Does Inter-municipal Cooperation Lead to Municipal Amalgamation? Evidence from Japanese Municipal Referenda*

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Abstract

Are citizens more likely to vote for the approval of municipal amalgamation in municipal referenda when their municipalities are conducting joint public works with neighboring municipalities? Joint works might deepen mutual understanding between the citizens of municipalities in cooperation, and hence, persuade them to approve of their amalgamation. On the contrary, the greater the number of joint works already executed between neighboring municipalities, the lesser the number of public services that citizens feel could possibly be made more efficient through amalgamation, and hence feel a weaker necessity for amalgamation.

This paper presents an empirical analysis of this question using the data from inter-municipal cooperation in the provision of public services, as well as from municipal referenda on amalgamation in Japan. Most of the previous studies use the data on whether neighboring municipalities resulted in amalgamation or not, but such data do not tell us how strongly each municipality sought amalgamation. In particular, when a municipality did not result in amalgamation with its neighboring municipality, we do not know whether the municipality itself declined, or whether it tried amalgamation but the neighboring one declined. Our data on referendum outcomes enable us to know the percentage of citizens in each municipality that supported amalgamation. The number of joint works being conducted with neighboring municipalities is also sufficiently different among Japanese municipalities, which is advantageous for conducting empirical analyses.

Our empirical results indicate that the more intensively municipalities provide joint public services with neighbors, the more the citizens vote against their amalgamation: citizens hope to keep their independence if the joint provision of their public services with neighbor municipalities is working well. Although local governments often regard inter-municipal cooperation as a first step to municipal amalgamation, our empirical results show that inter-municipal cooperation tends to favor the independence of municipalities.

Keywords: inter-municipal cooperation, amalgamation, consolidation, merger, referendum

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1. Introduction

Are two organizations that have been working together likely to merge? The experience of working together helps organizations reduce the cost of a merger, but it seems unnecessary for such organizations to merge. This paper deals with the case of municipal amalgamation.

The traditional economic literature of municipal amalgamation describes the decisions of municipalities as binary choices of whether to merge or remain independent (see Persson and Tabellini, 2000, Ch. 6 for a typical model). If municipalities merge, they enjoy the economies of scale in the provision of public services; that is, they can reduce the per-capita cost of garbage treatment, night soil treatment, firefighting, first aid, and so on. However, if they merge, they (or some of them) lose the control over policies in their regions, and hence the level of the provision of public services may not perfectly correspond to their preferences. Such tradeoff between the economies of scale and the loss of control in the provision of public services determines whether to merge or not.

However, there is another way for municipalities to enjoy the economies of scale: they remain independent of each other while providing some public services jointly. Such inter-municipal cooperation is popular in various countries (Hulst and Montfort, 2007). This paper empirically examines whether joint provision of public services leads to municipal amalgamation or not. Inter-municipal cooperation attracts researchers in the field of public administration (i.e., case studies and institutional analyses), but has not been focused on in the field of economics (i.e., quantitative analyses focusing on economic variables). Our quantitative analysis of municipal amalgamation in terms of inter-municipal cooperation can be a bridge between the two fields.

Laamanen and Haveri (2003) asked 90 Finnish experts, such as elected officials, municipal managers, and others, about their opinions on the relationship between inter-municipal cooperation and amalgamation. About half of them answered that cooperation reduces the need for amalgamation; while 76 per cent answered that increased inter-municipal cooperation would probably result in amalgamation. Even experts have not reached a consensus on this matter.

Studies in the previous literature also built opposing hypotheses. Kamo (2010) mentions that, behind the wide use of the word "network governance" in Europe, there seems to exist the idea that amalgamation is realized as an extension of municipal unions and cooperation. His view is consistent with some North American practical cases. For example, the Office of the New York State Comptroller provides local government officials with guidance for fiscal health. In its booklet published in 2007,[1] the Office mentions that "by creating an environment of familiarity and trust between communities, sustained cooperation over the long term may eventually lead to consolidation" (pp. 3-4). The

[1] *Intermunicipal Cooperation and Consolidation: Exploring Opportunities for Savings and Improved Service Delivery* (2007):
http://www.osc.state.ny.us/localgov/pubs/research/cooperation1.pdf
(accessed on May 24, 2015).

Monitoba Local Government also recommends municipalities to consider what partnerships, such as service sharing agreements, already exist with their potential partners when they determine their amalgamation partners.[2]

On the other hand, in his comparative analysis between German and Japanese cases, Katagi (2012) considers the presence of organizations that complement municipal administrations, such as municipal unions, to discourage amalgamation because municipalities do not need to create a larger municipality for the purpose of providing high-grade and complete administrative services.

Our empirical result is consistent with Katagi's (2012) view. That is, from our logit regression for grouped data, we obtained the result that joint provision of public services decreases the ratio of approval to disapproval of amalgamation in municipal referenda. This result implies that if several municipalities are providing public services jointly, their citizens do not strongly feel the necessity for amalgamation. Inter-municipal cooperation tends to discourage, rather than encourage, amalgamation.

We use data from Japanese municipalities. Japan experienced a big wave of municipal amalgamation in early 2000s, which decreased the number of municipalities from 3232 in 1999 to 1821 in 2006. Moreover, about half of such municipalities conducted local referenda that asked whether to found a council for discussing about amalgamation with neighboring municipalities, and/or whether to approve or disapprove of the amalgamation in question. Therefore, we can observe not only whether each municipality was amalgamated with other municipalities or not, but also the percentage of citizens that approved or disapproved amalgamation.

Except for Miyazaki (2014), previous studies on municipal amalgamation regress whether each municipality was amalgamated or not (i.e., binary variable) on economic and demographic explanatory variables. With such data, however, when we observe a municipality that remained independent, we do not know whether the municipality chose against amalgamation or whether it preferred amalgamation but was refused by its potential partner. Referendum results provide a continuous variable that expresses the extent to which citizens of each municipality preferred amalgamation.

This paper is organized as follows. Section 2 describes some details of municipal amalgamation, municipal referenda, and inter-municipal cooperation in Japan. Our empirical method and results are provided in Sections 3 and 4, respectively. Section 5 concludes the paper.

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[2] *Guide to Municipal Amalgamation: Developing Your Amalgamation Plan* (January 31, 2013): http://www.gov.mb.ca/ia/muniamalg/pubs/guide.pdf
(p. 6, accessed on June 1, 2015).

