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Municipal Mergers and the Change in Intra-Prefectural Migration

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Abstract

The purpose of this paper is to describe the recent changes in the number of municipalities and intra-prefectural inter-municipal migration (abbreviated as intra-prefectural migration). During the time of "Heisei no Daigappei," the number of municipalities notably decreased. But the decline in intra-prefectural migration was relatively small. At the prefecture level, the change in intra-prefectural migration relative to that of the number of municipalities shows a negative correlation with the average number of merged municipalities per merger, and a positive correlation with the average population of town/village municipalities. This paper also examines the situations of Niigata and Okayama prefectures, where the changes in the numbers of municipalities were similar but the levels of decline in intra-prefectural migration differed. Our analysis suggests that the larger average population of town/village municipalities in Niigata and relatively weak migration connection among the merged municipalities in Okayama would partly explain the larger relative change in intra-prefectural migration in Niigata.

1. Purpose of the study

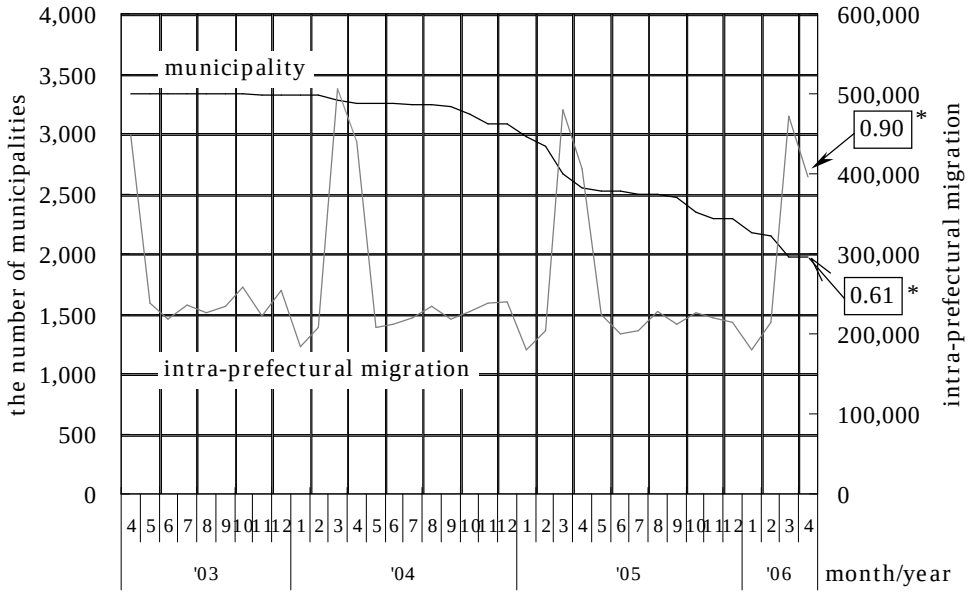
Since 1995, the national government has repeatedly revised the Special Municipal Merger Law (so called (*Kyu*) *Gappei Tokurei Ho*). These revisions are aimed at promoting the consolidation of municipalities so that these municipalities could effectively cope with various local and regional issues, such as their financial crises and ongoing population aging (e.g. Sasaki 2004, Ministry of Internal Affairs and Communications 2006). In response to the changes in that law, a large number of municipalities have stepped into the process of merging with neighboring municipalities, and as a result, the total number of municipalities in Japan has sharply declined. This process of large-scale municipal mergers has often been called "Heisei no Daigappei" (the Great Heisei Merger), the third of its kind in the modern history of Japan, following those undertaken in the Meiji and Showa periods.

In the course of the "Heisei no Daigappei," the level of intra-prefectural inter-municipal migration has gradually declined. This seems largely to be caused by the fact that some portions of inter-municipal migration have turned into intra-municipal moves due to the mergers of municipalities and have formally disappeared from counts in the migration statistics. At the same time, we might also observe that local socio-economic transformations stimulated by municipal mergers,[1] as well as various other factors unrelated to mergers, changed the level of migration. Presently, however, we cannot clearly articulate the causes of migration changes, because it may take some years to verify the extent to which the socio-economic impacts of mergers actually influence the level of migration.[2] For the analysis of recent change in intra-prefectural inter-municipal migration, our primary task for the time being would thus be to grasp the trend in intra-prefectural inter-municipal migration and provide basic information on its characteristics in relation to municipal mergers.

