of these bandwidths.[14]

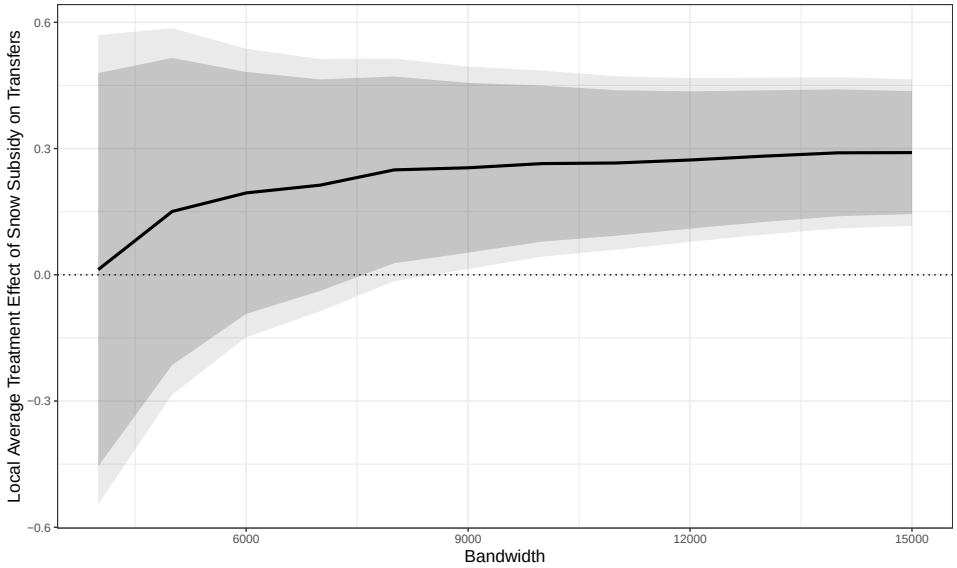
A GRD design yields valid estimates of the causal effect of a treatment when the border is not associated with other discontinuities in unit-level characteristics, when units cannot manipulate their treatment status, and when there is no 'compound treatment', which occurs when the border is synonymous with other boundaries. First, Online Appendix C checks for discontinuities at the border in the eight municipality-level attributes in Table 1, as well as Winning LDP Vote Share. We find a discontinuity only in area size: beneficiary municipalities immediately proximate to the border are slightly larger than their same-district non-beneficiary counterparts. This means we must exercise caution in interpreting our estimates of the treatment as causal, but the absence of discontinuities in the other attributes, plenty of which are known to influence transfers, gives us confidence that systematic discontinuities in unobserved attributes are unlikely. We run the following analysis with and without a control for area size and find that the results are similar. Second, the criteria governing subsidy eligibility makes it unlikely sorting occurred. Online Appendix D reports the results of a McCrary (2008) sorting test, which shows no evidence of self-sorting. Third, because the treatment is assigned to municipalities, our border is drawn *around* municipalities. It is not synonymous with a single municipality, nor any other administrative or political entity. We are not aware of anything that could occur along this border that might signify a compound treatment.

[13] A one-dimensional distance can be problematic because the units being compared could be close to the border yet far from each other (Keele and Titiunik, 2015). Our use of district-year fixed effects avoids this concern (municipalities are only ever compared to others in the same district).

[14] An alternative approach is to use the mean squared error optimal bandwidth selector, which yields the bandwidth of ± 6375. This is too narrow, however, because it leaves us with a single observation in most district-years. Given that we want to compare beneficiary and non-beneficiary municipalities in the same district-year, we must use slightly wider bandwidths. Note that the full range of distances to the border among municipalities in mixed districts is [−98,580, 54,663], so using a bandwidth of $\pm 15,000$ still represents a considerable narrowing of the sample.