2. Local Governance in Japan

In order to help readers understand our empirical analysis with data of Japanese municipalities, here we provide the details of municipal amalgamation, municipal referenda, and inter-municipal cooperation in Japan.

Japan has a three-tier government system: the national government, 47 prefectures, and 1718 municipalities (i.e., 790 cities, 745 towns and 183 villages) as of April, 2014. Each municipality is contained in one prefecture, and its land area does not overlap with the neighbors. That is, each Japanese citizen belongs to one municipality and one prefecture.

2.1 Municipal Amalgamation in Japan

Japan has experienced three waves of municipal amalgamation.[3] First, when her modern municipal system was founded in 1889, 71314 towns and villages were merged into 15859 cities, towns and villages (the Great Meiji Amalgamation). The second wave emerged from 1953 to 1961 when the national government needed to enhance the administrative capability of municipalities because the foundation and management of middle schools were delegated to municipalities. The number of municipalities decreased from 9868 to 3472 during this period (the Great Showa Amalgamation). Finally, from 1999 to 2010, 3229 municipalities were merged into 1727 (the Great Heisei Amalgamation), which is the target of this paper.

The Great Heisei Amalgamation is divided into two periods. The first period, from fiscal year 1999 to 2005, was under the old Municipal Merger Promotion Law.[4] The old law provided merged municipalities with special financial support aiming at giving a strong incentive for amalgamation. For example, merged municipalities were allowed to issue special local bonds to cover their start-up costs. It also determined not to reduce the local allocation tax grants for 10 years after amalgamation.[5] Moreover, the requirements for cites to be upgraded to higher ranks were relaxed during the first period, as explained in detail in subsection 3.3.

The second period, from fiscal year 2006 to 2009, was under the new Municipal Merger Promotion Law. Although the new law also provided special financial support as the old one did, it gave a weaker incentive for municipal amalgamation than the old one. For example, the special treatment on local allocation tax grants was shortened from 10 years to 5 years. The allowance of issuing special local bonds was abolished. This was the reason why a lot of applications for the

[3] See Yokomichi (2007) for the details from the Great Meiji Amalgamation to the first period of the Great Heisei Amalgamation.

[4] The old law was valid for municipal amalgamations applied to each prefectural governor until March 31, 2004 and realized until March 31, 2005.

[5] The local allocation tax grant is an unconditional fiscal transfer with which the national government guarantees the revenue of every local government. This amount for each municipality is calculated on the basis of standard administrative cost, which is estimated by many indicators, such as population, land area, length of road, and so on.

approval of amalgamation were made at the end of the first period. As a result, most of the municipal amalgamations in the Great Heisei Amalgamation were completed during the first period (reduction from 3229 to 1821) while the remaining amalgamations were in the second period (reduction from 1821 to 1727). This paper uses the data from the first period.

2.2 Municipal Referenda on Amalgamation in Japan

At least 429 municipal referenda on amalgamation were held in the fiscal years from 2001 to 2006. Municipal referenda were held when mayors or municipal assemblies proposed or when citizens submitted collected signatures of citizens to request mayors to have referenda. There were three types of referenda. First, of the 429 referenda, 300 referenda (70%) asked whether to approve or disapprove of the amalgamation in question. We use a part of these data in our analysis. Second, 64 referenda (15%) asked which municipalities were preferable as their amalgamation partners. To conduct these two types of referenda, each municipality needed to enact a bylaw. Finally, 61 referenda (14%) asked whether to approve or disapprove of setting up a committee that discussed about whether and how to proceed with amalgamation. The rules and procedures of this type of referendum were determined by the Municipal Merger Promotion Law.

2.3 Inter-municipal Cooperation in Japan

There are five types of inter-municipal cooperation in Japan. As of July, 2014, there are (1) 1515 partial cooperatives (*Ichibu-Jimu-Kumiai*), (2) 115 wide-area unions (*Kouiki-Rengo*), (3) 210 conferences, (4) joint setting up of 416 committees, and (5) 5979 cases of entrustment of specific affairs to other local governments.[6] Partial cooperatives and wide-area unions are special local public entities jointly established by two or more local governments for the purpose of conducting specific common affairs in the fields of managing social insurances and infrastructure for daily lives such as firefighting and waste treatment. On the other hand, the other three types of inter-municipal cooperation are often used in case of simple affairs, and local governments do not need to establish special organizations for them. In our empirical analysis, we focus on partial cooperatives and wide-area unions because they seem to be more recognizable for residents.

(1) Partial cooperatives (*Ichibu-Jimu-Kumiai*)

Partial cooperatives deal with affairs such as waste treatment (26.3%), night soil treatment (23.0%), firefighting (18.2%), emergency service (18.2%), and many others including waterworks (6.6%) and hospitals (5.2%). No powers are delegated from the nation or prefectures to partial cooperatives. In

[6] Japan Center for Cities (2013), "Local Governments in Various Countries," http://www.toshi.or.jp/app-def/wp/wp-content/uploads/2013/09/hikaku11.pdf. The numbers were renewed by authors.

each partial cooperative, municipalities are allowed to conduct only one affair jointly. If they would like to conduct two affairs, for example, they need to found two partial cooperatives.

Partial cooperatives are financed by the contributions from the member municipalities (70%), public utility charges of the affair (4%), local bonds (5%) and the others.[7] Local allocation tax grants are not distributed to partial cooperatives directly but are distributed indirectly. For example, in case of partial cooperative for waste treatment, the local allocation tax grants are basically distributed to each member municipality according to each population, and member municipalities contribute to their partial cooperative in accordance with their agreement. If the member municipalities are amalgamated, the new city receives the local allocation tax grants for their waste treatment. In this case, the national government estimates the standard administrative per-capita cost for waste treatment, but the estimated cost would be lower than the sum of costs for the separated municipalities because the estimation takes the economies of scale into account. This can be a disincentive for municipal amalgamation, and this is the reason why the old Municipal Merger Promotion Law determined not to reduce the local allocation tax grants for 10 years after amalgamation.