The purpose of this paper is to describe the recent trends in intra-prefectural inter-municipal migration (henceforth denoted simply as intra-prefectural migration) and the change in the number of municipalities during the time of the "Heisei no Daigappei." Since the vast majority of mergers have been completed by the end of March 2006, this paper observes the trend up to April 2006, the month right after the "Heisei no Daigappei." Generally speaking, an in-depth analysis of intra-prefectural migration requires inter-municipal OD (origin-destination) migration data. Such data, however, do not exist for some prefectures. The only statistics of intra-prefectural migration which cover all prefectures are the total number of intra-prefectural migration for each prefecture compiled from the Basic Resident Registers. In this paper, we use these data and information on municipal mergers provided by the Ministry of Internal Affairs and Communication (2006) and reveal the general relationships between the municipal mergers and the change in intra-prefectural migration. Then we supplement these findings by the analysis of OD data of selected prefectures.

In the next section, we firstly show the overall changes in the numbers of municipalities and intra-prefectural migration. Section 3 then describes their changes at the prefecture level. Section 4

Figure 1. The numbers of municipalities and intra-prefectural migration



*the ratios of the values in April 2006 to those in April 2004

The number of municipalities is the value at the end of each month.
Sources: municipality= author's calculations based on the data of the Ministry of Internal Affairs and Communication (2006); migration= the *Monthly Report on Internal Migration in Japan*

examines the correlations between demographic and merger-related variables on the one hand, and the indicators of municipal mergers and intra-prefectural migration change on the other. Section 5 briefly illustrates the situations of municipal mergers and intra-prefectural migration in Niigata and Okayama prefectures as a case study.

2. Trends at the national-level

First we will present a summary of the national-level statistics of the numbers of municipalities and intra-prefectural migration.

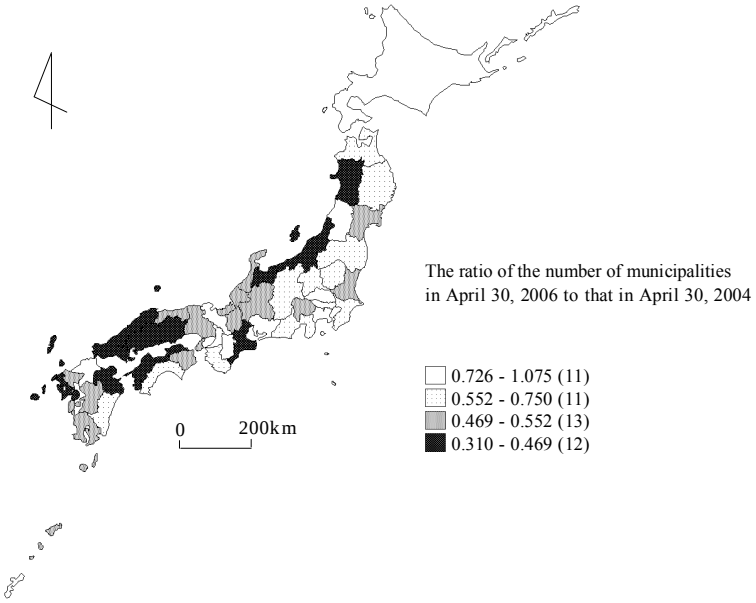
The statistics show that the rapid decline in the number of municipalities is a very recent phenomenon. As was mentioned, recent major revisions in the Special Municipal Merger Law have been implemented since 1995. However, municipalities' reactions to these revisions were generally slow (Figure 1). According to *Jumin Kihon Daicho Jinko Yoran (Basic Resident Registers Population Handbook)*, the number of municipalities was 3,371 on March 31, 1999.[3] About five years later, 3,247 municipalities still existed on April 30, 2004. However, the mergers seem to have gained momentum around October 2004, and the number of municipalities declined to 1,976 in April 30, 2006.[4]

The trend of intra-prefectural migration differs from that of the changes in the number of municipalities. At first glance, the numbers of intra-prefectural migration (based on the municipal boundaries at the end of each month) exhibit very large fluctuations (Figure 1). These fluctuations, however, are mainly due to seasonal surges recurring every March and April, when migration customarily occurs in accordance with the end and the beginning of the school and fiscal years. If we put aside those monthly changes, the fluctuations appear small. In April 2004, the number of intra-prefectural migration was 440,725. Two years later, that number was still 395,494. When we calculate the ratio of the figure in April 2006 to that in April 2004 (numbers on April 30 for municipality and monthly numbers for intra-prefectural migration), the ratios for the number of municipalities and intra-prefectural migration were 0.61 and 0.90, respectively. The number of municipalities has shown a larger decline than that of intra-prefectural migration.

