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

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

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Abstract

Are citizens more likely to vote to approve municipal amalgamation in municipal referenda when their municipalities conduct joint public works with their potential amalgamation partners? Joint works are considered to deepen mutual understanding between the citizens of municipalities during cooperation, and hence persuade them to approve of their amalgamation. In contrast, the greater the number of joint works already executed between neighboring municipalities, the fewer the number of public services that citizens feel could possibly be made more efficient through amalgamation. Hence, citizens might feel less of a need for amalgamation.

This paper presents an empirical analysis of this question using data from inter-municipal cooperation in the provision of public services, as well as from municipal referenda on amalgamation in Japan. Although most previous studies have used data on whether neighboring municipalities became amalgamated, such data do not tell us how strongly each municipality sought this status. In particular, when a municipality did not end up becoming amalgamated with its neighboring municipality, we do not know whether the municipality declined by itself or if it tried amalgamation, but the neighboring municipality declined. Our data on referendum outcomes enable us to determine the percentage of citizens in each municipality who supported amalgamation. The number of joint works being carried out with neighboring municipalities also differs sufficiently among Japanese municipalities, which is advantageous for performing empirical analyses.

Our empirical findings indicate that the more intensively municipalities provide joint public services with neighbors, the more likely they are to vote against amalgamation: Citizens hope to maintain their independence if the joint provision of public services with neighboring municipalities is working well. Although local governments often regard inter-municipal cooperation as a first step towards municipal amalgamation, our empirical outcomes show that intensive inter-municipal cooperation tends to favor municipalities' independence.

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

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1. Introduction

Are organizations that have been working together likely to merge? While the experience of working together plays a role of “trial marriage,” which reduces the information asymmetry between organizations, it also diminishes the gain from a merger because such organizations have already been enjoying the benefits of working together. In the context of mergers and acquisitions between companies, a number of quantitative studies support the hypothesis that the experience of prior alliances leads to mergers.¹ However, there have been few quantitative studies regarding municipal amalgamation. This study fills that gap.

The economics literature on regional integration describes the decisions of regions as binary choices on whether to be united or remain independent, in which regions face a tradeoff between economies of scale and control over policies.² Baldersheim and Rose (2010) describe these classical positions as consolidationists versus public choice advocates. If regions are united, they enjoy economies of scale in the provision of public services; they can lower the per capita cost of garbage treatment, night soil treatment, firefighting, first aid, and so on. On the other hand, if they are united, they (or some of them) lose control over policies in their areas, and hence the level of provision of public services might not perfectly coincide with their preferences.

However, there is another way for municipalities to enjoy economies of scale: to remain independent of each other while providing (parts of) some public services jointly. Inter-municipal cooperation (IMC) has been attracting scholars’ attention in the field of public administration. Baldersheim and Rose (2010) point out that retaining small-scale municipalities may entail cooperating with neighboring ones, or establishing larger territorial units encompassing numerous municipalities. Recently, an increasing number of case studies have been published on IMC in European countries (e.g., Hulst and van Montfort 2007; Blaeschke 2015; Teles 2016; Teles and Swianiewicz 2018).

While most previous literature in public administration considers whether municipalities choose amalgamation or IMC in their reform of local governance, we focus on the consequences of IMC. When the joint provision of public services among several municipalities is conducted in a wider scope, are they more likely to result in amalgamation with each other? Or does IMC induce municipalities to remain independent of each other? Laamanen and Haveri (2003) asked 90 Finnish

¹ Vanhaverbeke et al. (2002), Vassolo et al. (2004), and Chang and Tsai (2013) show that target companies, which have been acquired by other companies, are more likely to be previous alliance partners. In addition, the experience of a prior alliance leads to the positive performance of subsequent mergers and acquisitions (abbreviated as M&A) (Porrini 2004; Higgins and Rodriguez 2006; Zaheer et al. 2010; Chang and Tsai 2013; He et al. 2018). Only a few studies have obtained opposite results. Hagedoorn and Sadowski (1999) conclude that the experience of a prior alliance hardly plays any direct role in M&A. Villalonga and McGahan (2005) indicate that the experience of a prior alliance is more likely to result in subsequent alliances than M&A.

² See Persson and Tabellini (2000, Ch. 6) for a typical model.

experts, such as elected officials, municipal managers, and others, about their opinions on the relationship between IMC and amalgamation. About half of them said that collaboration reduces the need for amalgamation, while 76% answered that increased cooperation would probably result in amalgamation. Even experts have not reached a consensus on this matter.

Preceding literature has also proposed opposing hypotheses. Kamo (2010) mentions that, behind the wide use of the term “network governance” in Europe, there seems to exist the idea that amalgamation is realized as an extension of municipal unions and cooperation (p. 22). While the scope of public services covered by IMC is partial, amalgamation enables municipalities to enjoy the benefits of a complete scope (Soguel 2006). In this regard, therefore, amalgamation is seen as superior to IMC so that municipalities pursue amalgamation after IMC. Franzke et al. (2016) tackle the same question as the current paper through a comparative analysis of Brandenburg, Slovakia, and Slovenia. Referring to past studies, they suppose that “IMC might potentially be the first institutional step towards amalgamation, though there is no automatic link” (p. 84). However, they deduce that the answer depends on the central government’s ability to promote amalgamation.³ Saarimaa and Tukiainen’s (2014) work is probably the only quantitative study that examines the relationship between IMC and municipal amalgamation. The results of their coalition-level binary logit regressions suggest that existing IMC in the provision of healthcare services increases the likelihood of amalgamation in Finland; they deal with the presence of IMC as a measure of the similarities of preferences between municipalities.

Some North American local governments also perceive IMC as a first step towards amalgamation. The Office of the New York State Comptroller provided local government officials with guidance for fiscal health. In its booklet, published in 2007,⁴ 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 Manitoba Local Government also recommended that municipalities consider partnerships, such as service sharing agreements, when choosing potential amalgamation partners.⁵ Many Japanese local governments hold a similar view.

³ Referring to four Canadian cases of inter-municipal agreements, Sancton et al. (2000) mention that “Regina-Moose Jaw is the only one in which no one could possibly argue that a municipal agreement should lead to amalgamation. In each of the other three cases, there are serious claims still being made that at least some of the existing inter-municipal agreements should be replaced by inter-municipal amalgamation” (p. 74). However, they deal with inter-municipal agreements and amalgamation differently from the current paper, and suggest the importance of “a local desire to create a common local political community” (p. 74) as a determinant of amalgamation.

⁴ *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 December 28, 2018).

⁵ *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 December 28, 2018).

All of Japan's 47 prefectures established a general plan to promote municipal amalgamation by the end of fiscal year (FY) 2000; most of them proposed, as the basis of discussion, possible combinations of municipalities to be amalgamated, where IMC was listed as one of their determinants.⁶

On the other hand, many previous studies in public administration have regarded IMC as an alternative to amalgamation when municipalities pursue economies of scale (e.g., Hulst et al. 2009; Koprič 2012; Teles 2014). 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 to provide high-grade, comprehensive administrative services. Askim et al. (2016) investigate 17 western European countries and qualitatively test the validity of their theoretical model about what caused municipal amalgamation reform. They do not include IMC in the determinants, but assert that IMC would have decreased the likelihood of amalgamation reform if included.

In the context of U.S. city-county consolidation, inter-local agreements and special districts are also viewed as alternatives to consolidation (Carr 2004; Thurmaier and Wood 2004; McCabe 2004). Local governments tend to prefer them, as they can be introduced more easily than consolidation without incurring radical changes in local governance structures. Whether such agreements and districts eventually lead to consolidation has not been examined systematically in the literature; regarding them as alternatives to consolidation should imply that local governments that have introduced them are less likely to consolidate.