The legislative organization of partial cooperatives consists of an administrator and a council. The administrator is usually elected from the mayors of the member municipalities by vote among themselves. The council consists of representatives selected from each member municipality. The composition of representatives has variations among partial cooperatives. The number of representatives each member municipality can send off is proportional to its population in some cases but is the same among member municipalities in other cases. Their hybrids are also observed.[8] These variations mean that population size does not necessarily determine the strength of voice of each member municipality in partial cooperatives. Hence, municipal amalgamation might weaken small municipalities' power of control over joint works, which can be a disincentive for small municipalities to merge.

On the other hand, partial cooperatives connect the member municipalities strongly. The establishment of partial cooperatives has been a traditional way of inter-municipal cooperation in Japan since the Local Autonomy Law was enacted in 1947. As we can see in Figure 1, many of them were established in 1970s. Moreover, when a municipality selects its partners in amalgamation, it is

[7] Figures in parentheses indicate the yearly means for the period from 2002 to 2012 (Source: Ministry of Internal Affairs and Communications, "Annual Statistics on Local Public Finance, 2012").

[8] For example, Tokyo 23 wards have a council of partial cooperative for waste treatment, which consists of the 23 chairmen of the 23 ward assemblies. On the other hand, the partial cooperative for waste treatment among cities Osaka, Yao and Matsubara distributes the council seats to the member cities according to the combination of proportional distribution and equal distribution.

often an important factor whether they have partial cooperatives or not.[9] Therefore, partial cooperatives can also motivate member municipalities to amalgamate with each other.

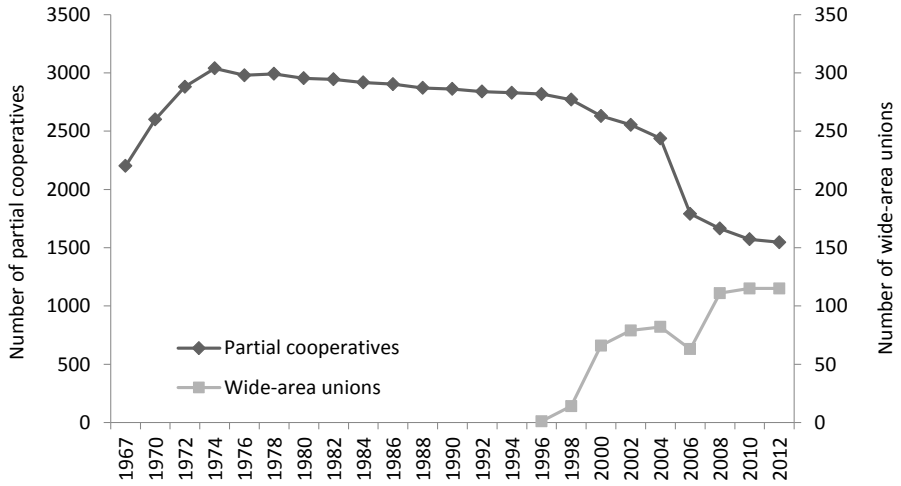

Figure 1. Number of Partial Cooperatives and Wide-area Unions

Note: The numbers are as of July 1st in each year. The large decrease from 2004 to 2006 is due to the Great Heisei Amalgamation. The large increase in the number of wide-area unions from 2006 to 2008 is due to the reform of medical care system for elderly people.
Source: The Survey of Joint Works among Local Governments (*Chihou Koukyou Dantai no Jimu no Kyoudou Shori no Joukyou Shirabe*), 2012.

(2) Wide-area unions (*Kouiki-Rengo*)

Founding wide-area unions is a newer method of inter-municipal cooperation enacted in July, 1995 with the establishment of the rank of core city. As we can see in Figure 1, many of wide-area unions were established from 1998 to 2000. It aims at meeting the growing needs for administration in wider regions and promoting devolution from the nation or prefectures to municipalities. In actual facts,

[9] This does not mean that there exists the problem of self-selection because not citizens but the local governments select the candidate municipalities proposed in referenda on amalgamation. The importance of inter-municipal cooperation is often mentioned in official documents. For example, the Yamaguchi Prefectural Government issued a plan for the promotion of municipal amalgamation. It proposed the combinations of municipalities which were thought necessary to promote their amalgamation according to the following four criteria: (1) geographical and historical backgrounds (e.g., commuting areas) and cooperation among municipalities (e.g., partial cooperatives and wide-area unions), (2) upgrade to core cities or special cities, (3) dissolving small municipalities as a countermeasure against depopulation and population ageing, (4) municipalities' concrete actions for amalgamation (Department of Regional Development, Yamaguchi Prefectural Government, "Municipal merger promotion plan in Yamaguchi prefecture," July, 2006, p.19: http://www.pref.yamaguchi.lg.jp/cmsdata/2/a/1/2a1498443f5ae22ed75b0e4d19bf1649.pdf (accessed November 29, 2016)).

many of wide-area unions are established to manage medical systems for elderly people over 75 years old and to deal with nursing care insurances.

Wide-area unions have the following four major differences from partial cooperatives.[10] First, each wide-area union can deal with multiple affairs. Each municipality does not necessarily join all the affairs dealt with in the wide-area union. Wide-area unions can also be deputed to deal with affairs which their prefectures are supposed to do.

Second, wide-area unions have the stronger initiative on the affairs than partial cooperatives. They can recommend their member municipalities the way of carrying out the relevant affairs, and request their member municipalities to change the rules of unions to manage the affairs efficiently.

Third, wide-area unions are able to be delegated some authorities from the nation or prefectures even if individual municipalities are not allowed to be delegated them because of their small scales. In contrast, partial cooperatives cannot undertake the affairs that no member municipalities have the right to do. This means that wide-area unions enable small municipalities to gain some authorities without being merged and upgrading to higher rank of the city. Therefore, the presence of wide-area unions can be the stronger disincentive for amalgamation than the presence of partial cooperatives.

Finally, the councilmen of wide-area unions are elected by the residents of member municipalities (i.e., direct election) or by the councilmen of each municipal assembly (i.e., indirect election). While the representatives of partial cooperatives can be appointed by the mayor of each municipality, the councilmen of wide-area unions must be elected. In this sense, the system of wide-area unions is more democratic than partial cooperatives. However, most of the executive councilmen are mayors of member municipalities, which implies that member municipalities are more or less equally dealt with in unions. This can work as a disincentive for small municipalities to be merged, as in the case of partial cooperatives.

3. Empirical Analysis

3.1 Hypotheses

In this subsection, we set up our hypotheses tested in our empirical analysis. How to measure each term statistically is provided in the next subsection.

