Electoral Reform and the Distribution of Public Expenditures: Evidence from Japan[+]

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Abstract

Does the equalization of legislative representation reduce policy bias? We examine this question by focusing on the redistricting and reapportionment of seats associated with the recent electoral reform in Japan. We first show that the reform of 1994 resulted in a considerable degree of equalization in the allocation of legislative seats per capita. Second, using municipality-level data, we present evidence that municipalities in over-represented districts received significantly more subsidies per capita from the central government, as compared to those in under-represented districts, in both pre-reform and post-reform years. Third, by examining the relationship between the *change* in seats per capita and the *change* in subsidies per capita at the municipality level, we show that the equalization in voting strength resulted in equalization of government transfers per person.

1. Introduction

Does the equalization of legislative representation (i.e., redistricting and/or reapportionment of seats) reduce policy biases and give more equal opportunity for every citizen in influencing government policies? American legal scholars and political scientists have extensively examined this question since the U.S. Supreme Court established the principle of one-person, one-vote in the 1960s. Recent re-examinations of this question confirmed that

the redistricting in the 1960s brought about a sizable change in policy outcomes (McCubbins and Schwartz 1988; Ansolabehere, Gerber and Snyder 2000).[1]

In this paper, we examine this important question for democratic governance from a comparative perspective. We consider that the U.S. case of legislative equalization is exceptional in the following sense. In the United States, the court-ordered redistricting literally equalized voting strength across districts, despite the severity of preceding problems. In most other democracies, however, any attempt for redistricting and/or reapportionment often ends up with partial alleviation of mal-apportionment. This is because, unlike the U.S. case of reapportionment revolution, the strong initiative by the judiciary branch has rarely been observed. Rather, more drastic and significant equalization in voting strength often takes place when a new electoral system with new electoral boundaries is introduced.[2] This paper focuses on one of such cases, Japan's 1994 electoral reform, and examines whether and how the electoral reform reshaped policy outcomes.

Japan provides an important case for the study of equalization in voting strength and its effect on public policies, because the electoral reform of 1994 approximates to a "natural experiment" for the following reasons. First, since the reform reduced the overall level of mal-apportionment in a relatively short span of time, we can examine the effects of the reform on policy outcomes, holding other social, economic, and demographic factors almost constant.[3] Furthermore, although the electoral reform reshaped Lower House districts throughout the nation, it kept intact other important institutional characteristics; namely, rules electing other politicians (i.e., Upper House members, governors, mayors, and local legislators), constitutional provisions over budget compilation and intergovernmental relations, statutes concerning subsidy allocation, and so forth. In other democracies, an electoral reform in a particular legislative body is often accompanied with reforms of other institutions, thus making us difficult to separate out the effects of the reform on policy outcomes.[4]

We expect that in Japan, the electoral reform in the Lower House had an important and direct effect on policy outcomes, particularly on intergovernmental transfers of public funds from the central to municipal governments. This is because, given the unitary nature of the Japanese state, interests of the central government are directly mirrored into local-level policy consequences. Furthermore, given the asymmetric bicameral legislature, the Lower House dominates the decision to compile the budget. Thus, the change in voting weight in

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[1] Many of the earlier studies found the court-ordered legislative equalization had little, if any, effect on policy outcomes. For a review of the literature on this issue, see Ansolabehere, Gerber, and Snyder (2000).

[2] Japan's prewar Lower House is an example. It used three different electoral systems, and each time an electoral institution was altered, equalization in voting strength was achieved as a spin-off.

[3] In contrast, although the court-ordered redistricting in the United States literally embodied the one-person, one-vote principle, the process of reapportionment was gradual and diffuse.

[4] For instance, in Italy, electoral rules for the Lower House were changed simultaneously with those for the Upper House as well as for local assemblies.

rural and urban districts for the Lower House is expected to affect the geographical distribution of public funds across municipalities.

To test the aforementioned claim, this paper proceeds in the following manner. The next section reviews the historical process of reapportionment decisions in Japan. Specifically, we show that the electoral reform of 1994 resulted in an unprecedented degree of equalization in electoral representation. The third section discusses data and empirical methods to test our argument. The fourth section reports our empirical findings. Using cross-municipal data, we present evidence that municipalities in over-represented districts received significantly more subsidies from the central government, as compared to those in under-represented districts, in both pre-reform and post-reform years. We then examine the relationship between the *change* in the number of seats per capita and the *change* in the amount of central-to-municipal subsides per capita, and show that the equalization in voting strength resulted in the equalization of government transfers per person. The fifth section concludes the paper and discusses implications.