What differentiates this paper from preceding research is that we harness a quantitative approach using data from 267 Japanese municipalities, including their referendum results. We provide new insight into the literature, in which quantitative approaches and Asian cases have been rarely employed. Our logit regressions for grouped data indicate that the joint provision of public services decreases the ratio of approval to disapproval of amalgamation in municipal referenda. This

⁶ In their official documents on promoting municipal amalgamation, 42 prefectures recognize IMC as an important factor representing the strength of the connections among neighboring municipalities. For example, the Yamaguchi Prefectural Government proposed combining municipalities to further their amalgamation according to the following four criteria: (1) geographical and historical background (e.g., commuting areas) and cooperation among municipalities (e.g., partial cooperatives and wide-area unions); (2) upgrades to core cities or special cities; (3) dissolving small municipalities as a countermeasure against depopulation and population aging; and (4) municipalities' concrete actions for amalgamation (Department of Regional Development, Yamaguchi Prefectural Government, "*Yamaguchi-ken Shichō Gappei Suishin Kōsō* (Municipal amalgamation promotion plan in Yamaguchi prefecture)," July, 2006, p. 19; available at <http://www.pref.yamaguchi.lg.jp/cmsdata/2/a/1/2a1498443f5ae22ed75b0e4d19bf1649.pdf>; accessed on December 28, 2018).

outcome suggests that if several municipalities offer public services jointly, their citizens do not strongly feel the need to amalgamate. Intensive IMC tends to discourage (rather than encourage) amalgamation.

Past quantitative studies of mergers among local governments have employed two approaches. The structural approach models each municipality as a decision maker that plays a matching or coalition-formation game, and estimates parameters so that the observed pattern of coalition formation is most likely to be realized from the structural model. Gordon and Knight (2009) limit the possible consolidation partners to two adjacent districts so that the matching game has a unique equilibrium. Weese (2015) allows for amalgamations among more than two municipalities, although multiple equilibria can exist.

In terms of the dependent variable, the reduced-form approach conducts logit or probit regressions based on whether a set of potential amalgamation partners is in fact amalgamated or not. Brasington (1999, 2003a, 2003b) uses the bivariate probit model developed by Poirier (1980), in which the dependent variable only takes a value of 1 if both adjacent districts choose to form a joint district. Saarimaa and Tukiainen (2014) use the coalition-level binary logit model to allow for amalgamations among more than two municipalities.

Both approaches attribute whether municipalities or districts have merged to economic and demographic variables. With such binary data, however, when we see a municipality that remains independent, we cannot distinguish whether the municipality chose by itself not to be amalgamated, or if it preferred amalgamation, but its potential partners rejected it. Such a lack of information is accompanied by difficulties in identifying potential amalgamation partners from the entire set of municipalities in each state, prefecture, or county, leading to severe computational burdens.

In our regressions, we use the number of citizens' votes for the approval and disapproval of a fixed combination of amalgamation partners in each municipal referendum. Such data are also used by Filer and Kenny (1980), who analyze city-county consolidation referenda in the United States,⁷ and Miyazaki (2014), who examined Japanese municipal amalgamation referenda.⁸ The vote distribution provides us with a continuous variable that expresses the degree to which citizens of each municipality preferred amalgamation during the period under study. Referenda also specify the potential amalgamation partners that should be included in our regressions.

Japan experienced a big wave of municipal amalgamation in the early 2000s, which decreased the number of municipalities from 3,229 at the beginning of FY 1999 to 1,821 at the end of FY 2005. During this period, 582 amalgamations were concluded and more than 400 referenda on

⁷ In the context of U.S. city-county consolidation, Carr and Sneed (2004) also use referendum results, but only in terms of whether a majority of voters supported the charter for creating a city-county government.

⁸ Miyazaki (2014) does not include IMC, but focuses on the effects of economies of scale, population size, the heterogeneity of preferences, and financial factors on referendum outcomes.

amalgamations were held. These abundant data enable us to determine whether existing IMCs influence voter reactions to municipal amalgamation.

The remainder of this paper is organized as follows. Section 2 outlines the details of municipal amalgamation, municipal referenda, and IMC in Japan. Sections 3 and 4 cover our empirical method and results respectively. Section 5 concludes the paper.

2. Local Governance in Japan

Since we use data from Japanese municipalities, here, we provide the details of municipal amalgamation, municipal referenda, and IMC in Japan as references.

Japan has a three-tier government system: the national government, 47 prefectures, and 1,718 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 its neighbors. That is, each Japanese citizen belongs to one municipality and one prefecture.

2.1 Municipal Amalgamation

Japan has experienced three waves of municipal amalgamation.⁹ First, when the modern municipal system was founded in 1889, 71,314 towns and villages were merged into 15,859 cities, towns, and villages (the Great Meiji Amalgamation). The second wave occurred from 1953 to 1961, when the national government needed to boost municipalities' administrative capability because the foundation and management of middle schools were delegated to municipalities. The number of municipalities shrunk from 9,868 to 3,472 during this period (the Great Shōwa Amalgamation). Finally, from 1999 to 2010, 3,229 municipalities were merged into 1,727 (the Great Heisei Amalgamation), which is the target of our paper.

The Great Heisei Amalgamation is divided into two periods. The first one, from FY 1999 to FY 2005, was under the previous Municipal Merger Promotion Law.¹⁰ The former law provided merged municipalities with special financial support aimed at offering a strong incentive for amalgamation. For example, merged municipalities were allowed to issue special local bonds to cover their startup costs. The past law also ensured that local allocation tax grants (LATGs) would not be reduced for 10 years after amalgamation.¹¹ Moreover, the requirements for cities to be

⁹ See Yokomichi (2007) for details on the Great Meiji Amalgamation to the first part of the Great Heisei Amalgamation.

¹⁰ The old law was implemented for municipal amalgamations that applied for approval from each prefectural governor by March 31, 2005 and realized by March 31, 2006.

¹¹ The LATG is an unconditional fiscal transfer with which the national government guarantees every local government's revenue. The amount for each municipality is calculated based on standard administrative cost, which is estimated with many indicators such as population, land area, and the lengths of roads.

upgraded to higher urban categories were relaxed during the first period, as explained in detail in Section 3.3.

The second period, from FY 2006 to FY 2009, was under the new Municipal Merger Promotion Law. Although the new law also gave special financial support like the previous one, it offered a weaker incentive for municipal amalgamation. For example, the special treatment for LATGs was shortened from 10 to 5 years. Issuing special local bonds was abolished. This was why many applications for the approval of amalgamation were made at the end of the first period. As a result, most municipal amalgamations during the Great Heisei Amalgamation were completed during the first period (a reduction from 3,229 to 1,821), while the remaining amalgamations were in the second period (a reduction from 1,821 to 1,727). This study uses data from the first period.

2.2 Municipal Referenda on Amalgamation

At least 424 municipal referenda were held on amalgamation from FY 2001 to FY 2006. Municipal referenda were held when mayors or municipal assemblies proposed them, or when citizens submitted their collected signatures to request that mayors hold them. We scrutinized three kinds of referenda. First, of the 424 referenda, 287 (68%) asked voters whether they approved or disapproved of the amalgamation in question. We used some of these data in our analysis. Second, 20 referenda (5%) asked voters which municipalities they preferred as their amalgamation partners. To implement these two types of referenda, each municipality needed to enact a bylaw. Forty-eight referenda (11%) asked both of these two agendas. Finally, 69 referenda (16%) asked voters whether they approved or disapproved of setting up a committee that would discuss whether and how to proceed with amalgamation. The Municipal Merger Promotion Law determined the rules and procedures of this form of referendum.

2.3 Inter-municipal Cooperation (IMC)

There are five kinds of IMC in Japan. As of July 2014, there were (1) 1,515 partial cooperatives (*Ichibu-Jimu-Kumiai*); (2) 115 wide-area unions (*Kōiki-Rengō*); (3) 210 conferences; (4) a joint establishment of 416 committees; and (5) 5,979 cases of entrustment of specific affairs to other local governments.¹² Partial cooperatives and wide-area unions are special local public entities jointly founded by two or more local governments to conduct specific common affairs in terms of managing social insurance and infrastructure for daily life, such as firefighting and waste treatment. By contrast, the other three types of IMC are often used in simple affairs and local governments do not

¹² Japan Center for Cities (2013), “Local Governments in Various Countries,” available at <http://www.toshi.or.jp/app-def/wp/wp-content/uploads/2013/09/hikaku11.pdf> (accessed December 28, 2018). The numbers have been updated by the authors.

need to create special organizations for them. In our empirical analysis, we focus on partial cooperatives and wide-area unions because residents seem to recognize them more easily.