As we discussed in Section 2, partial cooperatives and wide-area unions can work as both incentive and disincentive for municipal amalgamation. Hence, their actual effects need to be examined empirically. Our research questions are operationalized as follows:

[10] Source: Japanese Ministry of International Affairs and Communications, "Wide-Area Unions," http://www.soumu.go.jp/kouiki/kouiki1.html (accessed November 29, 2016).

Hypothesis 1-1: The more intensively municipalities provide joint public services with neighboring ones, the more citizens cast their ballots for their amalgamation in referenda.
Hypothesis 1-2: The more intensively municipalities provide joint public services with neighboring ones, the more citizens cast their ballots against their amalgamation in referenda.

As mentioned in the explanations of partial cooperatives and wide-area unions, if merged, small municipalities would become merely small regions of a new large municipality, and hence they might lose a part of their control over the affairs dealt with in partial cooperatives and wide-area unions. They would also lose the control over the other affairs they were conducting independently before they were merged. Hence, we also test the following hypothesis.

Hypothesis 2: The more severely municipalities are expected to lose their control over affairs, the more citizens cast their ballots against their amalgamation in referenda.

3.2 Dependent Variable and Methods

The causal effects of inter-municipal cooperation on the results of referenda are estimated with the weighted least-squares logistic regression in which the numbers of "yes" and "no" votes are grouped by each municipality. Our dependent variable is the logarithm of the ratio of "yes" votes to "no" votes (i.e. log-odds of "yes" vote). Filer and Kenny (1980) use the U.S. referendum data grouped by municipality. As in the current paper, their dependent variable is also the logarithm of the ratio of "yes" votes to "no" votes, but they seem to use the ordinary least squares in their regression with the grouped data,[11] which might be accompanied by heteroscedasticity of error terms.

Miyazaki (2014) uses almost the same referendum data to ours, and he also uses the ordinary least squares for his grouped data. Moreover, the dependent variable in his regression model is the share of "yes" votes in valid votes. In general, the share in the sample is not consistent with the true share in the population if the sampling rate differs between the groups. In case of referenda, the sampling rate of "yes" votes, that is, the ratio of actual "yes (no)" votes to potential "yes (no)" voters, can differ from that of "no" votes. This problem can be avoided by using not the share but odds as we do in the current paper.

We use data from 269 Japanese municipal referenda on the approval or disapproval of amalgamation during the period from July 29, 2001 to March 31, 2005. The dataset contains the date of each referendum, the lists of municipalities to be amalgamated, and the numbers of yes/no votes. This dataset was originally constructed by Murata (2006). We made corrections and made up for the lack of some referenda in reference to the official websites of each municipality and newspaper articles. We believe that our dataset covers the results of almost all referenda on municipal amalgamation held

[11] The regression method is not presented explicitly in their paper.

during the above period.

3.3 Independent Variables

Independent variables, which express the characteristics of each municipality in our model, consist of the variables representing the degree of inter-municipal cooperation, the gain/loss of control over affairs through amalgamation, fiscal conditions (i.e., financial strength ratio and debt burden ratio), and other control variables (i.e., proportion of population age 65 and over, and dummy variables for the upgrade in the rank of municipality). Our main focus is on the variables representing the degree of inter-municipal cooperation (i.e., Hypotheses 1-1 and 1-2), which differentiates our analysis from Filer and Kenny (1980) and Miyazaki (2014). The gain/loss of control is also related to the structure of inter-municipal cooperation (i.e., Hypothesis 2) and hence is given attention.

For many of other variables that express the incentive and disincentive for amalgamation, we calculate the difference in each index between the prospective municipalities created through amalgamation and the currently existing municipalities. We use fiscal data of municipalities from the Local Public Finance Survey (*Chihou Zaisei Joukyou Chousa*) and demographic data from the Basic Resident Register Population Survey. These are the complete surveys of all municipalities in Japan. Hereafter, we explain how to construct each independent variable. For each variable, we use the latest information which is available before the date of each referendum.

Variables representing the degree of inter-municipal cooperation

Each municipality can join any number of partial cooperatives and wide-area unions to conduct public works jointly with other municipalities. Suppose that two municipalities are considering to be amalgamated with each other to form a new larger municipality. If the two municipalities are joining a large number of partial cooperatives and wide-area unions together, we regard that the inter-municipal cooperation between them is intensive (we call this aspect *number*). However, if the partial cooperative or wide-area union the two municipalities are joining consists of twenty municipalities, for example, it seems difficult to regard the inter-municipal cooperation between the two municipalities is intensive there (we call this aspect *density*). Therefore, we would take account of both the number and the density when we construct the variables representing the degree of inter-municipal cooperation.[12]

[12] We refer to the nationwide list of wide-area unions from the website of Ministry of Internal Affairs and Communications: http://www.soumu.go.jp/kouiki/kouiki1.html#kouiki5. It includes the information on the member municipalities of each union. On the other hand, the nationwide list of partial cooperatives does not include the information on member municipalities, and hence we collected the information from all prefectures by ourselves. If a part of the information was lacking for some partial cooperatives, we checked the statute of the partial cooperatives or asked them by phone.