2. Political Context of Reapportionment in Japan

Since the first election under the new Constitution was held in 1947, inequalities in legislative representation steadily deteriorated toward the mid 1970s. This was caused by drastic population movements from rural to urban areas associated with rapid economic growth. Although the Public Offices Election Law (*Koshoku Senkyo Ho*) stipulates that the reapportionment of seats be made based on each national census, which takes place every five years (e.g., 1985, 1990, and 1995), efforts for reapportionment were minimal at best for the following political reasons.

First, since the strongholds of the governing Liberal Democratic Party (LDP) were disproportionately rural, the LDP was unlikely to gain anything from equalizing representation.[5] Second, given weak judicial independence accompanied by the prolonged tenure of the LDP, the Supreme Court was far from being active in alleviating mal-apportionment.[6] It is often claimed that the LDP could manipulate the preference of the Court by providing a variety of selective incentives to the court judges (Ramseyer and Rosenbluth 1993; Asahi Shimbun 1994; and Ramseyer and Rasmusen 2001). Finally, the single nontransferable vote (SNTV) system with medium-sized multimember districts (MMD), which was in use to elect Lower House members until 1993, imposed additional difficulties for reapportionment. Theoretically, unlike the Anglo-American single member district (SMD) rule, the MMD would have allowed equalization in voting strength without changing district boundaries; however, changing district magnitude (i.e., the number of seats)

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[5] The LDP was in control of the government since 1955 to the present except for a short non-LDP coalition period between 1993 and 1994

[6] Although the Baker vs. Carr case spawned a series of administrative litigation in Japan since the 1960s, it was not until April 1976 that Japan's Supreme Court ruled mal-apportionment in the Lower House as unconstitutional. Even that time, the Court did not void the election result per se.

would translate into changing partisan as well as factional representation in each district (Cox 1997; Kohno 1992). Therefore, faction leaders within the LDP, as well as leaders of opposition parties, faced insurmountable difficulties in wielding their will even if they had wanted to change the allocation of seats across districts. Furthermore, since the SNTV system provided a strong incentive for individual politicians to cultivate personal support base in their electoral district (Carey and Shugart 1995; McCubbins and Rosenbluth 1995), incumbents, who had spent the significant amount of time and money to obtain personal votes, ardently opposed any plan of redrawing of district borders regardless of their partisan affiliation.[7]

We can trace the steady deterioration of inequalities in the Lower House representation with a variety of measures. Figure 1 lays out the two most frequently used indices of inequalities in representation. The first index (with square symbols) is the ratio of the maximum over the minimum number of seats per capita (the maximin ratio).[8] The figure started off at 1.8 in 1947 and reached the record high of 5.0 in the 1972 election.[9] The two earliest reapportionments in 1964 and 1975 hurt no incumbents, because no existing districts suffered from a cutback in the district magnitude. These decisions only divided a few urban districts into two and *increased* district magnitude in several districts. Later, however, as the total number of seats reached the capacity limit of the Diet hall, it became necessary to reduce the number of seats in several districts. The 1986 reapportionment added one seat each to 8 districts and subtracted one seat each from 7 districts, without changing district boundaries.[10] The 1992 re-apportionment went through a similar process; namely, it increased another seat in 9 districts and decreased in 10 districts.

Figure 1 About Here

Not surprisingly, these four reapportionment decisions, which merely trimmed the few extreme cases, failed to alleviate the overall level of inequalities. This is evidenced by another measure of inequalities in representation, the Loosemore-Hanby (LH) index of electoral disproportionality (Taagepera and Shugart 1989).[11] The index takes the value zero when the seat allocation is perfectly proportional, and approaches one, as the allocation of seats is more concentrated on fewer districts. It is less frequently used than the maximin ratio, but reflects the overall tendency of mal-apportionment more accurately. This is because the

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[7] Even opposition parties, which would have benefited from reapportionment of seats, opposed reapportionment plans (Asahi Shimbun, June 19, 1964; December 3, 1992).

[8] This measure is sensitive to outlying observations, and does not sufficiently reflect the overall tendency of inequalities. Nevertheless, as in the United States, it is the most frequently cited measure in judicial decisions in Japan.

[9] As introduced earlier, in April 1976, the Supreme Court declared the 1972 election unconstitutional. This was the first court decision that declared unconstitutionality of an election in Japan.

[10] There were only three districts that underwent minor redrawing of district boundaries: Wakayama First and Second, Ehime First and Third, and Oita First and Second.

[11] The LH index is defined as $1/2\Sigma |s_i - p_i|$, where s_i is the seat share and p_i the population share of the ith district against the national total.

index takes into account the district magnitude per capita in *all* districts, not just the worst few cases.[12] Consider the two cases, in which the maximin ratio showed a significant decline: one in 1975 and another in 1986. Figure 1 shows that although the maximin ratio dropped from 5.0 to 3.5 in 1975 and 4.4 to 2.9 in 1986, the LH index shows only a slight decline; namely, from 0.15 to 0.13 in 1975 and 0.14 to 0.13 in 1986.