3. Trends by prefecture

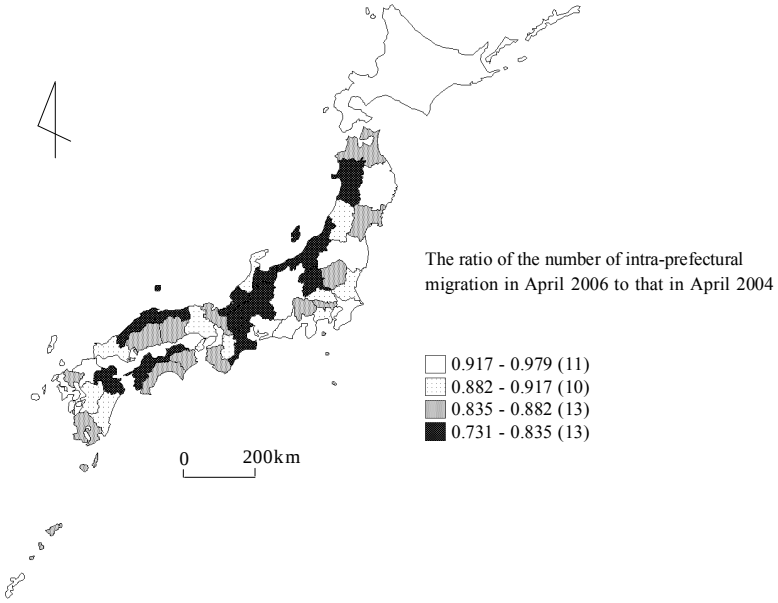
To examine the trends in the number of municipalities and intra-prefectural migration at the prefecture level, we observe the ratios of their numbers in April 2006 to those in April 2004. According to Figure 2, western Japan shows lower ratios for the number of municipalities. This geographic pattern has often been called the "west-

Figure 2. The ratio of the number of municipalities in April 30, 2006 to that in April 30, 2004



Sources: author's calculations based on the Ministry of Internal Affairs and Communication (2006)

Figure 3. The ratio of the number of intra-prefectural migration in April 2006 to that in April 2004



Sources: author's calculations based on the *Monthly Report on Internal Migration in Japan*

high east-low" pattern for municipal mergers. At the regional block level, the ratios were particularly small in the Chugoku region. As for intra-prefectural migration, western Japan shows small ratios again (Figure 3). Unlike the case of municipalities, however, some prefectures in the central part of Japan also exhibit large decline.

The differences in the geographic patterns of municipal mergers and intra-prefectural migration change are also evident in the following table and graph. Table 1 lists prefectures with the lowest and highest ratios for the number of municipalities and intra-prefectural migration. The prefecture with the lowest ratio for the number of municipalities is Oita (0.310), while Shimane (0.731) had the lowest ratio for intra-prefectural migration. These two lists do not have much in common. Only two prefectures, Shimane and Niigata, appear in the

Table 1. The ratio of the value in April 2006 to that in April 2004

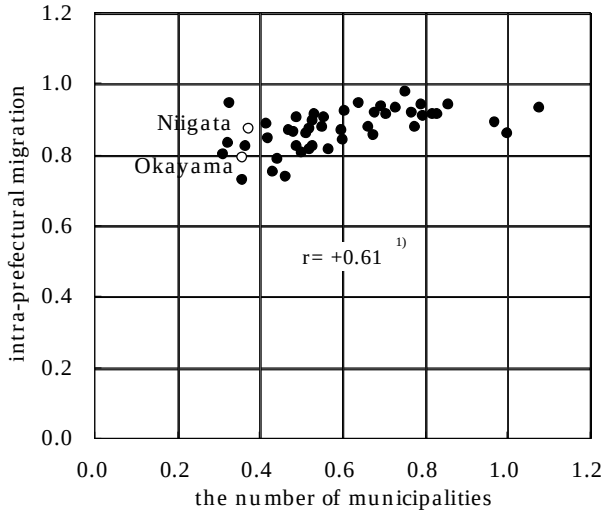
the number of municipalities		intra-prefectural migration	
1 Oita	0.310	1 Shimane	0.731
2 Ehime	0.323	2 Kagawa	0.740
3 Nagasaki	0.324	3 Toyama	0.755
4 Shimane	0.356	4 Mie	0.791
5 Niigata	0.357	5 Niigata	0.795
' ' '		' ' '	
45 Kanagawa	0.967	45 Nagasaki	0.945
46 Tokyo	1.000	46 Shizuoka	0.947
47 Osaka	1.075	47 Fukuoka	0.978

Sources: author's calculations based on the Ministry of Internal Affairs and Communication (2006) and the *Monthly Report on Internal Migration in Japan*

lowest five in both lists. In addition, a diagram comparing the two ratios (Figure 4) demonstrates a moderate level of correlation, but the dots are somewhat dispersed in the left part of the graph. For example, Niigata and Okayama show quite similar ratios for the number of municipalities, but their ratios for intra-prefectural migration differ from one another.