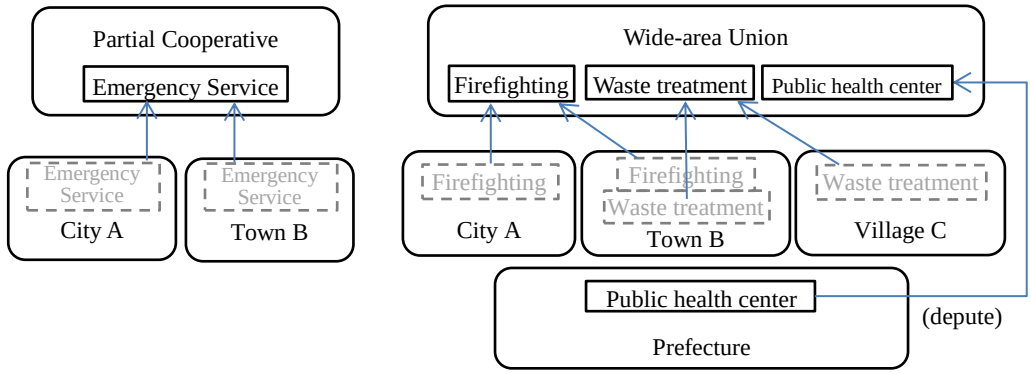

Figure 2. Partial Cooperatives and Wide-area Unions

Figure 2 provides an example of inter-municipal cooperation between city A and town B. Now suppose that city A holds a municipal referendum to ask citizens whether to approve or disapprove of the amalgamation between city A and town B. We measure the degree of inter-municipal cooperation between these two municipalities as follows. First, these two municipalities are providing emergency services jointly in a partial cooperative, and this partial cooperative consists of only the two municipalities. Since they occupy 2/2 of the member municipalities in the partial cooperative, we count this as 1. Next, city A and town B join a wide-area union, which consists of three municipalities.[13] Since their share in the wide-area union is 2/3, we count it as 2/3. Finally, we sum them up and regard 5/3 as the degree of inter-municipal cooperation between city A and town B. This index is a kind of weighted sum of organizations for inter-municipal cooperation. If these two municipalities are joining more than one partial cooperative and/or wide-area union, they are also counted and added to this index. In our empirical analysis, we also consider the case in which we construct this index for partial cooperatives and wide-area unions separately from each other. When we check the robustness of our empirical results, we also test four different ways of constructing this variable representing the degree of inter-municipal cooperation.

Gain/loss of control

Through amalgamation, each municipality would strengthen or weaken its control over affairs. To construct a variable which expresses this change of control for each municipality, we subtract one divided by the number of municipalities joining each amalgamation from the population share of the

[13] We do not count prefectures as the members of partial cooperatives or wide-area unions. We also do not count partial cooperatives or wide-area unions which consist of all municipalities in their prefecture. Since such cases are very few, they do not change our empirical results.

municipality (called region after amalgamation) in the newly created municipality.[14] Before amalgamation, we regard that the strength of control over affairs is the same among member municipalities in each partial cooperative or wide-area union regardless of the difference in population (i.e., each municipality is regarded as a voter in their decision making), but after amalgamation, it is proportional to the population of each region in the newly created municipality (i.e., each resident is regarded as a voter). Such a way of creating this variable implies that municipalities with large (small, respectively) population strengthen (weaken) their control over affairs through amalgamation.

Fiscal strength index

Fiscal strength index is the ratio of the standard revenue, which is mostly local taxes, to the standard expenditure of each local government. This index is often used as a measure of the fiscal condition of each municipality. For example, the national government does not provide the local allocation tax grants to municipalities whose fiscal strength indices exceed 1.[15] As an independent variable, we use the difference in this index before and after amalgamation. We expect it to have a positive effect on the dependent variable.

As an economic variable for municipalities, the previous literature, including Filer and Kenny (1980) and Miyazaki (2014), uses the change in per capita income, rather than such a fiscal index. Although individual incomes are often used to measure the fiscal conditions of municipalities, they are only a part of tax base for Japanese municipalities.[16] In fact, the major sources of revenue for Japanese local governments consist of local taxes (37%), local allocation tax grants (18%), national treasury disbursements (conditional grant) (14%), and local bonds (12%).[17] Income-based taxes on inhabitants are included in the local taxes, but fixed property taxes and corporate inhabitant taxes are also included there.

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[14] For example, suppose that municipalities A and B plan to merge and that their populations are 10000 and 20000 respectively. Then the gain/loss of control for municipality A is calculated as $\frac{10000}{30000} - \frac{1}{2} = -\frac{1}{6}$. That is, municipality A is regarded to lose its control over affairs by 1/6 through amalgamation.

[15] The smaller the fiscal strength index is, the greater amount of local allocation tax grants the national government provides to the municipality. However, the grants do not fully cover the shortage of revenue for each municipality.

[16] The previous literature does not always obtain statistically significant effects of the change in per capita income before and after amalgamation.

[17] Figures in parentheses indicate the mean for the period from 2002 to 2012. The largest differences from the mean in each year are as follows: 3.1% points for local taxes (except for 2007 and 2008 due to tax reform), 2.2% points for local allocation tax grants, 3.3% points for national treasury disbursements, and 2.3% points for local bonds (Source: Ministry of Internal Affairs and Communications, *White Paper on Local Public Finance, 2014*). The local taxes and the local allocation tax grants are called "general revenue sources." They are important for Japanese local governments because they are not earmarked for specific uses.

Debt burden ratio

Debt burden ratio is the ratio of the debt expenditure to the general revenue of each municipality. As another independent variable which captures the incentive and disincentive for amalgamation in terms of municipal finance, we use the difference in this ratio before and after amalgamation. We expect it to have a negative effect on the dependent variable.[18]

Proportion of people aged 65 years and over

Since many of elderly citizens retire and live on the national pension, municipalities with a larger share of elderly citizens tend to have a smaller tax base while they need a larger amount of medical costs. In addition, such municipalities usually locate in country sides, and their population tends to be decreasing. To manage such problems of aging and depopulation, the elderly citizens should have had a strong incentive to be amalgamated with large cities.

Upgrade to higher ranks of cities

As a result of amalgamation with neighboring municipalities, a town or village can be upgraded to a city if its population exceeds 30,000.[19] Cities can also be upgraded to "special cities," "core cities" and "designated cities." Their population requirements are 200,000, 300,000 and 800,000 respectively. As of April 2014, there are 40 special cities, 43 core cities and 20 designated cities. The higher the rank of city is, the greater authority is delegated from the prefectures.[20] Therefore, Japanese municipalities are able to expand their autonomy through their amalgamation if they succeed in achieving the population requirements for higher ranks. To capture this incentive, we introduce dummy variables for upgrades to these four types of cities.

In the Great Heisei Amalgamation, the above requirements for the upgrade of cities were relaxed. The population requirement for designated city had been relaxed from 800,000 to 700,000. The requirements for core city had also been relaxed gradually. A rank called core city was established in April, 1995, and three requirements were imposed: (1) the population was 300,000 or more, (2) the land area was 100 km^2 or more, and (3) the daytime population exceeded the nighttime population if the population did not reach 500,000. To begin with, the third requirement was abolished in 2000. Then, the second requirement had been restricted to the city with population smaller than 500,000 since 2002. A rank called special city was also established in April, 2000.

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[18] Miyazaki (2014) uses the difference in the debt level but does not obtain the statistical significance for its effect. A possible reason is that how heavy the burden of debt repayment is depends on the amount of revenue each municipality earns.