It was not until the 1994 electoral reform that reapportionment was conducted in a categorical manner. This reform introduced a combination of the 300 seats elected by the SMD plurality rule and another 200 seats elected by the proportional representation (PR) system from 11 regional blocks.[13] The reform was mainly intended to remove excessively personalized electioneering styles and to install party-centered competition (Christensen 1994; 1998). As a byproduct, however, the reform brought about a sizable reduction in mal-apportionment.[14] Although the 1994 reapportionment did not fully achieve the goal of the one-person, one-vote principle, it significantly alleviated the overall level of mal-apportionment; namely, the LH index dropped from 0.13 to 0.08.

This dramatic change is better evidenced by Figure 2, which provides three scatter plots of pre- and post-reapportionment voting right indices. The voting right index is defined as the district magnitude per million district-populations (subtracted by its national average). Each data point indicates voting right in each of about 3,200 municipalities in Japan.[15] The 45-degree line serves as the benchmark of no-change, while a regression line summarizes the data. If reapportionment strictly embodies the one-person, one-vote principle, every observation should be aligned on a horizontal regression line. Thus, the flatter the regression line is, the more significant the equalization of legislative representation.

Figure 2 About Here

Panels A and B show that the reapportionment decisions in 1986 and 1992 did not alleviate inequality in a sizable manner.[16] Most observations are concentrated along the 45-degree line. However, it is evident from Panel C that the reapportionment/redistricting associated with the electoral reform in 1994 led to a major reduction in inequalities in representation.[17] Although the positive slope of the regression line shows that municipalities in previously over-represented districts still tend to have heavier voting weight under the new electoral

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[12] See Samuels and Snyder (2001) for alternative measures of mal-apportionment.

[13] Since the regional PR blocks are apportioned fairly equally (i.e., the maximin ratio being 1.09 and the LH index 0.02 in 1996), we will neglect this portion and only examines the effects of the apportionment of SMD seats on policy outcomes.

[14] The redistricting/reapportionment was conducted in the following manner. After allocating one seat each to 47 prefectures, the remaining 253 SMD seats were allocated on the basis of prefecture population. The district borders were then drawn within each prefecture.

[15] Municipalities in a given electoral district have the same degree of voting right in a given year.

[16] The reapportionment in 1986 and 1992 entailed transfers of a few municipalities across district borders. Outlying municipalities near the center of the 45-degree line reflect these cases.

[17] Note that the voting right index for 1995 is calculated on the basis of the pre-reform SNTV districts.

system, the slope of the regression line is much flatter than those in the two previous cases of reapportionment (i.e., 0.20 in Panel C, as opposed to 0.78 in Panel A and 0.80 in Panel B).

In sum, the reapportionment/redistricting in 1994 was considerably different from the previous cases. The reform not only drew new district borders, but also alleviated the overall level of mal-apportionment. In the next section, we will focus on this major equalization in 1994 with the previous two occasions of minor apportionments as comparisons, and examine whether the electoral reform affected policy outcomes.

3. Data and Methods

Despite the fact that the unequal distribution of Lower House seats per capita has long been considered as a serious problem in Japan, scholars of Japanese politics and economy have not sufficiently examined the effects of mal-apportionment on policy outcomes. There exist only a few empirical studies, which examine the effect of apportionment of seats on inter-governmental transfers of public funds. However, they have found indeterminate (Yoshino and Yoshida 1988) or no significant effects (Kikuchi 1989).

We consider the existing studies as being inappropriate for the following reasons. First, literally *all* of them used the data aggregated at the prefecture level. The prefecture-level data are very easy to access, and convenient to examine the relationship between various types of political and economic variables. Nevertheless, with only 47 observations, the estimates of effects on public expenditures should suffer from a problem of inefficiency. Second, and more importantly, the Lower House seats are mal-apportioned not only across prefectures but also *within* prefectures.[18] Therefore, studies using the prefecture-level data, which average away analytically relevant pieces of information, could be biased. Finally, no existing studies to date have examined the effect of the reapportionment/redistricting attributable to the 1994 electoral reform, which is, as we have argued, the single most drastic equalization of representation in the postwar Japanese history.

Our analysis improves upon the existing studies by using data aggregated at the municipality-level. In Japan, there are roughly over 3,300 municipalities (*shi*, *ku*, *cho*, and *son*) within 47 different prefectures (*ken*), and electoral districts typically include multiple municipalities. These data not only increase the number of observations for statistical estimation, but also allow us to examine the relationship between representation and redistribution *within* prefectures.