In sum, the number of municipalities has notably declined, but the number of intra-prefectural migration has not. At the prefecture level, the correlation between the changes in the number of municipalities and intra-prefectural migration is positive but not very strong. These results lead us to consider the possibility that the flows of intra-prefectural migration to be "internalized" by mergers were originally small so that the municipal mergers did not substantially affect the level of intra-prefectural migration.[5] In general, the low level of intra-prefectural migration can result from conditions such as the small population in the municipalities concerned, low mobility among residents, and weak connection among the municipalities in terms of the frequency of population movement. In the following section, we examine correlations between the above two

Figure 4. The ratio of the value in April 2006 to that in April 2004



Sources: author's calculations based on the Ministry of Internal Affairs and Communication (2006) and the *Monthly Report on Internal Migration in Japan*

1. For the calculation of correlation coefficient (r), we excluded the data of Tokyo and Osaka. In Tokyo, no merger occurred between May 2004 and April 2006. In Osaka, the number of municipalities increased because of the creation of wards in *Sakai shi* in April 1, 2006.

Table 2. Correlation coefficients between the ratios for municipalities and intra-prefectural migration and the selected variables

	the number of municipalities (1)	intra-prefectural migration (2)	(2)／(1)
total population of prefecture	0.57	0.43	-0.42
total population of town/village municipalities	0.31	0.44	-0.26
average population of town/village municipalities	0.49	0.25	-0.47
proportion of town/village population	-0.42	-0.30	0.25
total number of municipalities	0.27	0.39	-0.15
number of small municipalities (less than 5,000 residents)	-0.00	0.09	0.09
proportion of small municipalities	-0.32	-0.21	0.33
average number of municipalities per merger	-0.58	-0.28	0.64

Sources: author's calculations based on the Ministry of Internal Affairs and Communication (2006), the *Monthly Report on Internal Migration in Japan* and *Jyumin Kihon Daicho Jinko Yoran*

1. "The number of municipalities" and "intra-prefectural migration" indicate the ratios of the values in April 2006 to those in April 2004.
2. For other variables except for "average number of municipalities per merger," we arranged the data as of March 31, 2004 (based on *Jyumin Kihon Daicho Jinko Yoran*) so that they are in line with the municipal boundaries as of April 30, 2004. "Average number of municipalities per merger" is based on the data of municipal mergers between May 1, 2004 and April 30, 2006. When a municipality experienced merger more than once, these multiple mergers are treated as one merger, that is, as if they occurred simultaneously.
3. For the calculation of the coefficients, we excluded the data of Tokyo and Osaka. In Tokyo, no merger occurred between May 2004 and April 2006. In Osaka, the number of municipalities increased because of the creation of wards in *Sakai shi* in April 1, 2006.

ratios on the one hand, and some demographic and merger-related variables on the other.

4. Correlation

Table 2 shows correlation coefficients between the selected variables and the ratios for municipal mergers and intra-prefectural migration. Variables examined here are mainly demographic; the total population of prefecture, the total population of town/village municipalities, the average population of town/village municipalities, the proportion of town/village residents (/the total population), the total number of municipalities, the number of small municipalities (less than 5,000 residents) and the proportion of small municipalities (/the total number of municipalities). We include various indicators concerning town/village and small municipalities because these municipalities have been major participants in the "Heisei no Daigappei."[6] The statistics for these indicators originally come from *Jyumin Kihon Daicho Jinko Yoran* as of March 31, 2004, but we rearranged the data so that they are in line with the municipal boundaries as of April 30, 2004. As for the merger-related variable, the average number of merged municipalities per merger is included as a measure of the scale of merger. This indicator is based on the mergers undertaken between May 1, 2004 and April 30, 2006.

Columns (1) and (2) in Table 2 show that while correlation coefficients are generally larger for the ratio of the number of municipalities, the signs of the coefficients are basically the same for the two indicators. For example, the number of municipalities and intra-prefectural migration decrease less in prefectures where the total population of prefecture, the total population of town/village municipalities, and the average population of town/village municipalities are larger (positive coefficients in the table). On the contrary, they decrease more in prefectures where the proportions of town/village residents and small municipalities are higher (negative coefficients). Negative correlation is also observed for the variable representing the scale of merger.