Having met these conditions, we can attribute differences in NTD between these two sets of municipalities in the same district and within this narrow geographic window to the causal effect of the subsidy. Figure 2 depicts the local average treatment effect ('LATE') of Snow Subsidy on the per capita NTD allocation received by municipalities in the years following our nine LH elections. On the x-axis, we vary the bandwidths from $\pm 4,000$ to $\pm 15,000$. The y-axis displays the coefficients on Snow Subsidy and their corresponding 90% and 95% confidence intervals. The number of observations changes from 1,221 at the most narrow bandwidth depicted, which equates to an average of 136 municipalities per election, to 3,802 at the widest bandwidth shown, which equates to an average of 422 municipalities per election. Even at the widest bandwidth, then, we are only including 13% of the 3,300+ municipalities.

Figure 2: Receiving the snow subsidy results in larger per capita NTD allocations after elections for municipalities in mixed districts, 1980-2005.



Note: This figure depicts the coefficient estimates on Snow Subsidy obtained from local linear regressions of beneficiary status on post-election per capita NTD when the bandwidth is changed from $\pm 4,000$ to $\pm 15,000$. Shaded areas indicate 90%/95% confidence intervals. Robust standard errors are clustered on the municipality.

Figure 2 shows that at a very narrow bandwidth, the effect of Snow Subsidy is positive but not statistically different from 0. However, at this bandwidth, we do not have a sufficient number of observations on both sides of the border within each district-year. Once we widen the bandwidth to include more observations (bandwidth $\geq 9,000$), while preserving the balance (absence of discontinuities) across the other characteristics, the effect of Snow Subsidy is positive and statistically significant. Its estimated effect is approximately 0.23, which means that

beneficiary municipalities received a per capita NTD allocation that was 26% larger than their otherwise-similar, proximate, same-district non-beneficiary counterparts. Its estimated effect at the threshold, then, is larger than its estimated effect in Models 2 and 3 in Table 1, whose sample was all municipalities in mixed districts.

Receiving the snow subsidy, then, *causes* a municipality to receive more NTD. Moreover, the absence of a discontinuity in Winning LDP Vote Share at the border shows that beneficiary municipalities received this extra NTD *without* delivering larger vote shares for their LDP incumbents. This reinforces the conclusions we drew from Table 1: beneficiary municipalities received more NTD than their same-district non-beneficiary counterparts, even when they delivered an identical vote share. This is consistent with our hypothesis. The fact that beneficiary municipalities received *both* the programmatic policy *and* the extra clientelistic goods, without delivering more votes to the LDP, is difficult to reconcile with the programmatic incumbent support hypothesis.

5 Alternative Explanations

All studies of the impact of programmatic policies have to grapple with the fact that beneficiaries differ from non-beneficiaries in the fact that the former receive the policy and the latter do not, but also in the baseline conditions that led to the former receiving the policy. In our case, beneficiary municipalities differ from same-district non-beneficiary municipalities in their receipt of the subsidy, but also in *snowfall*. This raises the possibility that they are receiving more NTD after elections not because their votes are more expensive and incumbents are buying them, but because NTD is being used to meet differences in *need* in mixed districts. We conducted the following tests to help adjudicate between our hypothesis and this alternative hypothesis. Due to space constraints, we report abbreviated results below and full results (with coefficients on the control variables) in the Online Appendix.

First, if LDP incumbents were using NTD to meet differences in need, we would be unlikely to observe the amount of NTD a municipality receives changing in response to its voting behavior. Table 2 presents abbreviated results of a two-way fixed effect regression of change in a municipality's Winning LDP Vote Share between two consecutive elections on change in the amount of NTD it received in the years after those elections for all municipalities in mixed dis-

tricts, 1983-2005. Municipality fixed effects control for baseline differences across municipalities, including in the price of votes. District-year fixed effects control for features of a municipality's district in the second election that could influence changes in NTD received by all municipalities therein. We also control for time-varying *municipality*-level attributes (population, per capita income, population density, proportion dependent, proportion in agriculture, and fiscal power) and time-varying *district*-level attributes (district-level versions of the above municipality-level attributes, as well as number of municipalities, asymmetry in municipality size, people per seat (an indicator of malapportionment), and share of seats won by the LDP), respectively.[15] Robust standard errors are clustered on municipality.

Table 2: In mixed districts, municipalities that increased their Winning LDP Vote Share between two consecutive elections received more NTD after the second election, 1983-2005 (consult Online Appendix E for the full results).