One may argue that we should use data aggregated at the district level, because subsidy programs might exhibit inter-municipal externality effects, and also because these programs

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[18] For example, the largest *within-prefecture* maximin ratio was 3.75 in 1972 (Chiba), 2.47 in 1993 (Tokyo), and 1.74 in 2000 (Aichi).

might be formed politically on the district basis.[19] In these cases, the municipality-level data could contain noises because the data may exhibit unnecessary concentration of subsidies into a few municipalities within the same electoral district.

Even with this potential problem, we would argue that the municipality-level data are more appropriate, at least for our analytical purposes. It is because electoral districts under both the old SNTV-MMD and the current SMD rules respect municipality borders.[20] Therefore, municipalities provide a stable frame of reference, in which we can compare inter-temporal differences of subsidy allocation under different districting schemes.[21]

Regression Models

Using this cross-municipal data set, we conduct two types of OLS regressions. As a first-cut analysis, we examine the effect of district magnitude per capita on the amount of subsidies per capita *in a given year*. Existing studies using the prefectural data have taken this cross sectional approach. Then, and more importantly, we examine how the *change* in representation affects the *change* in redistribution per capita.[22] We consider that the second type of regression is a more direct and appropriate approach to examine the consequences of institutional *changes* on policy outcomes. Moreover, by taking first-order differences, we could wash away unobservable municipality-specific effects on the amount of subsidy allocation.

We will give a more detailed account of the dependent and independent variables, after explaining sample periods for empirical tests.

Sample Periods

Before detailing how we chose sample years for our regression analyses, let us briefly explain the budget cycle in Japan. First of all, a fiscal year begins on April 1 and ends on March 31. All government ministries start drafting budget proposals in the preceding summer. The cabinet approves the ministerial proposal in the end of December. Finally, after a series of deliberation in the Diet, the members of both houses vote on the budget proposal, normally by the end of March. After the budget is approved, one or two supplementary budgets are approved during the fiscal year.

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[19] For example, Asahi Shimbun (July 14, 1998) reported that some ministries found projects on the electoral district basis.

[20] Under the old SNTV rule, there were only four cases in which Lower House district borders split a single municipality into more than two districts: Koriyama-shi, Chiba-shi, Chuo-ku of Osaka, and Okayama-shi. Districting under the new electoral rule continues to observe this principle.

[21] It should be also noted that the geographic borders of municipalities are fairly stable for the period under investigation in this paper.

[22] Ansolabehere, Gerber and Snyder (2000) took this approach in their recent paper.

To examine political influences on municipality-level budgets, we chose fiscal years that satisfy the following two conditions. First, the latest Lower House election must be held *prior to* the beginning of the budget cycle in the summer. Second, no election must be held during the fiscal year. When these conditions are satisfied, the budgets, including supplementary ones, are approved by politicians elected in the latest Lower House election, and are free from outright influences of politicians elected in the next election. The fiscal years satisfying these two conditions include 1985, 1988, 1992, and 1998. The latest elections for these fiscal years were those in December 1983, July 1986, February 1990, June 1993, and October 1996. Using the data from these fiscal years, we conduct cross-sectional regressions.[23]

The 1986 and 1993 elections were held just after the minor reapportionment decisions, whereas the 1996 election was held after the major reapportionment/redistricting associated with the electoral reform. Therefore, to examine the effect of the changes in voting right on the changes in inter-governmental transfers, we also conduct regressions using differenced data between 1986 and 1983, 1993 and 1990, and 1998 and 1995.

Dependent Variable: Central-to-Municipal Subsidies Per Capita

The dependent variable is the per capita amount of subsidies from the central government to municipal governments (Chiho Zaisei Kenkyu Kai, various issues; in logs). The amount of subsidies in each municipality is based on the account settlement, and therefore reflects both the main and supplementary budgets of each fiscal year. The subsidy items include both formulaic (e.g., welfare programs) and non-formulaic (e.g., construction projects) portions.[24] Since the program breakdown of subsidies to municipalities is not readily available, we control the effects of formulaic portions by including relevant variables, which we will introduce later.

We understand that the subsidies to municipalities account for only one portion of government resources, in which politicians can wield their influence. To the best of our knowledge, however, this is the only reliable source of information, which has a consistent coverage of the municipality-level data over a long period of time.

Treatment Variable: District Magnitude Per Capita

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[23] Data limitation does not allow us to analyze data from the 1960s and the 70s, although mal-apportionment of seats was severe and two minor re-apportionment decisions were made in these decades. The data for municipality-level subsidies from the central to the local government (*Kokko Shishutsukin*) are available only after 1978.