In order to examine the degree of change in intra-prefectural migration relative to that of the number of municipalities, Table 2 also shows correlations for the ratio between the two ratios (the rightmost column), that is, the ratio of the ratio of intra-prefectural migration (Column (2)) to the ratio of the number of municipalities (Column (1)). The scale of merger shows the largest absolute value of coefficient (+0.64), followed by the average

population of town/village municipalities (-0.47). The former coefficient suggests that the large-scale mergers produced smaller relative change in intra-prefectural migration compared to the change in the number of municipalities. The latter indicates that the smaller average population of town/village municipalities led to smaller relative change in the prefecture's intra-prefectural migration. This result confirms some of our expectations mentioned in the former section.

5. Case study

We demonstrated in Section 3 that Niigata and Okayama prefectures exhibited similar changes in the numbers of municipalities while the declines in their intra-prefectural migration differed from each other. As a case study, this section portrays the characteristics of municipal mergers and changes in intra-prefectural migration in these two prefectures.

Figures 5 and 6 illustrate the geography of municipal mergers and the three indicators of intra-prefectural migration "to be internalized" in Niigata and Okayama. The mergers listed here are those that occurred between May 1, 2004 and April 30, 2006. The numbers of intra-prefectural migration "to be internalized" are based on the data of the municipal mergers and OD migration data published by the governments of Niigata and Okayama prefectures. Here we applied the new administrative boundaries (as of April 30, 2006) to the annual OD data for the 2002-2003 period (between October 2002 and September 2003), and calculated the number of migration which would "disappear" by those mergers.

To measure the effects of the internalization of migration, we presented three indicators in the figures. The first indicator (③ in Figures 5 and 6) shows the proportion of the internalized migration to the total number of intra-prefectural migration (in and out) of the relevant municipalities (according to old boundaries). For example, *Sanjo shi*, *Sakae machi* and *Shitada mura*, which created the new *Sanjo shi* in May 2005, recorded numbers of intra-prefectural migration of 2,586, 364 and 298 between October 2002 and September 2003, respectively. The number of migration among the three municipalities, i.e., migration to be internalized, was 297 (99 (*Sanjo* →*Sakae*) + 60 (*Sakae* →*Sanjo*) + 54 (*Sanjo* →*Shitada*) + 82 (*Shitada* →*Sanjo*) + 1 (*Sakae* →*Shitada*) + 1 (*Shitada* →*Sakae*)), so that the value for the first indicator is 9.1% (= 297 ÷ (2,586+364+298) × 100). The second indicator (④ in Figures 5 and 6) represents the proportion of the internalized migration to the prefecture's total number of intra-prefectural migration. In the case of the new *Sanjo shi*, the figure of this indicator amounts to 0.7% (= 297 ÷ 40,846 (total number of intra-prefectural migration in Niigata prefecture) × 100). The third indicator, ⑤, is a sort of multi-regional application of Population Interchange Rate (PIR). The PIR, the ratio of migration between two areas to their total population, is considered to "measure the degree of inter-areal connection by migration" (Ogasawara 1999 p.73). In this paper, we compute the PIRs for all pairs of municipalities in the merged municipalities[7] (e.g. for the new *Sanjo shi*, ${}_3C_2 = 3$ pairs) and calculate their average. In general, the first two indicators show the effects of merger on the total numbers of intra-prefectural migration for the merged municipalities and for the entire prefecture, respectively. The third represents the average level of linkage (in terms of migration) among the merged municipalities.

Figures 5 and 6 show that the values of indicators ③, ④ and ⑤ are generally higher in Niigata than in Okayama. For example, the maximum value of the first indicator is 22.0% in Niigata (the new *Niigata shi*), and 16.5% in Okayama (the new *Maniwa shi*). Indicator ⑤ shows higher maximum value for Okayama (0.34) than for Niigata (0.30), but the average is higher for Niigata (0.13) than for Okayama (0.09). Unlike Indicator ⑤, indicators ③ and ④ do not take into consideration the numbers of merged municipalities per merger and their population. However, the above tendency is often observed (especially for indicator ③) when we compare mergers of similar scale. The new *Itoigawa shi* in Niigata (three municipalities were merged), for example, shows higher values for all indicators than the new *Soja shi* in Okayama (three municipalities were merged).[8]

Table 3 shows basic information on the mergers, intra-prefectural migration and selected variables. These data and Figures 5 and 6 explain, to some extent, why the relative change of intra-prefectural migration in Niigata is larger than in Okayama. On the one hand, the larger average population of town/village municipalities in Niigata indicates that since the number of migration is generally larger in areas with more population, the mergers of more populous municipalities would have internalized a larger number of migration. On the other hand, the smaller values of indicator ⑤ in Okayama (Figure 6, Table 3) imply that there was relatively weak migration connection among the merged municipalities, which resulted in the smaller level of migration internalization by the mergers.[9] These characteristics of population and municipal mergers seem to have caused the differences in the levels of indicators ③ and ④ in