[19] When a town or village does not amalgamate, the requirement on the population for the upgrade to a city is set at 50,000.

[20] See Council of Local Authorities for International Relations (2010) for the details of delegation of powers from prefectures to cities.

3.4 Descriptive Statistics

Table 1 provides the descriptive statistics of the main variables used in the current paper. The sample mean of the ratio of “Yes” votes to “No” votes in referenda is greater than 1. Namely, the share of “Yes” votes in valid votes is above 50% on average. In our sample, a majority cast “Yes” votes for amalgamation in 150 referenda and “No” votes in 119 referenda. Compared to the fact that the number of municipalities decreased from 3,224 to 1,821 in the corresponding period of our sample, the number of referenda in which a majority supported amalgamation is not so many.

The degrees of inter-municipal cooperation (abbreviated as IMC) through wide-area unions and partial cooperatives are 0.093 and 1.143 respectively. On average, 3.77 municipalities are listed as amalgamation partners in referenda. They jointly participate in one wide-area union with other 36.77 municipalities. There are no samples of amalgamation partners which jointly participate in more than one wide-area union. They also jointly participate in 3.3 partial cooperatives with other municipalities. Each municipality expects to be better off but lose the control over policies after amalgamation.

Table 1. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max	Obs.
The ratio of "Yes" votes to "No" votes	1.392	1.059	0.104	6.442	269
(The share of "Yes" votes in valid votes)	(0.520)	(0.159)	(0.094)	(0.866)	(269)
Inter-municipal cooperation (IMC)					
Wide-area unions + Partial cooperatives	1.236	0.999	0.000	4.744	269
Wide-area unions	0.093	0.226	0.000	1.000	269
Partial cooperatives	1.143	0.952	0.000	4.667	269
Financial strength index (diff.)	0.094	0.186	-1.212	0.725	269
Debt burden ratio (diff.)	-0.004	0.054	-0.260	0.124	269
Gain/Loss of control	-0.119	0.187	-0.495	0.383	269

Notes: Financial strength index, debt burden ratio and gain/loss of control are calculated by the expected value after amalgamation minus the value in case of remaining independent.

4. Empirical Results

4.1 Main Results

Table 2 shows the results of our logit regressions with grouped data. We have six models according to whether partial cooperatives and wide-area unions are counted jointly or separately and which control variables are included. We observe that the coefficients of the variables representing inter-municipal cooperation are significantly negative in every model although the significance level is 10% in model (6). That is, IMC increases “No” votes in comparison with “Yes” votes in referenda on amalgamation.

Models (1) to (3) count the two types of IMC jointly. They show that if a municipality joins

one additional IMC organization which consists of all municipalities listed on the plan of amalgamation, the ratio of the number of "Yes" votes to the number of "No" votes decreases by 11.7% to 13.5%.[21]

Models (4) to (6) tell us that if the two types of IMC are dealt with separately, the magnitude of their effects is quite different. Joining one additional wide-area union which consists of all municipalities listed on the plan of amalgamation decreases the ratio of "Yes" votes to "No" votes in a referendum by 49.9% in model (4) which includes no control variables and by 55.7% in model (5) which controls the changes that municipalities experience through amalgamation except for the upgrade to higher ranks of cities. If the upgrade to higher ranks of cities is also taken into account, this effect decreases to 44.4%.[22] On the other hand, partial cooperatives' counterparts are 9.4%, 10.6% and 9.4% respectively.

The greater impact of wide-area unions comes from the greater importance of one unit of wide-area union than one unit of partial cooperative in terms of the following two aspects. First, as we can see in Figure 1, the total number of wide-area unions is much smaller than partial cooperatives. At the same time, as the name "wide-area" implies, wide-area unions tend to consist of the greater number of municipalities than partial cooperatives. As a result, the mean of IMC variable for wide-area unions is smaller than that for partial cooperatives (Table 1). Second, only wide-area unions can be deputed some public works that the nation or prefectures are supposed to do. That is, joining wide-area unions enables municipalities to do what they cannot do in partial cooperatives.

Coefficients of most control variables take the expected sign. The gain/loss of control has a significantly positive effect on the referendum outcomes. That is, voters are likely to cast "Yes" votes for amalgamation when their political power measured with population size is expected to be strengthened. The two variables representing financial status also obtain the expected signs with statistical significance. First, when voters expect their new municipality to be better off, they are likely to cast "Yes" votes for the amalgamation. That is, if the financial strength index (i.e., the ratio of standard revenue to standard expenditure) increases by 0.1 after amalgamation, the ratio of "Yes" votes to "No" votes in referenda increases by 12% to 13%. Second, when voters expect the new municipality to be liable for the heavier debt, voters are likely to vote against the amalgamation. Models (2), (3), (5) and (6) show that if the debt burden ratio (i.e., the ratio of debt repayment to general revenue)

[21] Approximately, 0.04 increase of logit of "Yes" votes correspond to 1% increase of the rate of "Yes" votes when the rate lies between 35% and 65%. Using this, models (1) to (3) show that joining one additional IMC reduces the ratio of "Yes" votes by 2.93% to 3.38%.

[22] Using the same way as the previous footnote, models (4) to (6) show that joining one additional IMC approximately reduce the ratio of "Yes" votes by 11.1% to 13.93% with respect to wide-area union, and 2.35% to 2.65% respectively with respect to partial cooperative.

increases by 0.1 after amalgamation, the ratio of "Yes" votes to "No" votes decreases by 21% to 25%.[23] We can regard that our models succeed in capturing the effects of the difference in fiscal conditions among municipalities although the previous literature did not succeed by using the differences in income or debt level.