[24] In the 1998 fiscal year, the total amount of the subsidies transferred to municipalities (i.e., 5.4 trillion Japanese yen) accounts for approximately 1% of Japan's GDP and 4% of the total government expenditure at all levels. Of this total amount, roughly 30% is spent on General Construction Projects (*Futsu Kensetsu Jigyohi*), 20% on Livelihood Protection (*Seikatsu hogohi*), 8% on Assistance for the Aged Citizens (*Rojin Hogohi*). See Jichisho (2000a) for more details. Per-person receipt of subsidies varies across municipalities. The unweighted arithmetic average across municipalities equals 49,500 Japanese yen in the 1998 fiscal year.

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The degree of mal-apportionment of seats, our treatment variable, is measured in terms of the district magnitude divided by the district population (in logs).[25] We expect that this variable would have a positive effect on inter-governmental transfers per capita for the following reasons. The first reason is simple: If all incumbent politicians are endowed with equal ability and authority to elicit government resources, the mal-apportionment of seats inevitably creates inequalities in the *per-capita* amount of government resources brought into the district. Second, the constituency size may affect the behavior of incumbent politicians: The smaller the population a legislator represents, the more effort he/she is likely to make to obtain additional resources (Atlas et al., 1995). Third, viewed from party leaders' perspectives, legislative seats are "cheaper" when the district magnitude per capita is larger. Namely, when a party "buys" votes by providing subsidies or by conducting various types of campaign activities, mal-apportionment creates an asymmetric structure of costs and benefits across districts. Let us take an example from the 1972 election. Keizo Obuchi, a future Prime Minister, won his seat in Gumma-Third district with only 37,258 votes while Sadao Yamahana, a future opposition party leader, lost in Tokyo-Seventh district with as many as 144,415 votes. In the presence of mal-apportionment, it is more efficient for a party to allocate resources into over-represented districts.

For these reasons, we claim that the district magnitude per capita positively affects the subsidy allocation per capita in a given fiscal year and thus the reapportionment and/or redistricting changes the subsidy allocation per capita.[26]

Control Variables

Besides the number of representatives per capita, there are a variety of factors that affect the geographic allocation of subsidies. To cope with omitted-variable biases, and to capture other formulaic and non-formulaic determinants of the subsidy allocation, we included a set of control variables: population, area size, income, dependent population ratio, industrial structure, party strength, voter turnout, and municipality urbaneness. [27]

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[25] The district magnitude and the composition of municipalities in each electoral district are based on Mizusaki (1997). The district population is calculated as a total of the municipality population based on Jichisho (various issues b). If a municipality is divided into multiple electoral districts, the district population from this municipality is weighted by the number of electors in each district.

[26] We should note that the 1995 data of the district magnitude per capita is based on the districting scheme under the SNTV-MMD rule. The first redistricting plan under the new SMD rule was published in November 1994, when the 1995 budget was under compilation. We consider, however, that that the allocation of subsidies in the 1995 budget was not influenced by the new districting scheme for the following reasons. First, when the 1995 budget was compiled and approved, the LDP had not decided which incumbent to field in the brand new single-member districts. Second, the existing personal support groups were still present in accordance with the existing SNTV-MMD district borders.

[27] We should keep in mind that the formulaic portion might reflect, at least to some degrees, the partisan interests of the LDP. For example, Ihori and Doi (1998, in particular chapter 8) argued that the formulaic portions of the subsidies are already targeted to the LDP's constituents.

The municipality population (Somucho Tokeikyoku, various issues; in logs) is intended to control for the economy of scale in administration. Existing studies have shown that municipality population size is negatively correlated with the cost of administration (Saito and Nakai 1995). Another justification for including the municipality population is the asymmetry of lobbying resources. When Lower House representatives lobby for additional subsidies from the central government, mayors and members of the prefectural assembly typically pipelines construction projects. Since both the number of mayors and prefectural assembly members *per capita* is inversely related with the municipality population, we can expect that smaller municipalities obtain more subsidies per capita.

The municipality area size (Somucho Tokeikyoku 2000) is expected to matter significantly, because a large portion of infrastructure construction is roughly proportional to the land area of a municipality. The construction of roads and the embankment of rivers are the two most prominent examples.

The taxable income per capita (Nihon Makettingu Kyoiku Senta, various issues) is expected to have a negative effect, because some portions of the subsidies are used explicitly to assist the poor.

The dependent population, which is defined as the sum of population under age 15 and over 65 divided by the total population in each municipality (Somucho Tokeikyoku, various issues), captures the following two formulaic effects: the effect of aging population on welfare spending and the effect of young population on education costs.