	Δ Post-Election Per Capita Transfers (log)
Δ Winning LDP Vote Share	0.247**
	(0.125)
Δ Municipality-level Controls	Yes
Δ District-level Controls	Yes
District-Year Fixed Effects	Yes
Municipality Fixed Effects	Yes
N	5,465
R^2	0.165

Note: *p<0.1; **p<0.05; ***p<0.01. Robust standard errors clustered on the municipality.

The coefficient on Δ Winning LDP Vote Share is positive and statistically significant. Once we control for baseline differences across the municipalities in mixed districts, then, we find that municipalities casting more (fewer) votes for the LDP are rewarded (penalized) for doing so with more (less) NTD after elections. Substantively, a municipality that increases its Winning LDP Vote Share by 5 percentage points between two elections can expect to receive a 1.2% increase in NTD. We would be unlikely to observe this if differences in need were driving the allocation of NTD in mixed districts. We would observe this, however, if NTD was being used to buy votes. These results lend credence to our interpretation of the non-statistically significant

[15] If district borders were constant across our period of study, changes in time-varying district-level attributes would be constant for all municipalities in a district-year, meaning they would be controlled for with a fixed effect for district-year. Because our period of study spans Japan's 1994 electoral reform and 2003 redistricting, which redrew district boundaries, controlling for changes in district-level attributes is necessary.

coefficient on Winning LDP Vote Share in Table 1: systematic differences in the price of votes exists among the municipalities in mixed districts, which drown out any independent effect of Winning LDP Vote Share.

Second, if LDP incumbents were using NTD to meet differences in need, we will observe beneficiary municipalities receiving more NTD after elections than their same-district non-beneficiary counterparts regardless of how their Winning LDP Vote Share *compares* to those counterparts. Beneficiary municipalities could be returning smaller Winning LDP Vote Shares than their same-district non-beneficiary counterparts, but because NTD is being used to meet need, would still receive more NTD than their same-district non-beneficiary counterparts. In contrast, if the statistically discernible difference in NTD received by same-district beneficiary and non-beneficiary municipalities held only for beneficiary municipalities returning Winning LDP Vote Shares that exceeded those being returned by their non-beneficiary counterparts, this is evidence against the need hypothesis.

To test this, we took the 251 district-years that have been the subject of our analysis thus far and calculated the mean Winning LDP Vote Share obtained by the non-beneficiary municipalities in each. Then, for each beneficiary, we calculated the difference between its Winning LDP Vote Share and the mean Winning LDP Vote Share obtained by its same-district non-beneficiary counterparts. We used this to create a categorical variable indicating whether the municipality was a non-beneficiary (Non-Beneficiary), a beneficiary whose Winning LDP Vote Share was *higher* than the mean Winning LDP Vote Share exhibited by same-district non-beneficiary municipalities (Beneficiary With Higher Support), or a beneficiary whose Winning LDP Vote Share was *lower* than the mean Winning LDP Vote Share exhibited by same-district non-beneficiary municipalities (Beneficiary With Lower Support).

Table 3 presents abbreviated results of a fixed effect regression. The dependent variable, sample, eight time-varying municipality-level controls, use of district-year fixed effects and clustering of standard errors are identical to Table 1's Model 2. Instead of Snow Subsidy as the independent variable of interest, we are interested in the effects of Beneficiary With Higher Support and Beneficiary With Lower Support, respectively. The baseline category, to which the effect of being in both these categories is compared, is Non-Beneficiary. The coefficient on Beneficiary With Higher Support is positive and statistically significant, while the coefficient on Beneficiary With Lower Support is positive but not significant. This means that beneficiary

municipalities exhibiting Winning LDP Vote Shares that were *higher* than those of their same-district non-beneficiary counterparts received more NTD after elections than the latter and this difference was statistically discernible. Beneficiary municipalities exhibiting Winning LDP Vote Shares that were *lower* than those of their same-district non-beneficiary counterparts, on the other hand, did not receive an amount of NTD that was statistically discernible from the amount received by the latter.

Table 3: In mixed districts, beneficiary municipalities received a statistically discernible difference in NTD than their same-district non-beneficiary counterparts only when they returned Winning LDP Vote Shares that exceeded those of the latter and not when they did not, 1980-2005 (consult Online Appendix E for the full specification).