Table 2. Estimates of the effct of IMC on municipal amalgamation referenda

	(1)	(2)	(3)	(4)	(5)	(6)
IMC(Wide-area union + Partial cooperativ	−0.124***	−0.135***	−0.117**			
	(0.043)	(0.043)	(0.046)			
IMC(Wide-area union)				−0.499**	−0.557***	−0.444**
				(0.223)	(0.212)	(0.212)
IMC(Partial cooperatives)				−0.094**	−0.106**	−0.094*
				(0.047)	(0.045)	(0.049)
Gain/Loss of control		0.560**	0.570**		0.573**	0.592**
		(0.231)	(0.272)		(0.230)	(0.271)
Financial strength index (diff.)		1.271***	1.280***		1.218***	1.232***
		(0.330)	(0.349)		(0.329)	(0.349)
Debt burden ratio (diff.)		−2.122*	−2.547**		−2.105*	−2.511**
		(1.096)	(1.091)		(1.090)	(1.088)
Proportion of population age 65+ (diff.)		1.447**	0.721		1.668**	0.974
		(0.727)	(0.833)		(0.731)	(0.847)
Upgrade to city (dummy)			−0.005			0.000
			(0.121)			(0.121)
Upgrade to special city (dummy)			−0.351***			−0.327***
			(0.129)			(0.130)
Upgrade to core city (dummy)			0.393***			0.380***
			(0.143)			(0.143)
Upgrade to designated city (dummy)			−0.046			−0.040
			(0.174)			(0.174)
Obs.	269	269	269	269	269	269
Adj. R2	0.026	0.153	0.174	0.033	0.163	0.179

Notes: The table reports the marginal effects for models by the weighted least-squares logistic regression for grouped data using July 2001-March 2005 data. Dependent variable is the log of the ratio of yes votes to no votes for amalgamation. Column 4-6 show estimates in case of deviding the IMC varable in column 1-3 into two types of IMC. The minimum populations required to upgrade the municipality class are as follows: city 20,000 after an amalgamation, 50,000 in principle; special city 200,000; core city 300,000; metropolitan city 500,000. Standard errors in parentheses; * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

4.2 Robustness and Validity

In this section, we check the robustness of our main results.

[23] Using the same way as the previous footnote, models (2), (3), (5) and (6) show that 0.1 increase of the financial strength index raises the ratio of "Yes" votes by about 3%, while 0.1 increase of the debt burden ratio reduces by 5.26% to 6.37%, approximately.

4.2.1 Upgrade to Special City or Higher Ranks of City

In models (3) and (6) of Table 2, we obtain a significantly negative effect of the dummy variable for the upgrade to a special city on the dependent variable. One possible reason is that citizens would like to avoid their municipalities from being upgraded to special cities because of few benefits.[24] Another reason is the possibility of multicollinearity between the dummy variables for the upgrade to a special city and to a core city. Under our definition of dummy variables for the upgrade, if a city skips a special city and is upgraded to a core city, both of the dummy variables take value 1. This definition is based on the idea that when a city is upgraded to a core city and gets some authorities, the city should have also got the authorities that special cities are given. In fact, a high correlation is observed between the dummy variables for the upgrade to a special city and to a core city ($r = 0.71$).[25]

We also find in Table 2 that adding the dummy variables for the upgrade to higher ranks of cities weakens the effect of inter-municipal cooperation slightly (models (3) and (6)). To look into this point more carefully, we employ another way to control the effect of the upgrade. That is, we conduct additional regressions in Table 3 with the division of the sample into two groups, 201 municipalities that would be upgraded to special cities or higher ranks of cities (models (1) and (2)) and 68 municipalities that would not (models (3) and (4)).

If we count wide-area unions and partial cooperatives jointly to measure the degree of inter-municipal cooperation (i.e., models (1) and (3)), we obtain significantly negative effects of inter-municipal cooperation. On the other hand, if we separate wide-area unions and partial cooperatives in constructing the variables for the degree of inter-municipal cooperation, the effects of the two types of inter-municipal organizations show the opposing moves to each other. That is, (*i*) for municipalities that would not be upgraded (i.e., model (2)), the negative effect of partial cooperatives is strengthened while the effect of wide-area unions becomes insignificant. (*ii*) For municipalities that would be upgraded (i.e., model (4)), the negative effect of wide-area unions is strengthened while the effect of partial cooperatives becomes insignificant.

For the following reasons, these results support Hypothesis 1-2 (i.e., the more intensively municipalities provide joint public services with neighboring ones, the more citizens cast their ballots against their amalgamation in referenda). First, since municipalities that would not be upgraded are not given any authority after amalgamation, they keep participating in their wide-area unions to get it while they dissolve their partial cooperatives which consist of only amalgamating municipalities because it becomes useless after amalgamation. Therefore, whether to have been joining wide-are unions or not are less likely to affect their decisions on amalgamation. If we eliminate such

[24] In simple linear regression analysis, the dummy variable of upgrading to a special city or higher rank of cities has a negative but insignificant influence on log-odds of "yes" vote.

[25] We tested some different definitions of the dummy variable for the upgrade to higher ranks of cities, but the conclusion about the effect of the inter-municipal cooperation did not change.

municipalities in our regression, we obtain a stronger negative effect of wide-area unions (i.e., model (4)). Second, amalgamation partners that would be upgraded usually include a few large municipality and many other small municipalities. Since large municipalities tend to provide public services by themselves, partial cooperatives are rarely founded among such partners. If we eliminate such amalgamation partners, we obtain a stronger negative effect of partial cooperatives (i.e., model (2)). Note that the stronger negative effects of inter-municipal organizations might be, in part, due to the possibility of overestimation caused by the small sample size.

Table 3. Estimates for the observations upgrade/not upgrade to a special city

	Not upgrade to a special city		Upgrade to a special city	
	(1)	(2)	(3)	(4)
IMC(Wide-area union & Partial cooperatives)	−0.129***		−0.214**	
	(0.047)		(0.105)	
IMC(Wide-area union)		0.234		−2.621***
		(0.215)		(0.514)
IMC(Partial cooperatives)		−0.149***		0.090
		(0.048)		(0.107)
Gain/Loss of control	0.454	0.442	0.401	0.617*
	(0.358)	(0.356)	(0.429)	(0.365)
Financial strength index (diff.)	1.365***	1.447***	1.345**	1.130**
	(0.453)	(0.453)	(0.656)	(0.553)
Debt burden ratio (diff.)	−1.618	−1.613	−3.351	−2.394
	(1.253)	(1.247)	(2.316)	(1.970)
Proportion of population age 65+ (diff.)	1.512*	1.302	−1.371	2.046
	(0.840)	(0.843)	(2.158)	(1.955)
Obs.	201	201	68	68
Adj. R^2	0.116	0.124	0.170	0.380

Notes: The table reports grouped logit estimates. The estimates in this table were constructed using the observation upgrade or not upgrade to a special city if the amalgamation realizes. Standard errors in parentheses; * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

4.2.2 Different Definitions of Inter-municipal Cooperation

As another robustness check, we conduct additional regressions with four different ways of constructing the variable representing the degree of inter-municipal cooperation. These four ways are created by the following two factors. In any case, we require all the amalgamating municipalities, instead of a part of them, to join the same organization for inter-municipal cooperation.