We also controlled for the industrial structure in each municipality. Specifically, we used the ratio of the number of persons employed in the agricultural sector against the total number of employed persons in each municipality (Somucho Tokeikyoku, various years). A similar measure is calculated for the service sector. These two industrial sectors are expected to give positive effects for the following reasons. First, since agriculture and service are vulnerable to international competition, these sectors raise their demands for protective measures. Second, the base category for comparison is the manufacturing industry, in which the strength of unions prevented penetration of the LDP's partisan support.

The LDP's district seat share (i.e. the number of LDP incumbent legislator divided by the district magnitude) is intended to control for the effect of partisanship. If the LDP piles up subsidies for their constituents even after providing the formulaic portion, the coefficient should be positive and significant. On the other hand, the LDP could want to use subsidies to buy off marginal voters who had not previously voted for that party. Under this scenario, the coefficient should be negative.

One important characteristics of the period under investigation is the end of the LDP's single-party majority. Japan entered an era of coalition governments after the 1993 Lower House election. In order to control for this potentially confounding factor, we included the

seat share of the LDP's coalition partners between 1994 and 1998; namely, the Japan Socialist Party (JSP) and the New Party Sakigake.

The municipality-level voter turnout is intended to control for the effect of political participation.[28] We included this variable because rational politicians might target those who will not vote for them unless targeted (Rosenstone and Hansen, 1993). Thus, the fewer the number of electors not going to the last poll, the more politicians make their efforts to mobilize them by providing selective benefits (e.g., subsidies).

The ratio of the population in Densely Inhabited Districts (DID) against the total population is a measure of urbaneness of the municipality (Somucho Tokeikyoku, various years). A large portion of the construction expenditure is spent on purchasing project sites, and the cost is typically higher in urban areas than rural areas (Jichisho 2000a). Therefore, the urbaneness is expected to have a positive effect on the amount of subsidies.

Since census-related data are collected and published every five years, the data for non-census years were linearly interpolated. Given the practical limitation that the 2000 census results are not available yet, the data for the 1998 fiscal year were linearly extrapolated based on the 1990 and 1995 data.[29]

4. Results

Our analysis of the relationship between legislative representation and economic redistribution boils down to the following two questions. The first question is whether municipalities in over-represented districts, in a given year, received disproportionately more subsidies from the central government. The second question is whether the equalization of representation resulted in the equalization of subsidy allocation. We present our answers to these questions in turn.

Cross-sectional Regressions

Inequalities in voting strength directly translate into unequal receipts of money per capita. Table 1 indicates that, in all five cross regressions, the district magnitude per capita had a

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[28] Since the exact figure for voter turnout at the municipality-level is not available in Mizusaki (1997), we used the total number of effective votes divided by the number of electorates. Investigation of the official record shows that the differences between the turnout and the effective votes are almost negligible.

[29] We removed observations with nonsensical extrapolation from the analysis. The number of removed cases is relatively small (n=48 or 1.4% of the total effective observations) and their inclusion or exclusion does not affect the conclusion of our analysis. We will correct for this data problem as soon as the 2000 census results become available.

strong positive effect on the receipt of intergovernmental transfers per capita. The elasticity estimates range between 0.18 in FY1985 and 0.28 in FY1988.[30]

Table 1 About Here

To take an example from the 1992 sample, suppose that there are two municipalities that have almost identical demographic and political characteristics, except for the apportionment of seats. If the first municipality is represented twice as heavily than the second municipality, the receipt of subsidy increases by 24%, even after the formulaic portion of the allocation is already taken into consideration. This relationship holds even after the electoral reform of 1994. We do not observe a considerable difference in the elasticity estimates between the pre-and the post-reform periods.

Most of the control variables (i.e., the population, the area size, the per capita income, the dependent population ratio, and the agriculture and service sector workers' ratios) all exhibit statistically significant effects in the expected directions. In addition, the sizes of these coefficients are fairly stable across sample years.

Contrary to Doi and Seriya's (1997) analysis using the prefecture level data, our regression estimates suggest that the LDP's seat share has a negative effect on the subsidy allocation.[31] We might interpret our result as a consequence of the LDP's efforts to buy off marginal voters. The size of the coefficient for this variable dropped after the electoral reform (i.e., -0.36 in 1995 whereas -0.11 in 1998). We consider that this difference reflects the dichotomous nature of the LDP's representation in single-member districts, *vis-à-vis* semi-proportionality under the SNTV-MMD rule.[32] The effect of coalition partners is positive, but did not reach the conventional level of statistical significance.

Effects of Equalization in Voting Strength on Growth in Subsidies Per Capita

Next, and more importantly, we examine the relationship between the changes in apportionment/redistricting and the subsequent changes in subsidy allocation. The regression results are shown in Table 2.[33] Since unobserved time-invariant municipality-specific effects

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[30] Since relevant variables are already log-transformed, we can interpret the coefficients as partial elasticity estimates for these variables.