	Post-Election Per Capita Transfers (log)
Beneficiary With Higher Support	0.108***
	(0.042)
Beneficiary With Lower Support	0.059
	(0.042)
Municipality-Level Controls	Yes
District-Year Fixed Effects	Yes
N	6,446
R^2	0.145

Note: *p<0.1; **p<0.05; ***p<0.01. Robust standard errors clustered on the municipality.

The statistically significant difference in NTD received by same-district beneficiary and non-beneficiary municipalities, then, is driven by beneficiary municipalities whose Winning LDP Vote Share compares favorably to those of the latter. The fact that beneficiary municipalities receive more NTD than their same-district non-beneficiary counterparts when they exhibit more electoral support than the latter, but not when they exhibit less, is further evidence NTD is not being used to meet need, but to buy votes.

Third, our hypothesis and a need-based hypothesis lead to different expectations about whether and how the *views* of voters in same-district beneficiary and non-beneficiary municipalities differ from each other. Our theory expects that the snow subsidy lowers beneficiaries' willingness to support LDP candidates. It does so by reducing the value attached to the clientelistic goods beneficiaries receive, with the implication that LDP incumbents can increase this willingness with more clientelistic goods. A theory rooted in differences in need, however, would not necessarily expect systematic differences in willingness to support LDP candidates. If such

a difference existed, it might expect it to run in the opposite direction: because resources are controlled by the central government, the residents of needier municipalities would be *more* willing to support LDP candidates.

In lieu of a survey of ordinary voters, we use the Nationwide Survey of Neighborhood Associations (Pekkanen, Tsujinaka and Yamamoto, 2014) to examine these expectations. Neighborhood associations (NHAs) are informal, voluntary groupings that provide social services, mediate interactions between citizens, local government and politicians, and mobilize voters during election campaigns (Pekkanen, 2009).[16] Between 2006 and 2007, this survey was mailed to 33,438 NHAs in 890 Japanese municipalities (almost half that existed at the time). Of the 18,404 NHA heads who responded, approximately 3,000 were located in our 31 mixed districts, spanning 148 municipalities (56 beneficiary and 92 non-beneficiary) therein. While extrapolating from the views of NHA heads to the views of ordinary voters requires caution, if systematic differences in the views of voters in both sets of municipalities exist, it is reasonable to expect they would be observable in answers to the survey.

One question was 'What type of activities does your NHA conduct?' Of the possible answers, one was 'Assisting [and recommending a particular candidate] in election campaigns'. Respondents were presented with a binary 'Yes' or 'No' choice. Table 4 presents abbreviated results of a linear probability model of 'Yes' answers given by NHA respondents in mixed districts as a function of Snow Subsidy. The unit of analysis is the NHA. We control for the number of member households in the NHA and the same eight time-varying municipality-level attributes. We include district fixed effects and cluster standard errors on district.

The coefficient on Snow Subsidy is negative and statistically significant ($p = 0.0506$). This means that NHA heads in beneficiary municipalities are *less* likely to report getting involved in election campaigns on behalf of particular candidates than their counterparts in non-beneficiary municipalities in the same district. Substantively, receiving the snow subsidy decreases the probability of campaign involvement by 6 percentage points. This is evidence that systematic differences in views exist and are in a direction aligned with our hypothesis, not with a hypothesis rooted in need.

[16] According to one study, nearly all Japanese adults reported being part of an NHA (Pekkanen, 2009, 30).

Table 4: In mixed districts, NHA heads in beneficiary municipalities were less likely to report supporting a particular candidate in election campaigns than their counterparts in same-district non-beneficiary municipalities (consult Online Appendix E for the full specification).

	Supporting a Candidate During Electoral Campaigns
Snow Subsidy	-0.061^{**}
	(0.029)
NHA-Level Control	Yes
Municipality-Level Controls	Yes
District Fixed Effects	Yes
N	2,740
N of Districts	31

Note: $^{*}p<0.10$; $^{**}p<0.05$. NHA = neighborhood association. Observations are NHA heads in mixed districts who responded to the survey. The model is a linear probability model with fixed effects by district. Robust standard errors clustered on district in parentheses.