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

Partial cooperatives deal with matters such as waste treatment (26.3%), night soil treatment (23.0%), firefighting (18.2%), emergency services (18.2%), and many others, including waterworks (6.6%), and hospitals (5.2%).¹³ No authorities are delegated from the nation or prefectures to partial cooperatives. In principle, municipalities are only allowed to deal with one affair jointly in each partial cooperative.¹⁴

Partial cooperatives are financed by the contributions of member municipalities (70%), public utility charges for the issue (4%), local bonds (5%), and others.¹⁵ LATGs are not directly distributed to partial cooperatives, but are distributed indirectly. For example, in the case of partial cooperatives for waste treatment, LATGs are basically distributed to each member municipality according to each population, and member municipalities contribute to their partial cooperatives in accordance with their agreement. If member municipalities are amalgamated, the new municipality receives LATGs for waste treatment. The national government determines the standard administrative per capita cost for waste treatment, but the predicted cost for such a new municipality would be lower than the sum of expenses for the separated municipalities, because the estimation takes economies of scale into account. This can be a disincentive for municipal amalgamation, and this is why the previous Municipal Merger Promotion Law stipulated that LATGs would not be reduced for 10 years after amalgamation.

The legislative organization of partial cooperatives consists of an administrator and a council. The mayors of the member municipalities usually choose the administrator among themselves. Representatives selected from each member municipality comprise the council. The composition of representatives varies among partial cooperatives. The number of representatives each member municipality sends off is not necessarily proportional to its population. In many cases, it is equal across member municipalities; hybrids of proportionality and equality are also observed.¹⁶

¹³ Source: Japanese Ministry of Internal Affairs and Communications, “*Chihō Kōkyō Dantai-kan no Jimu no Kyōdō Shori no Jōkyō Shirabe* (Survey on Jointly Handled Affairs Among Local Governments), as of July 1, 2014,” available at <http://www.soumu.go.jp/kouiki/kouiki.html> (accessed December 28, 2018).

¹⁴ Composite partial cooperatives arranged in 1974 can deal multiple common affairs. However, many partial cooperatives were founded before, as seen in Figure 1.

¹⁵ Figures in parentheses indicate the yearly means for the period from 2002 to 2012 (Source: Ministry of Internal Affairs and Communications, “*Heisei 24-nendo Chihō Zaisei Tōkei Nenpō* (Annual Statistics on Local Public Finance, 2012),” available at <https://www.soumu.go.jp/iken/zaisei/toukei24.html>; accessed December 28, 2018).

¹⁶ For example, Tokyo’s 23 wards collectively 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

These variations mean that population size does not necessarily determine the strength of each member municipality's voice in partial cooperatives. Hence, municipal amalgamation might weaken small municipalities' control over joint works, which can discourage small municipalities from merging.

On the other hand, as mentioned in Section 1, when Japanese prefectures proposed combinations of municipalities to be amalgamated in their general plan to promote municipal amalgamation, most of them perceived partial cooperatives as an important factor that embodied strong relationships among municipalities. In fact, the establishment of partial cooperatives has been a traditional approach of IMC in Japan since the Local Autonomy Law was passed in 1947. As seen in Figure 1, many were founded in the 1970s or earlier. Thus, partial cooperatives can also drive member municipalities to amalgamate with one another.

[Figure 1 here]

The fact that most partial cooperatives were established long before referenda enables our empirical analysis to avoid the problem of endogeneity between IMC and amalgamation. It is quite unlikely that the citizens at that time made the decision of IMC, considering the possibility of municipal amalgamation in the far future. Moreover, citizens would have changed over the years. This also applies to wide-area unions, although their history is shorter than that of partial cooperatives, as explained below.

(2) Wide-area unions (*Kōiki-Rengō*)

Founding wide-area unions is a newer method of IMC started in July 1995 when the “core city” was established as an urban category. As outlined in Figure 1, many wide-area unions were created from 1998 to 2000. They aimed to meet the growing need for administration in wider regions and promoting devolution from the central government or prefectures to municipalities. In reality, many of them were established to manage medical systems for elderly people over 75 years old and to deal with nursing care insurance.

Wide-area unions have the following four major differences from partial cooperatives.¹⁷ First, each wide-area union can preside over multiple issues. Each municipality does not necessarily work on all of the affairs dealt with by the wide-area union. Wide-area unions can also be assigned to deal with topics that their prefectures are supposed to address.

for waste treatment among the cities of Osaka, Yao, and Matsubara distributes the council seats to the member cities according to the combination of proportional and equal distributions.

¹⁷ Source: Japanese Ministry of Internal Affairs and Communications, “*Kōiki Rengō* (Wide-area Unions),” available at <http://www.soumu.go.jp/kouiki/kouiki1.html> (accessed December 28, 2018).

Second, wide-area unions have stronger initiatives regarding local problems than partial cooperatives. They can recommend that their member municipalities manage relevant matters, and request that their member municipalities change the rules of unions to handle affairs efficiently.

Third, wide-area unions can be delegated some authority from the central government or prefectures, even if individual municipalities are not allowed to be assigned due to their small scales. In contrast, partial cooperatives cannot manage issues that no member municipalities have the right to control. This means that wide-area unions enable small municipalities to gain some authority without being merged and upgraded to a higher urban category. Therefore, the presence of wide-area unions can strongly dissuade amalgamation compared to the presence of partial cooperatives.

Finally, the residents of member municipalities (i.e., direct elections) or the council members of each municipal assembly (i.e., indirect elections) vote for the council members of wide-area unions, while the mayor of each municipality can appoint the representatives of partial cooperatives. In this sense, the system of wide-area unions is more democratic than that of partial cooperatives. Most executive council members are mayors of member municipalities, which implies that member municipalities are more or less equally dealt with in unions. This can deter small municipalities from merging, as in the case of partial cooperatives.

3. Empirical Model

3.1 Hypotheses

In this subsection, we set up the hypotheses tested in our empirical analysis. We explain how to measure each term statistically in the following subsections.

As discussed in Section 2.3, partial cooperatives and wide-area unions offer both incentives and disincentives for municipal amalgamation. Hence, their actual effects need to be examined empirically. We operationalize our research questions, as follows:

Hypothesis 1-1. The more intensively municipalities provide public services jointly with candidate ones to be amalgamated, the more citizens will cast their ballots for amalgamation in referenda.

Hypothesis 1-2. The more intensively municipalities provide public services jointly with candidate ones to be amalgamated, the more citizens will cast their ballots against amalgamation in referenda.

As stated in the explanations on partial cooperatives and wide-area unions, if merged, small municipalities would become merely small regions of a larger, newer municipality, and hence might lose part of their control over matters addressed in partial cooperatives and wide-area unions. They would also lose control over the other issues they were handling independently before they merged. Thus, we test the following hypothesis:

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

In previous literature, we can hardly find papers testing these hypotheses quantitatively.

3.2 Dependent Variable

We estimate the association of IMC with the outcomes of referenda using weighted least-squares logistic regressions in which the numbers of “yes” and “no” votes are grouped by municipality. Our dependent variable is the logarithm of the ratio of “yes” to “no” votes (i.e., the log-odds of a “yes” vote). Filer and Kenny (1980) use U.S. referendum data grouped by municipality. As in the current paper, their dependent variable is also the logarithm of the ratio of “yes” to “no” votes, although they do not explicitly mention the detailed regression method employed in their analysis.

Miyazaki (2014) uses data from almost the same referenda as ours, but he employs ordinary least squares (OLS) for his grouped data, with the share of “yes” votes in valid votes as the dependent variable. However, if the turnout rate differs between potential “yes” and “no” voters, then the sampling rate of “yes” votes (i.e., the ratio of *actual* “yes” votes to *potential* “yes” voters) differs from that of “no” votes. We can avoid this problem if we use odds, as we do in our paper, instead of the share.