Table 3. Selected indicators for Niigata and Okayama prefectures

	Niigata	Okayama
A. number of municipalities (ratio)	0.36	0.37
B. intra-prefectural migration (ratio)	0.80	0.87
C. number of intra-prefectural migration in the 2002-2003 period	40,846	31,196
D. number of "internalized" intra-prefectural migration	11,300	3,263
E. total population of prefecture (1,000)	2,456	1,957
F. average population of town/village municipalities	9,327	7,495
G. proportion of town/village population	29%	26%
H. average number of municipalities per merger	5.2	3.9
I. number of mergers	15	17
J. average of the percentages of "internalized" migration (/total intra-prefectural migration of merged municipalities)	12.2	7.2
K. average of the percentages of "internalized" migration (/total intra-prefectural migration of prefecture)	1.8	0.6
L. average of the averages of Population Interchange Rates (PIRs) for merged municipalities	0.13	0.09

Sources: author's calculations based on the Ministry of Internal Affairs and Communication (2006), the *Monthly Report on Internal Migration in Japan, Jyumin Kihon Daicho Jinko Yoran, Niigata-ken no Jinko Ido* and *Okayama-ken Jinko no Ugoki*.

1. Variables A and B indicate the ratios of the values in April 2006 to those in April 2004. Variable C shlows the numbers of intra-prefectural migration between October 2002 and September 2003. In the case of Niigata, the migration between *Shibata shi* and *Toyoura machi*, those among municipalities in *Sado ga shima* and among the new *Agano shi* were excluded, because those municipalities were merged before April 30, 2004. Variable D indicates the number of intra-prefectural migration in the 2002-2003 period to be internalized if we apply the municipal boundaries as of April 30, 2006. For variables E-G, we arranged the data as of March 31, 2004 (based on *Jyumin Kihon Daicho Jinko Yoran*) so that they are in line with the municipal boundaries as of April 30, 2004. Variables H and I are based on the data of municipal mergers between May 1, 2004 and April 30, 2006. When a municipality experienced merger more than once, these multiple mergers are treated as one merger, that is, as if they occurred simultaneously. For the calculation of variables J, K and L, see the text.

Niigata and Okayama, and have eventually produced the disparity in the relative change of the total number of intra-prefectural migration for these two prefectures.

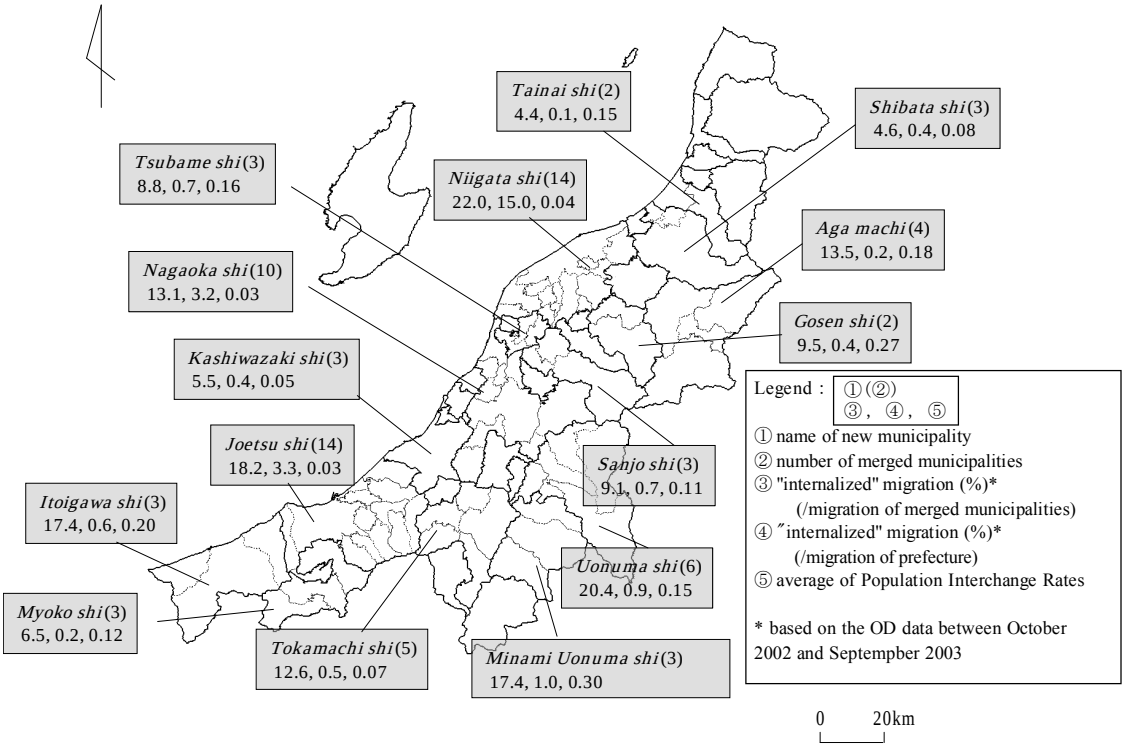
However, some of the information in Table 3 does not match the general relationships between the municipal mergers and intra-prefectural migration change. For example, the effect of the scale of merger is contrary to expectation. As was pointed out in Section 4, the larger the scale of merger, the smaller the relative change in intra-prefectural migration. In Niigata, the scale of mergers is larger, but the relative change in intra-prefectural migration is also larger. Since migration is a very complex phenomenon influenced by various socio-economic and geographic conditions of origins and destinations, we need to take more factors into consideration to clarify this point. For instance, the geographic locations, population size and industrial characteristics of prefectural capitals and other large cities would have been important determinants for the direction and volume of intra-prefectural migration of small municipalities. Further investigation is necessary to more fully account for the relationships between municipal mergers and changes in intra-prefectural migration.