6 Conclusion

When programmatic policies are enacted in clientelistic settings, they increase the price of beneficiaries' votes. Incumbents will be faced with a choice: abandon clientelism altogether in favor of an alternative electoral strategy or increase the amount of clientelistic goods offered to beneficiaries. We posited that in many instances, incumbents will prefer to continue with the clientelistic mode of competition they have used thus far. This means they will pay the higher price of beneficiaries' votes. Evidence from Japan, where the amounts of clientelistic goods flowing to different types of voters is observable, supports this claim: municipalities that received the programmatic policy received more clientelistic goods for their votes than municipalities that did not.

One takeaway of our study is that research on the impact of programmatic policies on votes for the incumbent in clientelistic settings likely suffers from a confounder. How beneficiaries vote likely reflects *both* the policy *and* incumbent efforts to counteract an anticipated negative effect of the policy. Once we recognize that programmatic policies increase the price of votes, we can see that incumbents will vary in their ability to pay this price. This could help explain why programmatic policies have had such disparate effects on votes for the incumbent, even among incumbents of the same party in the same political system. Work on the programmatic incumbent support hypothesis should be revisited in light of these findings.

To do so, measuring the amounts of clientelistic goods flowing to different types of voters is key. While this quantity is hard to measure when clientelistic exchanges are between incumbents and *individuals*, a second takeaway of our study is that it will likely be easier to measure when the exchanges are between incumbents and *groups* of voters. While only 5% of recent clientelism studies looked at exchanges between incumbents and groups (Hicken and Nathan, 2020), the case of Japan suggests that whenever incumbents can discern how groups vote and access resources targetable at those groups, they may be able to formulate clientelistic exchanges with them. In countries where clientelistic exchanges are with groups, researchers will be better equipped to measure and control for any confounding effects of incumbent efforts to buy votes.

This study focused on testing the hypothesis that incumbents have incentives to respond to the enactment of a programmatic policy by increasing the amount of clientelistic goods provided to beneficiaries. Because clientelism has survived extraordinary changes in Japan's wealth, demographics, and political system, our prior was that it would do so. In countries that have transitioned away from clientelism, it is possible incumbents made different decisions. Future work should formalize the conditions under which incumbents will do what they did in our case, versus jettison clientelism altogether. Because the clientelistic exchanges are observable in Japan and a host of other programmatic policies exist, it can serve as a laboratory in which the predictions of these models can be tested.

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Online Appendix: Programmatic Policies Increase the Clientelistic Goods Received by Policy Beneficiaries: Evidence from Snow Subsidies in Japan

A Additional Information About the Snow Act

- The 'Special Measures Act Concerning Countermeasures for Heavy Snowfall Areas' (*Gosetsu Chitai Taisaku Tokubetsu Sochi Ho*) can be found at: https://elaws.e-gov.go.jp/search/elawsSearch/elaws_search/lsg0500/detail?lawId=337AC1000000073.
- The criteria for eligibility for the snow subsidy is stipulated in two ordinances: 'Cabinet Ordinance on the Criteria for the Designation of Heavy Snowfall Area' (https://elaws.e-gov.go.jp/search/elawsSearch/elaws_search/lsg0500/detail?lawId=338CO00000000344) and 'Ministerial Ordinance on the Stipulation of Period and Facilities in Cabinet Ordinance on the Criteria for the Designation of Heavy Snowfall Area' (https://elaws.e-gov.go.jp/search/elawsSearch/elaws_search/lsg0500/detail?lawId=338M50000002047).
- According to these ordinances, a municipality is eligible for the snow subsidy if it is located in 'heavy-snowfall area' in which the height of accumulated snow over the post thirty years exceeded 5,000 cm per year, and if it satisfies either of the following conditions:
  1. More than two-thirds of the municipality's area is in a 'heavy-snowfall' area.
  2. More than one-half of the municipality's area is in a 'heavy-snowfall' area, and it is in a prefecture whose capital is in a 'heavy-snowfall' area.
  3. Either the municipal government office (e.g., city hall), Class 1 and 2 national highways, or prefectural road/city road/national railway station in Article 56 of the Road Law is in a 'heavy snowfall' area.
  4. More than one-half of the municipality's area is in a 'heavy-snowfall' area, and more than two-thirds of the municipal border is in contact with municipalities that satisfy conditions 1, 2, or 3.
- The following table illustrates how one would calculate the height of accumulated snow

over the first thirteen days of December for a hypothetical municipality:

December	Snowfall	Snow Height on the Ground	Height of Accumulated Snow
1st	0	0	0
2nd	1	1	1
3rd	2	2	3
4th	1	1	4
5th	24	24	28
6th	0	22	50
7th	0	17	67
8th	22	36	103
9th	0	34	137
10th	2	27	164
11th	0	27	191
12th	2	19	210
13th	0	19	229

- Prior to 2001, the Snow Act stated that the Prime Minister is responsible for the designation of a 'heavy snowfall' area. After 2001, it stipulates that the Ministries of Land, Infrastructure, and Transport, Internal Affairs and Communications, Agriculture, Forestry, and Fisheries, and the National Land Development Council are responsible.
- The Snow Act was introduced by a non-partisan coalition of politicians. The affiliations of the signatories include the LDP (75), Japan Socialist Party (25), and Democratic Socialist Party (1). Not all signatories hailed from districts containing municipalities that would eventually fit the criteria for designation.

B Descriptive Statistics

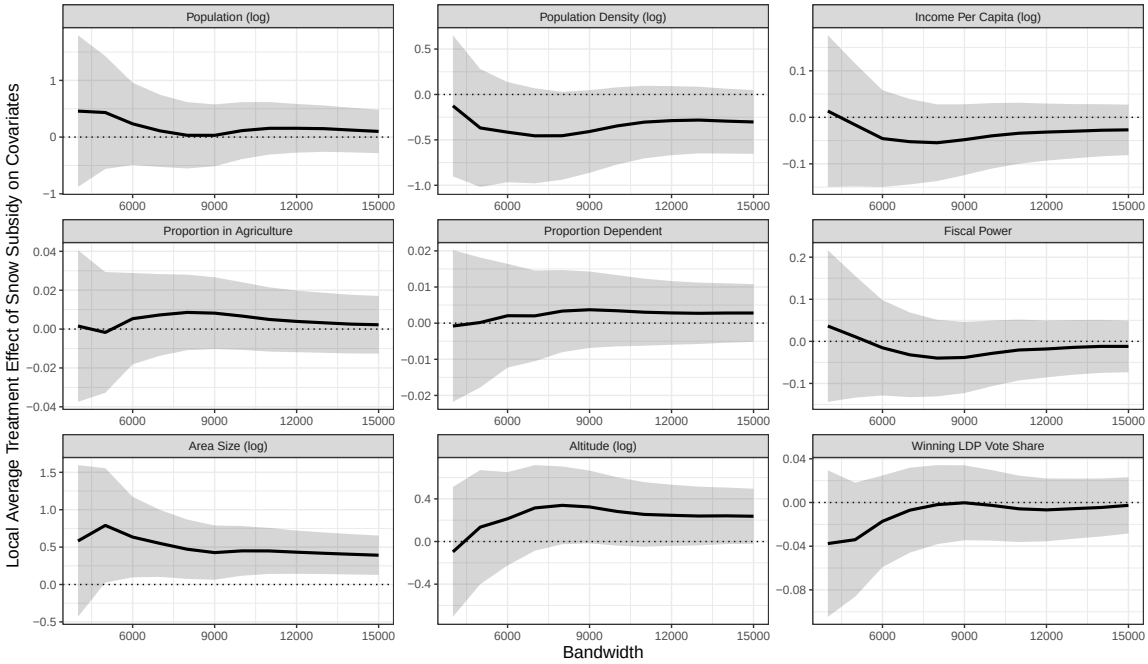
Table B.1: Descriptive Statistics of Municipalities in Mixed Districts