We harness data from 267 Japanese municipal referenda on the approval or disapproval of amalgamation from July 29, 2001 to March 31, 2005. The dataset contains the date of each referendum, lists of municipalities to be amalgamated, and the numbers of yes/no votes.¹⁸

3.3 Independent Variables

Independent variables, which express the characteristics of each municipality in our model, consist of the variables representing the degree of IMC, 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., the proportion of the population aged 65 and over, and dummy variables for the upgrade to each urban category). We mainly focus on the variables embodying the degree of IMC (i.e., Hypotheses 1-1 and 1-2), which differentiates our analysis from that of Filer and Kenny (1980) and Miyazaki (2014). The gain/loss of control is also tied to the structure of the IMC (i.e., Hypothesis 2) and hence is given attention.

For many other variables that indicate the incentives and disincentives for amalgamation,

¹⁸ 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 during the above period.

we calculate the difference in each index between prospective municipalities created through amalgamation and currently existing ones. We use fiscal data from the local public finance survey (*Chihō Zaisei Jōkyō Chōsa*), income data from the Municipal Taxation Survey (*Shichōson Kazei Jōkyō Tō no Shirabe*), and demographic data from the Basic Resident Register Population Survey (*Jūmin Kihon Daichō Jinkō Chōsa*). These are the complete surveys of all municipalities in Japan. Next, we explain how to construct each independent variable. For each variable, we use the latest information available before the date of each referendum.

Variables representing the degree of inter-municipal cooperation (IMC)

Each municipality can join any number of partial cooperatives and wide-area unions to conduct public works jointly with neighboring municipalities. Suppose that two municipalities are amalgamated with each other to form a larger, new municipality. If the two municipalities join a large number of partial cooperatives and wide-area unions together, we deem the IMC between them to be intensive (we call this aspect *number*). However, if the partial cooperative or wide-area union that the two municipalities are joining consists of many municipalities, it becomes difficult to view the IMC between the two municipalities as intensive (we call this aspect *density*). Therefore, we consider both number and density when we construct the variables representing the degree of IMC.¹⁹

[Figure 2 here]

Figure 2 provides an illustrative example of IMC between city A and town B. 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 gauge the degree of IMC between these two municipalities as follows. First, these two municipalities jointly provide emergency services in a partial cooperative, which only consists of 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 is made up of three municipalities.²⁰ 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 IMC between city A and town B. This index is a weighted sum of the number of organizations for IMC. If these two municipalities join 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 take into account the cases in

¹⁹ We refer to the nationwide list of wide-area unions from the website of the Ministry of Internal Affairs and Communications: <http://www.soumu.go.jp/kouiki/kouiki1.html#kouiki5> (accessed December 28, 2018). It includes information on each union's member municipalities. On the other hand, the nationwide list of partial cooperatives does not include details on member municipalities. Hence, we collected information from all prefectures by ourselves. If part of the information was lacking for some partial cooperatives, we checked the statute of the partial cooperatives or asked about them by phone.

²⁰ We do not count prefectures as members of partial cooperatives or wide-area unions. We also do not count partial cooperatives or wide-area unions that consist of all the municipalities of their prefectures. Since there are very few cases like this, they do not change our empirical outcomes.

which we construct this index for partial cooperatives and wide-area unions separately from one another. When we test the robustness of our empirical results, we also consider four different ways of constructing this variable, signaling the degree of IMC.

Gain/Loss of control

As explained in Section 2.3, each municipality's bargaining power in IMC is not necessarily proportional to its population, but is more or less equal to those of other member municipalities. Once municipalities are amalgamated with each other, they simply become regions of the newly created municipality. Each region's bargaining power is perceived as proportional to its population if residents determine policies by voting. In this sense, amalgamations can either strengthen or weaken each municipality's control over its public services according to its population relative to other municipalities.

To capture such a change in each municipality's control over affairs—which we call *gain/loss of control*—we subtract the inverse of the number of candidate municipalities to be amalgamated from the population share of the municipality (called a “region” after amalgamation) in the newly created municipality.²¹ In the case of a municipality that does not conduct IMC with any neighboring municipality, we replace the inverse of the number of candidate municipalities with one in the definition of gain/loss of control. This is because such a municipality is perceived as the only member involved in every matter, so that it can determine everything by itself. Such a definition implies that municipalities solely providing public services must lose control over local issues through amalgamation, regardless of their populations.

Fiscal strength index

The fiscal strength index is the ratio of the standard revenue to the standard expenditure of each local government. This index is often used to determine each municipality's fiscal circumstances. For example, the Japanese national government does not provide LATGs to municipalities whose fiscal strength indices exceed one.²² As an independent variable, we used the difference in this index before and after amalgamation. The more this index improves, the larger the incentive to amalgamate municipalities. In fact, as affirmed by Weese (2015), the Japanese literature finds that poorer municipalities are more likely to amalgamate, for which this fiscal strength index is normally used.

²¹ For example, suppose that municipalities A and B plan to merge, and that their populations are 10,000 and 20,000, respectively. 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 seen as losing its control over affairs by 1/6 through amalgamation.

²² The smaller the fiscal strength index, the greater the amount of LATGs the national government provides to the municipality. However, the grants do not fully cover the shortage of revenue for each municipality.

Debt burden ratio

The debt burden ratio is each municipality's ratio of debt payment to general revenue. As another independent variable that 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.²³

Income

In econometric models of previous literature, income is considered an important tax base for individual municipalities (e.g., Filer and Kenny 1980; Miyazaki 2014; Saarimaa and Tukiainen 2014). The larger the per capita income, the greater the amount of public services each municipality can provide, which increases citizens' utility. Hence, as an economic incentive for amalgamation, we introduce in our regressions the difference in per capita taxable income before and after amalgamation (i.e., the net increase in per capita taxable income caused by amalgamation).²⁴

However, even if this net increase takes the same value for several municipalities, its importance should be different if their per capita taxable incomes are different; it should be more significant for poorer municipalities than richer ones. We take account of this difference in importance between municipalities by introducing per capita taxable income for each municipality before amalgamation, as well as its net increase realized through amalgamation. Per capita taxable income itself is also a critical socio-economic characteristic for each municipality. Whether directly or indirectly, it can be related to how strongly the municipal population as a whole seeks amalgamation.²⁵

²³ Miyazaki (2014) uses the difference in accumulated municipal bond per capita, but does not obtain statistical significance for its effect. One possible reason is that how heavy the burden of debt repayment is depends on the amount of revenue that each municipality earns.

²⁴ However, income is not enough to capture the fiscal conditions of Japanese municipalities. This is why we also introduce the fiscal strength index as an independent variable. The major sources of revenue for Japanese local governments consist of local taxes (37%), LATGs (18%), national treasury disbursements (conditional grants) (14%), and local bonds (12%), where figures in parentheses indicate the mean during the period from 2002 to 2012 (Ministry of Internal Affairs and Communications, *White Paper on Local Public Finance, 2014*). Income-based taxes on inhabitants are included in local taxes; fixed property taxes and corporate inhabitant taxes are also included.

²⁵ To capture the difference in preferences between potential amalgamation partners, some studies such as Brasington (2003a, 2003b) and Miyazaki (2014) use median income (rather than average income) since the median voter theorem suggests that policies are determined in accordance with the median voter's preference. For Japanese municipalities, however, median incomes are not available in data, but need to be estimated, as Miyazaki (2014) does. We do not employ such an estimation strategy to avoid the possibility of model misspecification, but instead use available data on per capita incomes. Nonetheless, using a simple utility-maximization model of the median voter, in which the production of collectively distributed goods is financed by proportional income tax, Filer and Kenny (1980) show that if per capita income increases after an amalgamation, it is highly likely that the median voter before the amalgamation

Population

While the smaller share of the population after amalgamation in a newly created municipality discourages amalgamation in terms of *gain/loss of control*, a small population provides the following two types of incentives for amalgamation. First, the smaller the population, the more greatly the economies of scale that operate in the provision of public services would grow after the amalgamation. Brasington (1999) studies the consolidation of school districts and notes a significantly negative effect of the number of students on whether the districts merge. Second, the smaller the population, the more difficult it is for municipalities to manage their provision of public services by themselves. Miyazaki (2014) discusses the possibility that his observation of the high frequency of amalgamation for municipalities with small populations relates to the Japanese government's promotion of amalgamation for small municipalities, and also to the anticipated financial difficulties they would face due to the decreasing birthrate and aging population.