[31] Doi and Seriya (1997) did not consider the effect of malapportionment in their analysis. Thus, their estimates may be suffered from an omitted variable bias. We should also note that their measure of the LDP's strength was the LDP's vote share.

[32] Cox (1991) shows that the SNTV-MMD rule and the d'Hondt PR rule are equivalent.

[33] Since differenced land area is almost always zero, we dropped this variable from the list of explanatory variables. Also note that the first-difference of log-transformed variables approximates to the growth rate.

are removed by differencing data, we can use the results to check the robustness of our previous findings.[34]

Table 2 About Here

The table shows several important findings. First, unlike cross-sectional estimates, the effects of other control variables are mostly insignificant and unstable across sample periods.

Second, the effect of the coalition partner (i.e., the JSP and the New Party Sakigake) is statistically significant for the two sample periods when these parties were in power.

Finally, and most importantly, consider the effects of the changes in the district magnitude per capita in various years. This effect did not reach the conventional 5% level of statistical significance for minor reapportionments in 1986 or 1992. Thus, although the maximin ratio misleadingly suggests that there was a sizable degree of reapportionment in these years, there was no substantive change in economic redistribution. On the other hand, the major equalization of representation, which took place before the 1996 election, resulted in a significant change in subsidy allocation. The coefficient estimate shows that if the difference between the district magnitude per capita and its national average doubles, the subsidy allocation per capita increases by 7%. This finding further corroborates our claim; namely, *how much votes count has a sizable impact both cross-sectionally and inter-temporally*.

5. Conclusion

Does the equalization of legislative representation (i.e., redistricting and/or reapportionment of seats) reduce policy biases? Our answer to this question based on recent Japanese data is positive, particularly when there was sizable equalization of representation associated with the electoral reform. In Japan, over the past decades, municipalities in over-represented districts received significantly more inter-governmental subsidies from the central government, as compared to those in under-represented districts. This policy distortion was alleviated by the electoral reform. Municipalities included in districts with an *increased* district magnitude per capita now receive a significantly larger amount of subsidies per capita, as compared to the pre-reform period.
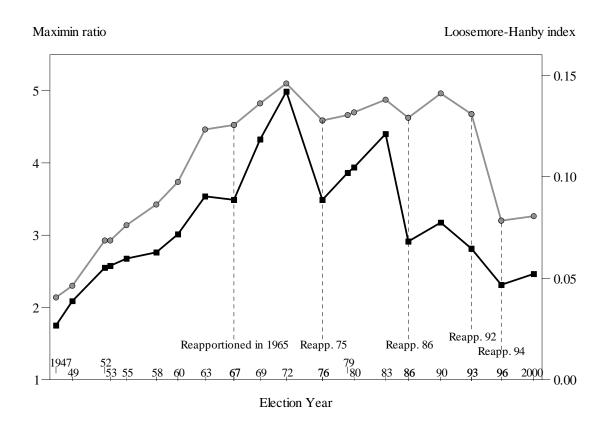
The analysis in this paper illustrates the importance of institutional design and reform. Besides a variety of demographic factors, this paper showed that institutions (e.g., the district magnitude per capita) and their changes systematically affect policy outcomes. The existing studies on the 1994 electoral reform have tended to focus on the realignment of partisan support and the changing natures of party organizations (e.g., Christensen 1998; Cox, Rosenbluth and Thies 1999). As we have shown, however, the electoral reform not only

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[34] It is not only technically but also substantively important to remove municipality-specific effects because some portions of intergovernmental subsidies are determined by location-specific factors (e.g., isolated islands, locating a nuclear power, etc).
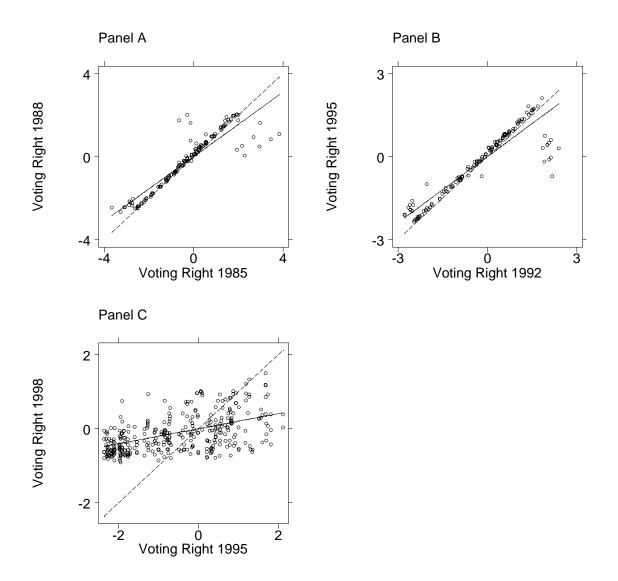
altered the nature of electoral competition, but also changed policy outcomes. More studies on the institutional reforms and its policy consequences are needed in future research.