6. Conclusion

While we need to control the relationships among the explanatory variables to confirm the above results, the foregoing discussion suggests that the change in intra-prefectural migration during the period of municipal mergers has been affected not only by the decline in the number of municipalities, but also, to a degree, by the demographic situations of prefectures and municipalities, as well as by factors related to the process and conditions of mergers, such as the scale of mergers. In future studies, the examination of other socio-economic and geographic conditions of municipalities would help us reveal more about the changes in intra-prefectural migration during the period of the "Heisei no Daigappei."

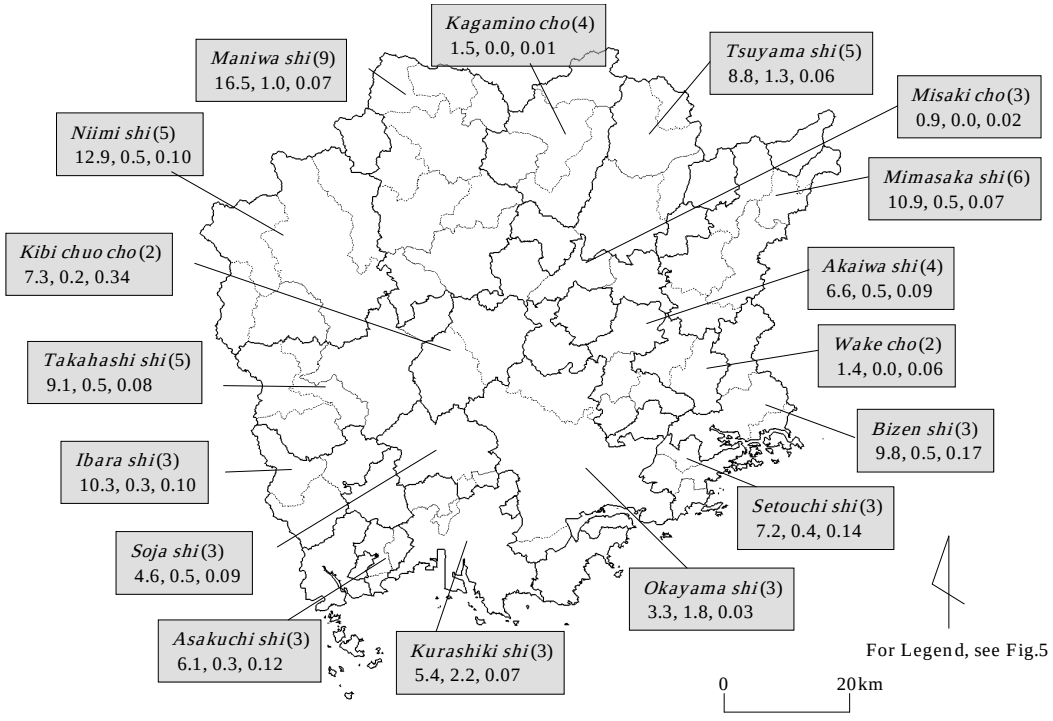
Among the discussions we presented above, the question of whether there was originally a strong migration connection among the merged municipalities has an important implication. The national government has pointed out the growing mismatch between the living sphere of residents and administrative boundaries (Ministry of Internal

Figure 5. Municipal mergers and changes in intra-prefectural migration in Niigata prefecture



Sources: author's calculations based on the Ministry of Internal Affairs and Communication (2006) and *Niigata-ken no Jinko Ido*.