Proportion of people over 65 years old

Since many elderly citizens retire and live on national pensions, municipalities with a larger share of elderly people tend to have a smaller tax base, although they require higher medical costs. This imbalance is expected to continue to rise due to Japan's declining birthrate and aging population. To manage this problem, citizens of municipalities with a large proportion of elderly people should have a strong incentive to support amalgamation. On the other hand, elderly people tend to be more conservative and try to avoid change, which implies that they might vote against amalgamation. We test for the net effect of these opposite aspects related to elderly people by including each municipality's proportion of residents over 65 years old in our empirical model.

Upgrades to higher urban categories

There are six urban categories in Japan; from smallest to largest they are: village, town, city, special city, core city, and designated city. The higher the category, the greater the authority delegated from the prefectures, except for an upgrade from village to town.²⁶ Therefore, Japanese municipalities are able to expand their authority through amalgamation if they succeed in achieving the population requirements necessary for higher categories. For instance, core and designated cities are allowed to establish health centers, while others are not. To capture this incentive, we introduce dummy

would be better off; if it decreases, he or she would be unambiguously worse off. Hence, our regressions, using per capita income, partially capture the predictions obtained from the median voter theorem.

²⁶ See the Council of Local Authorities for International Relations (2010) for details on the delegation of powers from prefectures to cities.

variables for upgrades to city and higher categories. For example, if the requirements for the upgrade to a city are satisfied after amalgamation, the dummy variable for the upgrade to a city takes a value of 1 for such villages and towns, while other upgrade dummy variables take 0. If an amalgamation increases the category of member municipalities from town to special city, we set both the upgrade dummy variables for city and special city as 1, because the newly created municipality acquires both authorities given to a city and a special city.²⁷

3.4 Descriptive Statistics

Table 1 provides the descriptive statistics of the main variables that we used. The sample mean of the ratio of “yes” 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 voted “yes” for amalgamation in 149 referenda and “no” in 118 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 particularly large.

[Table 1 here]

The sample mean of each dummy variable for the upgrade to the higher urban category corresponds to the share of upgradable municipalities through amalgamation. The possible acquisition of “city” authority (due to amalgamation) accompanies about 70% of referenda. The higher the city status acquired through amalgamation, the smaller the number of referenda involved. Nonetheless, the possible acquisition of “special city” and “core city” authority accompanies 25.5% and 15.0% of referenda, respectively.

The degrees of IMC through partial cooperatives and wide-area unions are 1.148 and 0.094, respectively. On average, 3.77 municipalities are listed as potential amalgamation partners in referenda. The mean of the gain/loss of control is negative, which means that average municipalities occupy a smaller share of the population in their newly created municipalities than 1 divided by the number of member municipalities. The fiscal strength index and per capita income increase through amalgamation, while the debt burden ratio declines for average municipalities. These statistics imply that amalgamation tends to improve municipalities’ fiscal health in exchange for control over the provision of public services.

²⁷ The requirements for the upgrade to each urban category during the period under study are as follows. A town or village can be upgraded to a city if its population exceeds 30,000 due to amalgamation. When a town or village does not amalgamate, the requirement for the population for the upgrade to a city is set at 50,000. Likewise, the population requirements for special, core, and designated cities are 200,000, 300,000, and 700,000, respectively. In addition, a core city’s land area must be 100 km² or greater. This additional requirement regarding land area was modified from April 2002 to June 2006; municipalities with populations of 500,000 or larger were exempt from it. As of April 2001, there were 30 special cities, 28 core cities, and 12 designated cities. In April 2005, after the first part of the Great Heisei Amalgamation, there were 40 special cities, 35 core cities, and 14 designated cities.

4. Empirical Results

4.1 Main Results

Table 2 shows the outcomes 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 variables are included. The coefficients of the variables representing IMC are negative in every model, and statistically significant except for wide-area unions in model (6), which supports Hypothesis 1-2. That is, intensive IMC increases “no” votes in comparison to “yes” votes in referenda on amalgamation.

[Table 2 here]

Models (1) to (3) count the two types of IMC together. They show that if a municipality joins an additional IMC organization comprised of all of the municipalities listed on the plan of amalgamation, the ratio of the number of “yes” votes to the number of “no” votes increases by 12.2% to 17.1%.²⁸

Models (4) to (6) indicate that the magnitude of the effect of the two types of IMC is quite different if they are dealt with separately. Joining one additional partial cooperative that consists of all the municipalities to be amalgamated shrinks the ratio of “yes” votes to “no” votes in a referendum by 9.2% if only IMC variables are included as explanatory variables (i.e., model (4)), and by 14.0% if the variable for another hypothesis regarding the gain/loss of control is also added (i.e., model (5)). If fiscal and demographic conditions, as well as whether a municipality will be upgraded to one of the higher urban categories, are also taken into account (i.e., model (6)), this effect produces a 13.8% decrease. On the other hand, the impact of joining one additional wide-area union is much greater than that of partial cooperatives, although it is insignificant in model (6). The counterparts of wide-area unions are 50.3%, 56.5%, and 34.2%, respectively.²⁹

The greater impact of wide-area unions comes from the greater importance of one unit of a wide-area union than one unit of a partial cooperative in terms of the following two aspects. First, as described in Section 2.3, the total number of wide-area unions is much smaller than that of partial cooperatives. At the same time, as the label “wide-area” implies, wide-area unions tend to comprise a greater number of municipalities than partial cooperatives. As a result, the mean of the IMC variable for wide-area unions is much smaller than that of partial cooperatives (Table 1). Second,

²⁸ Approximately, a 0.04 increase in the logarithm of the yes-no ratio (i.e., $\ln(\#yes/\#no)$) corresponds to a 1% rise in the share of “yes” votes in the valid votes (i.e., $\#yes/(\#yes+\#no)$) when the share lies between 35% and 65%, whereby $\#yes$ ($\#no$) represents the number of votes for “yes (no).” This correspondence suggests that an increase in the IMC variable by 1 increases the share of “yes” votes in the valid votes by 3.05% to 4.28%.

²⁹ Applying the same calculation as footnote 28 to models (4) to (6) shows that an increase in IMC by 1 approximately reduces the share of “yes” votes in the valid votes by 2.3% to 3.5% with respect to partial cooperatives, and 8.55% to 14.13% with regard to wide-area unions.

only wide-area unions can be assigned some public works that the central government or prefectures are supposed to do. That is, joining a wide-area union enables municipalities to do what they cannot do in partial cooperatives.

The effect of gain/loss of control is significantly positive in every model, which supports Hypothesis 2. The coefficient is approximately 1.0 in models (3) and (6). This means, for example, that if municipality A plans to be amalgamated with municipality B (whose population is twice as large as that of municipality A), then the ratio of “yes” to “no” votes in municipality A’s referendum declines by 16.7%.³⁰

The coefficients of most control variables take the expected signs. First, when the new municipality is expected to be better off, voters are more likely to cast “yes” votes for amalgamation. Concretely, if the financial strength index improves by 0.1 after amalgamation, the ratio of “yes” to “no” votes in referenda rises by more than 12%. Second, when the new municipality is expected to be liable for the heavier debt, voters are more likely to vote against amalgamation, although this effect is statistically insignificant.³¹ Third, when per capita income is expected to rise to a greater extent after amalgamation, voters are more likely to cast “yes” votes for amalgamation, which is in line with previous literature.

The estimated coefficients of the dummy variables for the upgrade to higher urban categories are significantly positive for core and designated cities. On the other hand, the coefficients of city and special city are negative and statistically insignificant. These results imply that the authority accompanied by an upgrade to a core city or higher is sufficiently attractive for voters, while the upgrade to a lower category is not.³²

4.2 The Relationship Between IMC and the Upgrade to Higher Urban Categories

Some powers can be devolved to municipalities, not only through upgrades to higher urban categories, but also by creating wide-area unions. In terms of authority, this subsection examines the relationship between IMC and upgrades to higher urban categories.