Statistic	N	Mean	St. Dev.	Min	Max
Post-Election Per Capita Transfers (log)	6,578	−3.737	0.698	−5.814	0.021
Snow Subsidy	6,882	0.286	0.452	0	1
Winning LDP Vote Share	6,882	0.395	0.184	0.000	0.909
Fiscal Power	6,807	0.389	0.229	0.000	1.990
Proportion Dependent	6,543	0.367	0.040	0.182	0.585
Proportion in Agriculture	6,543	0.098	0.066	0.001	0.450
Population (log)	6,882	9.240	1.128	6.047	13.638
Income Per Capita (log)	6,807	−0.170	0.355	−1.538	0.602
Population Density (log)	6,882	4.923	1.330	0.265	9.069
Area Size (log)	6,882	4.311	0.899	0.962	7.688
Altitude (log)	6,864	5.333	1.445	−0.916	7.569

As the main paper explains, the data used in this study are based on Catalinac, Bueno de Mesquita and Smith (2019), JED-M (Mizusaki, 2014), Nikkei NEEDs (http://www.nikkei.co.jp/needs/contents/regional.html), the National Land Numerical Information Service (http://nlftp.mlit.go.jp/ksj-e/index.html) and the Geospatial Information Authority of Japan (http://www.gsi.go.jp/ENGLISH/index.html).

C Covariate Balance Between Heavy Snowfall and Non-Heavy Snowfall Municipalities

Figure C.1: Investigating Discontinuities in Covariate Characteristics Between Heavy Snowfall and Non-Heavy Snowfall Municipalities Proximate to the Border in the Same District



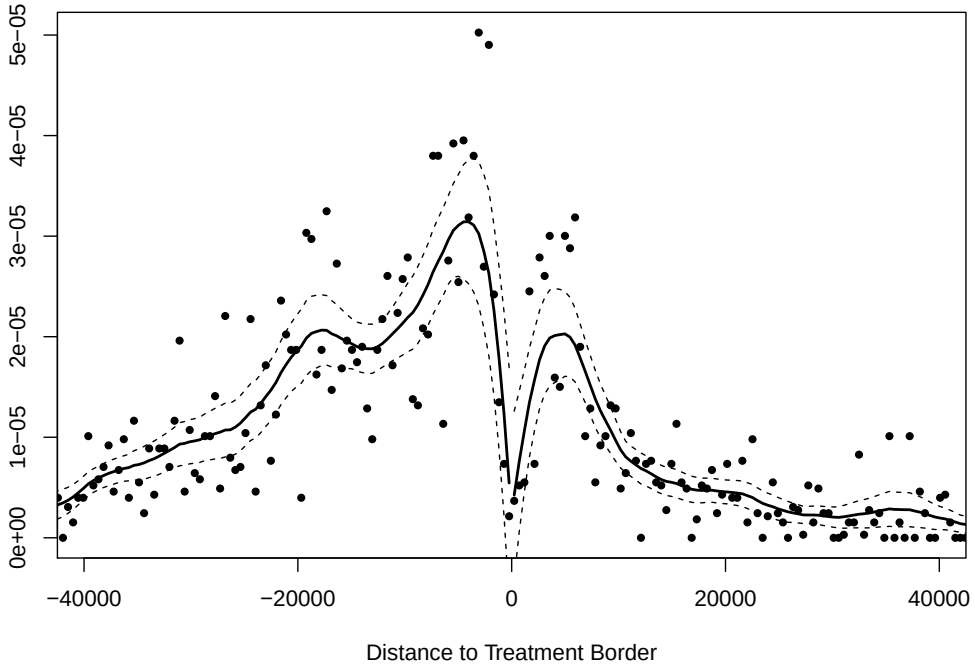
To examine whether there are any discontinuities (sudden changes) in covariate characteristics at the border, we estimated the same local linear regression with triangular kernel weights described in Equation 1 in the main paper with nine municipality-level attributes that may influence NTD. Population, population density, income per capita, proportion of the population employed in agriculture, proportion of the population who are dependent, and fiscal strength are standard controls in work on transfers. We include Winning LDP Vote Share to assess whether there is a discontinuity in vote shares for winning LDP candidates. Area size and the altitude of the municipality's centroid are geographical features of a municipality that may also influence transfers. We use the same range of bandwidths that were used in the main paper's Figure 2. In all specifications, we include district-year fixed effects.