Figure 6. Municipal mergers and changes in intra-prefectural migration in Okayama prefecture



Sources: author's calculations based on the Ministry of Internal Affairs and Communication (2006) and *Okayama-ken Jinko no Ugoki*.

Affairs and Communication 2006). Against this backdrop, the government of Niigata prefecture, for example, has proclaimed that where residents share a common living sphere across municipal borders, it is beneficial for the relevant municipalities to merge because this would facilitate effective local planning in line with the stretch of living sphere (see Kido 2004, p.64). One of the most important elements composing the living sphere of residents is the geographical expanse of commuting. However, intra-prefectural migration among municipalities also relates to the make-up of living sphere. As Mizoguchi (2002) indicates, a large part of intra-prefectural migrants move for new housing without changing their jobs.[10] This means that the geographical extent of intra-prefectural migration reflects, to a degree, the expansion of commutable areas. Intra-prefectural migration linkage among municipalities would thus partly correspond to the expanse of the living sphere. As we indicated above, some mergers seem to have occurred among weakly connected municipalities, implying that the new municipality comes to contain a group of people who belong to different living spheres. The level of migration internalized by the mergers may thus give us one clue for evaluating how effective the mergers were to lessen the spatial mismatch between the living sphere of people and administrative boundaries.

*An earlier version of this paper was presented at the Annual Meetings of the Population Association of Japan, June, 2006. I would like to thank two anonymous reviewers and Shiro Koike for their helpful comments.

Notes

1 Yoshimura (2004) estimates that an increase in the population of a municipality generally improves the level of public administrative services.

2 Regarding the socio-economic impacts of mergers, for example, Kansai Institute of Information System & Industrial Renovation (2005) indicates that we need to wait several years to find out the real effect of municipal mergers on public utility charges.

3 *Jumin Kihon Daicho Jinko Yoran* sometimes excludes wards in government ordinance-designed major cities from the total number of municipalities. In line with the migration statistics, however, this paper treats them as municipal units.

4 Tateishi (2004) indicates that the so-called "Nishio private proposal," presented at a committee of the Local Government System Research Council in November 2002, hastened municipalities to consider seriously entering the process of mergers. Suganuma (2005) cites an opinion that a speech by Hiromu Nonaka, presented at a meeting of the Liberal Democratic Party in August 2000, played a similar role.

5 This assumption is certainly based on a precondition that municipal merger was the main cause of the recent change in the number of intra-prefectural migration.

6 According to *Jumin Kihon Daicho Jinko Yoran*, the number of town/village municipalities decreased from 2,562 on March 31, 1999 to 1,044 on March 31, 2006. Specifically, the number of town/village municipalities decreased from 1,532 to 495 (-67.7%) for those with less than 5,000 residents, from 699 to 318 (-54.5%) for those with 5,000 - 9,999 residents, and from 331 to 231 (-30.2%) for those with 10,000 residents or more.

7 For the data of population, we use the average of populations as of October 1, 2002 and October 1, 2003.

8 As for population, larger municipal population is likely to produce the larger number of intra-prefectural migration and migration "to be internalized." But at least in the cases of the new *Itoigawa shi* and the new *Soja shi*, the difference in the total population would not account for the higher values of ③ and ④ in the new *Itoigawa shi*, because the population of the new *Soja shi* (66,276, see note 7) is larger than that of the new *Itoigawa shi* (51,683).

9 Indicator ⑤ tends to become small in a larger-scale merger. This is due to the following reason. In a large-scale merger, small peripheral towns and villages are likely to join a central municipality, such as the prefectural capital. In such a case, it is often observed that peripheral municipalities have held strong migration connections to the central municipality, but the connections among the peripheral towns and villages have been weak. Since the number of such weak ties rapidly increases as the number of peripheral municipalities participating in the merger grows, the average value of the PIRs is likely to decline in a larger-scale merger. An important point is that indicator ⑤ is higher for Niigata despite the fact that the scale of merger is larger in Niigata than in Okayama.

10 Niigata Prefecture (2004) shows that during the 2002-2003 period, the most popular reasons for intra-prefectural migration were housing-related reasons (31%), followed by job-related reasons (28%).

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