Figure 1. Trends of Mal-apportionment of Seats in the Japanese Lower House

Figure 2. Comparison of Recent Three Reapportionment Decisions

Panel A

Panel B

Panel C

- - - - no-change baseline (the 45-degree line)
———— regression line

Voting Right Index is defined as the district magnitude per million district-population subtracted by its national average.

Table 1. Cross Sectional Regressions

Dependent Variable = Central-to-Municipal Subsidies Per Capita (log)

Independent Variables	FY1985	FY1988	FY1992	FY1995	FY1998
District Magnitude Per Capita (log)	0.18	0.28	0.24	0.27	0.20
	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)
Population (log)	-0.17	-0.21	-0.21	-0.25	-0.18
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Area Size (log)	0.17	0.16	0.15	0.15	0.12
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Income Per Capita (log)	-0.79	-0.77	-0.69	-0.91	-0.91
	(0.08)	(0.07)	(0.06)	(0.07)	(0.07)
Dependent Population Ratio	3.77	3.38	2.92	2.33	2.30
	(0.72)	(0.65)	(0.57)	(0.44)	(0.39)
Agriculture-Sector Workers Ratio	0.64	0.97	1.41	1.44	1.37
	(0.16)	(0.16)	(0.16)	(0.15)	(0.16)
Service-Sector Workers Ratio	1.85	2.03	2.27	2.23	2.24
	(0.16)	(0.16)	(0.15)	(0.15)	(0.15)
LDP Seats / District Magnitude	-0.38	-0.53	-0.46	-0.36	-0.11
	(0.07)	(0.07)	(0.07)	(0.07)	(0.02)
JSP+Sakigake Seats/ District Magnitude				0.08	0.09
				(0.07)	(0.06)
Voter Turnout	0.16	0.09	-0.37	0.15	0.62
	(0.21)	(0.23)	(0.29)	(0.25)	(0.16)
DID Population Ratio	1.10	1.18	1.06	1.16	1.12
	(0.08)	(0.08)	(0.07)	(0.07)	(0.06)
Constant	-3.35	-1.49	-1.23	-0.53	-2.16
	(0.71)	(0.80)	(0.80)	(0.85)	(0.77)
Number of Observations	3,348	3,350	3,359	3,368	3,320
F-Value	106	147	178	193	188
R-Squared	0.24	0.32	0.36	0.41	0.39
Root Mean Squared Error	0.64	0.62	0.61	0.58	0.56

Note: The White/Huber/sandwich standard errors are in parentheses.

Table 2. Effects of Equalization in Voting Strength on Growth in Subsidies Per Capita

Dependent Variable = Δ Central-to-Municipal Subsidies Per Capita (log)

Independent Variables	FY1988 - FY1985	FY1995 - FY1992	FY1998 - FY1995
Δ District Magnitude Per Capita (log)	0.02	0.15	0.07
	(0.10)	(0.09)	(0.03)
Δ Population (log)	-0.76	-0.75	-0.34
	(0.34)	(0.44)	(0.39)
Δ Income Per Capita (log)	0.01	-0.22	-0.33
	(0.14)	(0.16)	(0.17)
Δ Dependent Population Ratio	2.72	2.84	-0.88
	(1.25)	(1.55)	(1.13)
Δ Agriculture-Sector Workers Ratio	-0.89	-1.13	2.32
	(0.82)	(0.92)	(0.68)
Δ Service-Sector Workers Ratio	0.05	-0.85	0.25
	(1.07)	(1.20)	(0.94)
Δ LDP Seats / District Magnitude	-0.06	0.05	0.00
	(0.05)	(0.05)	(0.02)
Δ JSP+Sakigake Seats / District Magnitude		0.17	0.08
		(0.06)	(0.03)
Δ Voter Turnout	0.07	0.58	-0.28
	(0.24)	(0.34)	(0.14)
Δ DID Population Ratio	-0.38	0.24	-0.16
	(0.32)	(0.28)	(0.34)
Constant	-0.05	0.25	0.09
	(0.03)	(0.04)	(0.03)
Number of Observations	3,348	3,359	3,320
F-Value	7.77	3.69	3.43
R-Squared	0.02	0.02	0.01
Root Mean Squared Error	0.56	0.53	0.45

Note: The White/Huber/sandwich standard errors are in parentheses.

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