[Table 3 here]

Table 3 summarizes the estimation outcomes of the regression models, which enable us to

³⁰ In this example, the gain/loss of control for municipality A is calculated as $\frac{1}{3} - \frac{1}{2} = -\frac{1}{6}$, which is close to the sample mean of -0.161. Applying the same calculation as footnote 28 to models (3) and (6) indicates that the share of “yes” votes in the valid votes declines by 4% when the gain/loss of control is equal to the mean, -0.161.

³¹ Applying the same calculation as footnote 28 to models (3) and (6) shows that a 0.1 increase in the financial strength index increases the share of “yes” votes in the valid votes by about 3%, while a 0.1 increase in the debt burden ratio diminishes it by 3.8%.

³² In the course of the second decentralization reform since 2006, the population requirement for the category of core city was relaxed to 200,000, while the category of special city was abolished in April 2015.

look at the relationship between IMC and city-category upgrades in more detail than the regression models in Table 2. Models (1) and (2) introduce the interaction terms of IMC and upgrades under the assumption that the effects of other variables are common to all 267 municipalities. On the other hand, the other six models divide the data into three groups according to whether they are upgraded to the category of city (140 municipalities in models (5) and (6)), special city or a higher category (68 municipalities in models (7) and (8)), or not (59 municipalities in models (3) and (4)). Such data division allows the estimated effect of each variable to differ according to whether or not—and to what status—municipalities are upgraded.³³

In every model, the IMC (measured as a sum of partial cooperatives and wide-area unions) continues to have a significantly negative effect on the referendum outcomes (i.e., models (1), (3), (5), and (7)). However, if partial cooperatives and wide-area unions are counted separately, the effects of the two kinds of inter-municipal organizations differ from each other. For municipalities that would not be upgraded or would be upgraded to cities, the effect of partial cooperatives is still significantly negative, while the impact of wide-area unions is insignificant (i.e., models (4) and (6)). We obtain the same relationship, even if we use all of the data and add the interaction terms (i.e., model (2)). In contrast, for municipalities that would be upgraded to special cities or higher categories, wide-area unions have a significantly negative influence, while the effect of partial cooperatives is insignificant (i.e., model (8)).³⁴

In terms of authority, we interpret the above findings on the effects of the IMC variables as follows. For municipalities that would not be upgraded, amalgamation does not give them any authority; hence, they would stay in their wide-area unions even after amalgamation to maintain the control obtained by participating in wide-area unions. Therefore, whether to have been joining wide-area unions is less likely to affect amalgamation decisions. By contrast, municipalities would inevitably dissolve partial cooperatives whose members are amalgamation partners; thus, partial cooperatives matter. Such effects are expected to remain if municipalities are upgraded but their categories are still low (i.e., cities). If municipalities are upgraded to sufficiently high categories (i.e., special cities or higher), which is accompanied by sufficiently strong power, then amalgamation and wide-area unions are seen as alternatives so that the significantly negative coefficient of IMC

³³ The sample size becomes too small to estimate if we further divide the data into groups of municipalities to be upgraded to core and designated cities.

³⁴ We ascertain the consistency between models (2) and (8) as follows. For partial cooperatives in model (2), the effect of the interaction term with the special-city dummy is significantly positive, while the one with the designated-city dummy is significantly negative. These effects are combined in model (8) so that the effect of partial cooperatives is insignificant. However, for wide-area unions in model (2), all of the interaction terms with an upgrade to each category have negative effects, although only the one with the special-city dummy is statistically significant. As a result, the impact of wide-area unions is significantly negative in model (8).

(wide-area union) is obtained in model (8).³⁵

4.3 Alternative Definitions of the Degree of Inter-municipal Cooperation (IMC)

To check the robustness of our main results, we conduct additional regressions with four different ways of constructing the variable representing the degree of IMC, as shown in Table 4. These four methods are created as combinations of the following two aspects. In any case, we require all of the amalgamating municipalities (instead of some of them) to join the same organizations for IMC.

[Table 4 here]

The first aspect is which type of organization we view as one activity for IMC among the amalgamation partners: (A) organizations whose members are exactly the same as the amalgamation partners, or (B) organizations that include amalgamation partners, notwithstanding the number of other municipalities. Since zero other municipalities are allowed under definition (B), organizations that satisfy definition (A) are included in the organizations that satisfy definition (B). Note that definition (B) corresponds to the definition used in our primary analysis in Table 2.

The second aspect is how to count the number of organizations. One way (labeled (1)) is to set 1 if there is at least one organization that satisfies definition (A) or (B), and 0 if otherwise. This binary variable only considers the presence of such organizations while ignoring the number of organizations. Another way (labeled (2)) is to count the number of organizations that satisfy definition (A) or (B). If method (2) is paired with definition (B) (i.e., model B2 in Table 4), every organization that satisfies definition (B) counts as one, despite the number of other municipalities. Hence, the index for IMC in model B2 must take a larger value than the index used in our chief analysis.

[Table 5 here]

Table 5 summarizes the estimation outcomes of the eight models in Table 4. All models obtain a negative sign for the coefficient of IMC, measured by counting partial cooperatives and wide-area unions jointly, although their significance levels are 10% or worse. Models A1-b and A2-b tell us that if we count only organizations whose members are exactly the same as amalgamation partners (i.e., definition (A)), then the effect of wide-area unions is insignificant. This is due to the composition of wide-area unions. Since they usually consist of a large number of municipalities, it is difficult to find wide-area unions that satisfy definition (A). Hence, regardless of how to count the number of organizations, the IMC index made by definition (A) takes 0 for most municipalities if applied to wide-area unions. Such a lack of variation makes it difficult to identify the effect of wide-area unions. On the other hand, the negative influence of partial cooperatives is robust to such a change in definition.

³⁵ Note that its large absolute value (i.e., -2.256) may be partially due to the possibility of overestimation caused by the small sample size.

In contrast, if we allow other municipalities to constitute some members of organizations as well as amalgamation partners (i.e., definition (B)), then the effect of partial cooperatives becomes insignificant. This is also due to the lack of variation in the value of the index. Since most municipalities join at least one partial cooperative, there are few cases where amalgamation partners are not working together in any partial cooperative. Hence, if the IMC index only reflects the presence of partial cooperatives (i.e., definition (1)), it takes 1 for most municipalities. If we count the number of partial cooperatives (i.e., definition (2)), the variation can be captured more, but insufficiently, because it cannot identify the different compositions of municipalities in diverse partial cooperatives. Yet the negative effect of wide-area unions is robust to such a change in definition.

The above analyses imply that the four alternative definitions of the degree of IMC are either too narrow or too loose to pinpoint the effect of IMC. Nonetheless, we obtain the significantly negative outcomes of either partial cooperatives or wide-area unions when the definitions do not cause a lack of variation in those data. In this sense, the negative effect of IMC on referendum outcomes is robust against the change in the definition of the degree of IMC. We believe that our definition in Table 2 is more appropriate for capturing the difference in the degree of IMC among municipalities.

5. Conclusion

In this paper, we explore whether IMC leads to municipal amalgamation. IMC can both encourage and discourage municipal amalgamation. While performing joint work deepens mutual understanding between municipalities, it may also cause citizens to feel less of a need for municipal amalgamation. To conduct weighted least-squares logistic regressions, we operationalize this question as to whether citizens are more likely to vote in favor of amalgamation in municipal referenda when their municipalities are carrying out joint public works more intensively with potential amalgamation partners. The data from Japanese IMC and municipal referenda on amalgamation are suitable for our purpose. Our empirical results demonstrate that the more intensive joint works that are conducted between potential amalgamation partners, the less likely citizens will be to vote for amalgamation in their municipal referenda. Although local governments often perceive IMC as a first step towards municipal amalgamation, our empirical findings suggest that intensive IMC actually boosts municipalities' independence.