Figure C.1 summarizes the results for each covariate. The y-axis displays the coefficients on Snow Subsidy and their corresponding 95% confidence intervals. If the confidence intervals include 0, there is no evidence for a discontinuity in characteristics of the municipalities just above and below the border. Figure C.1 shows that the snow subsidy does not have a significant effect on any covariate except for area size (left panel in the third row). Importantly, there is no

discontinuity in any of the variables thought to influence transfers, such as income per capita, fiscal strength, proportion of the population who are dependent, or Winning LDP vote share.

D Investigating Self-Sorting

Figure D.1: Results of a McCrary Sorting Test



The results of the McCrary (2008) sorting test in Figure D.1 indicate that there is little evidence of self-sorting. This is unsurprising given than a municipality's eligibility for the subsidy is determined by the objective criteria laid out in the main paper.

E Alternative Explanations

Table E.1: This is the full specification of Table 2 in the main paper.

	Δ Post-Election Per Capita Transfers (log)
Δ Winning LDP Vote Share	0.247**
	(0.125)
Δ Fiscal Power	−0.206
	(0.149)
Δ Proportion Dependent	1.064
	(1.287)
Δ Proportion in Agriculture	−0.911
	(1.030)
Δ Population (log)	−13.015
	(8.446)
Δ Income Per Capita (log)	−0.027
	(0.252)
Δ Population Density (log)	11.804
	(8.441)
Δ Fiscal Power (district)	−17.283**
	(6.983)
Δ Proportion Dependent (district)	4.278*
	(2.237)
Δ Proportion in Agriculture (district)	5.346
	(21.427)
Δ Population (log) (district)	−8.780
	(7.335)
Δ Income Per Capita (log) (district)	9.355***
	(3.040)
Δ Population Density (log) (district)	1.090
	(0.856)
Δ People Per Seat (district)	2.211
	(1.794)
Δ Asymmetry (district)	8.156*
	(4.706)
Δ Number of Municipalities (log) (district)	0.200
	(0.776)
Δ LDP Winners (district)	−2.790***
	(0.833)
District-Year Fixed Effects	Yes
Municipality Fixed Effects	Yes
N	5,465
R^2	0.165

Note: *p<0.1; **p<0.05; ***p<0.01. Robust standard errors clustered on the municipality.

Table E.2: This is the full specification of Table 3 in the main paper.

	Post-Election Per Capita Transfers (log)
Beneficiary With Higher Support	0.108***
	(0.042)
Beneficiary With Lower Support	0.059
	(0.042)
Fiscal Power	0.349***
	(0.098)
Proportion Dependent	1.315***
	(0.459)
Proportion in Agriculture	−0.241
	(0.340)
Population (log)	−0.071
	(0.165)
Income Per Capita (log)	−0.182
	(0.158)
Population Density (log)	−0.097
	(0.167)
Area Size (log)	0.112
	(0.164)
Altitude (log)	−0.008
	(0.016)
District-Year Fixed Effects	Yes
N	6,446
R^2	0.145

Note: *p<0.1; **p<0.05; ***p<0.01. Robust standard errors clustered on the municipality.

Table E.3: This is the full specification of Table 4 in the main paper.

	Supporting a Candidate During Electoral Campaigns
Snow Subsidy	-0.061^{**}
	(0.029)
NHA Households (log)	-0.011
	(0.009)
Fiscal Power	0.038
	(0.112)
Proportion Dependent	0.324
	(0.662)
Proportion in Agriculture	-0.157
	(0.385)
Population (log)	0.025
	(0.222)
Income Per Capita (log)	-0.100
	(0.066)
Population Density (log)	0.094
	(0.070)
Area Size (log)	0.095
	(0.070)
Altitude (log)	-0.007
	(0.010)
District Fixed Effects	Yes
N	2,740
N of Districts	31

Note: $^{*}p<0.10$; $^{**}p<0.05$. NHA = neighborhood association. Observations are NHA heads in mixed districts who responded to the survey. The model is a linear probability model with fixed effects by district. Robust standard errors clustered on district in parentheses