The first factor is which type of organization we regard as one activity for inter-municipal cooperation among the amalgamating municipalities, (*a*) organizations whose members are exactly the same as the amalgamating municipalities, or (*b*) organizations which include the amalgamating municipalities as well as others. Definition (*a*) ((*b*), respectively) is narrower (broader) than the

definition used in our main analysis in Table 2.

The second factor is how to count the number of organizations. One method is (*c*) to set 1 if there exists at least one organization in which all the amalgamating municipalities participate and 0 otherwise. This binary variable takes account of only the presence of such organizations while ignoring the number of organizations. Another method is (*d*) to count the number of organizations which satisfy condition (*a*) or (*b*). This is consistent with the method used in our main analysis in Table 2.

These two factors yield four definitions of inter-municipal cooperation, the pairs of (*a*) and (*c*), (*a*) and (*d*), (*b*) and (*c*), and (*b*) and (*d*). In addition to these four definitions, whether to combine wide-area unions and partial cooperatives or separate them from each other finally creates eight regression models, as in Table 4.

As in models (2) and (4) show, if we count only organizations whose members are exactly the same as each set of amalgamation partners (i.e., definition (*a*)), the effect of wide-area unions becomes insignificant. This is due to the formation of wide-area unions. That is, since wide-area unions are usually formed by many municipalities in wide areas as the name suggests, the variable representing inter-municipal cooperation in terms of wide-area unions takes zero for most municipalities if we count it on the basis of such narrow meaning. This lack of variation makes it difficult to identify the effect of wide-area unions. On the other hand, the negative effect of partial cooperatives is shown to be robust to such change in definition.

In contrast, if we allow other municipalities to constitute a part of members in organizations as well as amalgamation partners (i.e., definition (*b*)) when we measure the degree of inter-municipal cooperation among amalgamation partners, the effect of partial cooperative becomes insignificant. In this case, the presence or the number of partial cooperatives faces the lack of variation. Most municipalities join some partial cooperatives, and hence there are few cases that amalgamation partners are not working together in any partial cooperative. On the other hand, the negative effect of wide-area unions is shown to be robust to such change in definition.

The above analyses illustrate that the other four definitions of the degree of inter-municipal cooperation are either too narrow or too loose to identify the effect of inter-municipal cooperation. Nonetheless, we obtain the significantly negative effects of wide-area unions and partial cooperatives when the definitions do not cause the lack of variations in data. In this sense, we conclude that the negative effect of inter-municipal cooperation on referendum outcomes is robust even if we use the different definition, and we think that our definition used in Table 2 is suitable for our analyses.

Table 4. Estimates of the effects of the different definitions of IMC on municipal amalgamation referenda

	IMC organizations consist of all candidate municipalities				IMC organizations consist of municipalities including all candidate municipalities			
	Dummy	Dummy	Total amount	Total amount	Dummy	Dummy	Total amount	Total amount
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IMC(Wide-area union & Partial cooperatives	−0.172**		−0.103**		0.268*		−0.025	
	(0.086)		(0.052)		(0.149)		(0.020)	
IMC(Wide-area union)		0.324		0.403		−0.346***		−0.358***
		(0.394)		(0.397)		(0.122)		(0.123)
IMC(Partial cooperatives)		−0.188**		−0.123**		0.205		−0.009
		(0.086)		(0.054)		(0.136)		(0.021)
Gain/Loss of control	0.508**	0.511**	0.514**	0.522**	0.351	0.416*	0.513**	0.525**
	(0.232)	(0.232)	(0.233)	(0.232)	(0.240)	(0.237)	(0.236)	(0.233)
Financial strength index (diff.)	1.395***	1.410***	1.388***	1.404***	1.568***	1.425***	1.365***	1.307***
	(0.330)	(0.330)	(0.330)	(0.329)	(0.336)	(0.335)	(0.339)	(0.335)
Debt burden ratio (diff.)	−2.050*	−2.038*	−2.085*	−2.073*	−1.692	−1.885*	−2.052*	−2.099*
	(1.108)	(1.107)	(1.109)	(1.107)	(1.122)	(1.103)	(1.114)	(1.100)
Proportion of population age 65+ (diff.)	0.907	0.813	0.962	0.847	0.64	1.274*	1.202	1.549**
	(0.717)	(0.721)	(0.717)	(0.720)	(0.737)	(0.745)	(0.750)	(0.752)
Obs.	269	269	269	269	269	269	269	269
Adj. R2	0.134	0.135	0.134	0.136	0.131	0.153	0.126	0.147

Notes: The table reports grouped logit estimates. Dependent variable in column 1-2 is dummy variable whether there exists any IMCs whose complete subset consist with all candidate municipalities for amalgamation (=1) or not (=0). Dependent variable in column 3-4 is total amount of IMCs including all candidate municipalities as a complete subset. Dependent variable in column 5-6 is dummy variable whether there exists any IMCs whose subset consist with all candidate municipalities for amalgamation (=1) or not (=0). Dependent variable in column 7-8 is total amount of IMCs including all candidate municipalities as a subset. Standard errors in parentheses; * $p<0.1$; ** $p<0.05$; *** $p<0.01$.

5. Conclusion

In this paper, to operationalize our research question whether inter-municipal cooperation leads to municipal amalgamation, we set up a question whether citizens are more likely to vote for amalgamation in municipal referenda when their municipalities are conducting joint public works more intensively with neighboring municipalities. Our empirical results gave a negative answer to this question.

Inter-municipal cooperation can be both the incentive and the disincentive for municipal amalgamation. That is, doing joint works deepens the mutual understanding between municipalities, but it may also let citizens feel weaker necessity for municipal amalgamation. We can interpret our empirical results that the disincentive is stronger than the incentive: citizens hope to keep their independence if the joint provision of their public services is working well with neighbor municipalities. Although local governments often regard inter-municipal cooperation as a first step to municipal amalgamation, it is expected from our empirical results that inter-municipal cooperation rather helps the independence of municipalities.

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