Our finding on the effect of IMC on municipal amalgamation is in contrast to the outcomes of Saarimaa and Tukiainen (2014). They include existing cooperation between municipalities (i.e., the joint provision of healthcare services in Finland) as a control variable in their coalition-level logit regressions on municipal mergers. They obtain a positive effect of the presence of IMC on the likelihood of mergers. These contrasting results can be explained as follows. In their

empirical model, actual mergers are compared to all potential coalitions of municipalities that could have merged. On the other hand, our data are restricted to municipalities listed as amalgamation partners in referenda. Combining these findings leads to the following hypothesis: IMC partners are more likely to be chosen as amalgamation partners than other municipalities. However, given the presence of IMC, the more intensive IMC is, the less likely that municipal amalgamation will occur. Future research should test this hypothesis within an analytical framework.

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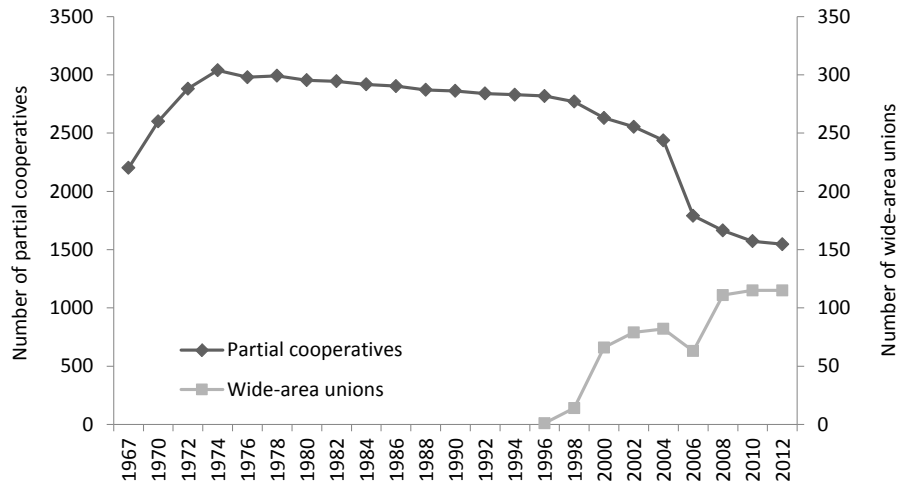


Figure 1. Number of Partial Cooperatives and Wide-area Unions

Note: The numbers are as of July 1 in each year. The large decrease from 2004 to 2006 was due to the Great Heisei Amalgamation. The large rise in the number of wide-area unions from 2006 to 2008 is due to the reform of the medical care system for elderly people.

Source: Japanese Ministry of Internal Affairs and Communications, “*Chihō Kōkyō Dantai no Jimu no Kyōdō Shori no Jōkyō Shirabe* (Survey on Jointly Handled Affairs Among Local Governments), as of July 1, 2012,” available at https://www.soumu.go.jp/menu_news/s-news/01gyosei03_02000014.html (accessed December 28, 2018).

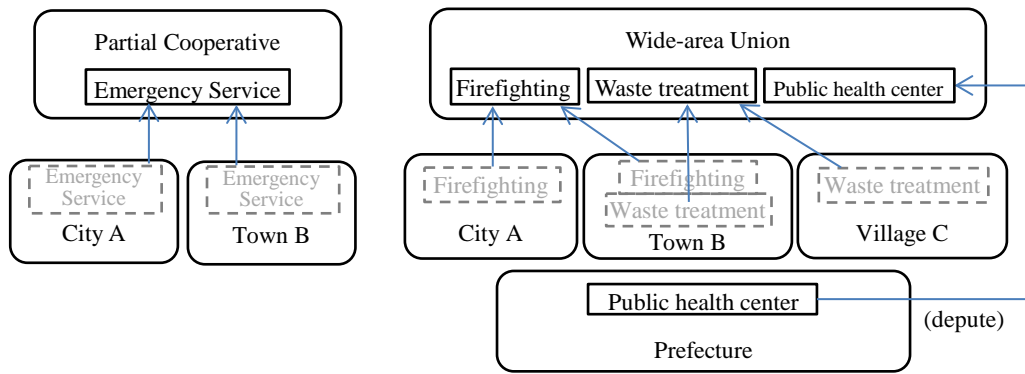


Figure 2. An Illustrative Example of Inter-municipal Cooperation

Table 1. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
The ratio of "Yes" votes to "No" votes (The share of "Yes" votes in valid votes)	1.394 (0.521)	1.061 (0.159)	0.104 (0.094)	6.442 (0.866)
<i>Inter-municipal cooperation (IMC)</i>				
Partial cooperatives + Wide-area unions	1.242	0.999	0.000	4.744
Partial cooperatives	1.148	0.952	0.000	4.667
Wide-area unions	0.094	0.227	0.000	1.000
Gain/Loss of control	-0.161	0.272	-0.992	0.383
Financial strength index (diff.)	0.093	0.185	-1.212	0.725
Debt burden ratio (diff.)	-0.004	0.053	-0.260	0.124
Income per capita (1 million yen)	1.062	0.272	0.448	1.882
Income per capita (diff.)	0.078	0.135	-0.219	0.581
Population (100,000 people)	0.205	0.285	0.007	2.150
Proportion of population age 65+	0.251	0.068	0.115	0.485
<i>Upgrade and possible acquisition of authority by amalgamation (dummy)</i>				
"City" authority	0.708	0.456	0.000	1.000
"Special city" authority	0.255	0.437	0.000	1.000
"Core city" authority	0.150	0.358	0.000	1.000
"Designated city" authority	0.034	0.181	0.000	1.000

Notes : Gain/loss of control, financial strength index (diff.), debt burden ratio (diff.), and income per capita (diff.) are calculated as the expected value after amalgamation minus the value in case of remaining independent.

Table 2. Estimates of the Effect of IMC on Referendum Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Inter-municipal cooperation (IMC)</i>						
IMC (total)	-0.122*** (0.043)	-0.171*** (0.046)	-0.150*** (0.046)			
IMC (Partial cooperatives)				-0.092* (0.047)	-0.140*** (0.049)	-0.138*** (0.048)
IMC (Wide-area unions)				-0.503** (0.224)	-0.565** (0.222)	-0.342 (0.212)
<i>Gain/Loss of control</i>		0.405*** (0.141)	1.000*** (0.203)		0.409*** (0.140)	0.997*** (0.204)
<i>Control variables</i>						
Financial strength index (diff.)			1.251*** (0.386)			1.224*** (0.387)
Debt burden ratio (diff.)			-1.535 (1.094)			-1.530 (1.095)
Income per capita (1 million yen)			0.342 (0.278)			0.295 (0.284)
Income per capita (diff.)			1.185** (0.530)			1.147** (0.533)
Population (100,000 people)			-0.305*** (0.115)			-0.292** (0.116)
Proportion of population age 65+			0.536 (1.289)			0.559 (1.291)
<i>Acquisition of authority by amalgamation (dummy)</i>						
"City" authority			-0.043 (0.105)			-0.035 (0.106)
"Special city" authority			-0.200 (0.126)			-0.186 (0.127)
"Core city" authority			0.305** (0.144)			0.294** (0.145)
"Designated city" authority			0.331* (0.197)			0.334* (0.197)
Constant	0.109* (0.065)	0.214*** (0.074)	-0.218 (0.592)	0.104 (0.064)	0.210*** (0.073)	-0.175 (0.595)
Obs.	267	267	267	267	267	267
Adj. R2	0.025	0.051	0.227	0.033	0.059	0.228

Notes: The table reports the marginal effects for the models of weighted least-squares logistic regressions for grouped data from July 2001 to March 2005. The dependent variable is the logarithm of the ratio of "yes" votes to "no" votes for amalgamation. Columns (4) to (6) show the estimates in case of dividing the IMC variable used in columns (1) to (3) into two types of IMC. Standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1, 5, and 10% levels, respectively.

Table 3. Estimates for the Relationship Between IMC and Upgrade of Urban Category

	Models estimated for each category of municipalities							
	Models including interaction terms		Not upgrade		Upgrade to city		Upgrade to special city or higher	
	IMC (total)	IMC (Partial cooperatives, Wide-area Unions)	(3)	(4)	(5)	(6)	(7)	(8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Inter-municipal cooperation (IMC)</i>								
IMC (total)	-0.202** (0.079)		-0.267*** (0.089)	-0.313*** (0.092)	-0.129** (0.060)	-0.130** (0.060)	-0.297*** (0.104)	-0.020 (0.122)
IMC (Partial cooperatives)		-0.191** (0.082)						-2.256*** (0.579)
IMC (Wide-area unions)		0.248 (0.351)						0.713*** (0.232)
<i>Gain/Loss of control</i>	1.063*** (0.208)	0.939*** (0.200)	1.258* (0.703)	1.321* (0.692)	0.625 (0.589)	0.620 (0.606)	0.839*** (0.252)	
<i>Control variables</i>								
Financial strength index (diff.)	1.105*** (0.388)	1.138*** (0.370)	1.529 (1.757)	1.689 (1.726)	1.066** (0.524)	1.069** (0.531)	1.173 (0.703)	1.272* (0.636)
Debt burden ratio (diff.)	-1.804 (1.093)	-1.772* (1.041)	-3.852 (3.297)	-3.694 (3.232)	-2.164 (1.452)	-2.159 (1.458)	-1.584 (2.183)	-0.908 (1.999)
Income per capita (1 million yen)	0.271 (0.278)	0.120 (0.276)	-0.735 (0.661)	-0.498 (0.672)	0.160 (0.446)	0.159 (0.448)	0.885 (0.542)	0.510 (0.505)
Income per capita (diff.)	1.068** (0.529)	0.640 (0.513)	0.239 (1.624)	1.091 (1.598)	1.087 (0.822)	1.087 (0.829)	1.891* (0.950)	0.916 (0.903)
Population (100,000 people)	-0.411*** (0.126)	-0.226** (0.125)	-1.807** (0.757)	-1.623** (0.748)	0.764 (0.982)	0.829 (1.002)	-0.337** (0.143)	-0.062 (0.151)
Proportion of population age 65+	0.270 (1.287)	1.176 (1.236)	-4.513 (2.848)	-3.534 (2.865)	0.961 (1.818)	0.968 (1.830)	-1.661 (3.099)	2.462 (3.054)
<i>Acquisition of authority by amalgamation (dummy)</i>								
"City" authority	-0.161 (0.163)	0.100 (0.091)	-0.013 (0.159)	0.047 (0.093)				
"Special city" authority	-0.102 (0.197)	-0.008 (0.123)	-0.250 (0.190)	0.347*** (0.133)				
"Core city" authority	0.234 (0.206)	0.223 (0.249)	0.346* (0.198)	-0.033 (0.242)				
"Designated city" authority	0.598** (0.234)	-0.768** (0.329)	-0.558** (0.223)	-0.792** (0.313)				
Constant	0.017 (0.607)	-0.150 (0.583)	2.852** (1.317)	2.292* (1.344)	-0.365 (0.813)	-0.368 (0.820)	-0.495 (1.218)	-1.020 (1.123)
Obs.	267	267	59	59	140	140	68	68
Adj. R ²	0.239	0.303	0.234	0.257	0.107	0.100	0.301	0.389

Notes: The table reports the marginal effects for the models of weighted least-squares logistic regressions for grouped data from July 2001 to March 2005. Columns (1) and (2) show estimates with interaction terms. Columns (3) to (8) show estimates in case of dividing the observations according to the urban category reached after amalgamation. Standard errors are in parentheses. ***, **, and * indicate statistical significance at the 1, 5, and 10% levels, respectively.

Table 4. Alternative Models for Robustness Check

		How do we count the number of organizations?	
		(1) Set 1 if there is at least one organization that satisfies (A) or (B), and 0 if otherwise.	(2) Count the number of organizations that satisfy (A) or (B).
What type of organization do we count?	(A) The members are exactly the same as the amalgamation partners.	Models A1-a and A1-b	Models A2-a and A2-b
	(B) The members include the amalgamation partners.	Models B1-a and B1-b	Models B2-a and B2-b

Note: Models with “a” count partial cooperatives and wide-area unions together to create the variable for IMC, while models with “b” deal with them separately.

Table 5. Estimates with Other Four Possible Definitions of the Degree of IMC

	IMC organizations consisting of all amalgamation municipalities				IMC organizations including all amalgamation municipalities			
	Dummy		Total number		Dummy		Total number	
	(A1-a)	(A1-b)	(A2-a)	(A2-b)	(B1-a)	(B1-b)	(B2-a)	(B2-b)
<i>Inter-municipal cooperation (IMC)</i>								
IMC (total)	-0.162* (0.088)		-0.100* (0.052)		-0.424 (0.279)		-0.021 (0.022)	
IMC (Partial cooperatives)		-0.183** (0.088)		-0.128** (0.054)		-0.344 (0.212)		-0.009 (0.023)
IMC (Wide-area unions)		0.440 (0.382)		0.545 (0.387)		-0.306** (0.125)		-0.253** (0.122)
<i>Gain/Loss of control</i>		0.940*** (0.205)		0.959*** (0.204)		1.295*** (0.333)		0.923*** (0.207)
<i>Control variables</i>								
Financial strength index (diff.)	1.315*** (0.391)	1.327*** (0.390)	1.295*** (0.391)	1.308*** (0.389)	1.354*** (0.394)	1.262*** (0.390)	1.284*** (0.394)	1.238*** (0.392)
Debt burden ratio (diff.)	-1.471 (1.111)	-1.410 (1.109)	-1.582 (1.110)	-1.515 (1.106)	-1.459 (1.114)	-1.474 (1.104)	-1.536 (1.116)	-1.563 (1.109)
Income per capita (1 million yen)	0.485* (0.281)	0.552* (0.286)	0.494* (0.281)	0.598** (0.286)	0.513* (0.283)	0.346 (0.282)	0.408 (0.286)	0.343 (0.286)
Income per capita (diff.)	1.248** (0.538)	1.289** (0.538)	1.224** (0.538)	1.277** (0.536)	1.306** (0.540)	1.161** (0.536)	1.214** (0.542)	1.137** (0.540)
Population (100,000 people)	-0.294** (0.116)	-0.290** (0.116)	-0.294** (0.116)	-0.291** (0.116)	-0.348*** (0.128)	-0.294** (0.121)	-0.271** (0.116)	-0.240** (0.117)
Proportion of population age 65+	0.835 (1.305)	0.965 (1.307)	0.893 (1.303)	1.104 (1.304)	1.047 (1.310)	0.965 (1.298)	0.811 (1.313)	1.008 (1.309)
<i>Acquisition of authority by amalgamation (dummy)</i>								
"City" authority	-0.068 (0.107)	-0.051 (0.108)	-0.058 (0.107)	-0.035 (0.107)	-0.003 (0.111)	0.023 (0.110)	-0.053 (0.108)	-0.012 (0.109)
"Special city" authority	-0.181 (0.129)	-0.174 (0.128)	-0.192 (0.128)	-0.184 (0.127)	-0.153 (0.133)	-0.139 (0.129)	-0.214* (0.128)	-0.175 (0.129)
"Core city" authority	0.374** (0.145)	0.364** (0.145)	0.389*** (0.143)	0.373*** (0.143)	0.415*** (0.142)	0.366** (0.142)	0.407*** (0.146)	0.368** (0.146)
"Designated city" authority	0.274 (0.199)	0.277 (0.198)	0.275 (0.199)	0.281 (0.198)	0.305 (0.201)	0.317 (0.199)	0.262 (0.200)	0.284 (0.199)
Constant	-0.590 (0.587)	-0.712 (0.595)	-0.626 (0.586)	-0.805 (0.593)	-0.345 (0.622)	-0.187 (0.628)	-0.500 (0.612)	-0.503 (0.608)
Obs.	267	267	267	267	267	267	267	267
Adj. R2	0.207	0.210	0.208	0.214	0.202	0.212	0.198	0.205

Notes: Dependent variables are as follows: in model A1, whether there exists any IMC whose members are exactly all the amalgamation partners (1) or not (0); in model A2, the total number of IMCs whose members are exactly all the amalgamation partners; in model B1, whether there exists any IMC which includes all the amalgamation partners (1) or not (0); and in model B2, the total number of IMCs which include all the amalgamation partners. Standard errors are in parentheses. ***, **, * and * indicate statistical significance at the 1, 5, and 10% levels, respectively.