Joint Discussion Paper Series in Economics

by the Universities of

Aachen · Gießen · Göttingen
Kassel · Marburg · Siegen

ISSN 1867-3678

No. 42-2012

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Welfare-Induced Migration of the Elderly in Japan[†]

Gender differences in welfare migration patterns among the elderly

September 17, 2012

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[†] We are grateful to Akihiro Kawase, Masayoshi Hayashi, Bernd Hayo, Franz Westermaier, and workshop participants at Philipps-Universität Marburg for their helpful comments. This paper is a part of the academic project funded by the Grant-in-Aid for Young Scientists (B) 23730286 from the Ministry of Education, Culture, Sports, Science and Technology in Japan.

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Abstract

In Japan, there is a shortage of long-term care facilities for the elderly and families are having difficulty supporting the elderly at home. Thus, the elderly in Japan often want to move to municipalities that have a greater availability in long-term care facilities. The purpose of this paper is to examine whether there is a gender difference in the elderly's welfare migration patterns in Japan. The analysis was performed by calculating net migration data by gender and age group using available plural statistical materials. Results showed a clear gender difference for both the early-stage and late-stage elderly. Results also revealed that the hypothesis of welfare migration is more appropriate for the late-stage elderly rather than the early-stage elderly, and confirmed that welfare-induced migration was a trend among males, especially those at the early-stage. The effect of the long-term care facilities was found to be the strongest for migration patterns among late-stage elderly females. In addition, the pattern for female migration showed consistent inflow to the larger cities. Implications of these findings on long-term care policy in Japan are discussed.

JEL classifications: H73, H75, I38, R23

I. Introduction

Much of the previous research on interregional migration in Japan has focused on the labor migration of young people. However, little attention has been paid to migration among the elderly because most elderly people in Japan live with their family with the families acting as the primary caretakers of elderly. Thus, the Japanese elderly do not make decisions regarding migration alone because of the role their families play in their lives. Yet, Japan is rapidly becoming one of the most aged countries; the number of elderly people in Japan in 2010 was 29,580,000, which is 23.1% of the overall population. Japan is also a country where the progression of aging is rapid. From 1950 to present, the elderly proportion of the population increased about 20 percentage points.

Given this rapid progression of aging, it has become more difficult for families to provide support for the elderly. The number of average people per household has reduced from 5 to 2.62 in the past 60 years, and the number of single-aged households has increased 1.28 million to 5.02 million in 24 years.[1] In this context, the importance of long-term care facilities has grown as the number of elderly increases and families' abilities to provide support weaken. However, there is a shortage in the supply of long-term care facilities in Japan, and many elderly are waiting for admission in many municipalities.[2] This paper investigates two aspects of this issue. First, this study examines whether there is a significant portion of the elderly in Japan that want to move

[1] The Ministry of Health, Labor and Welfare (2012) *Comprehensive Survey of Living Conditions of the People on Health and Welfare*

[2] According to an investigation by the Ministry of Health, Labor and Welfare in 2006, the number of applicants who were waiting for admission to long-term care facilities was about 385,500. The national average ratio of the number of those waiting for admission to the capacity of existing facilities is 101%. An especially large number of applicants waiting for admission reside in major cities. For instance, the ratio is 126% in Tokyo and Kanagawa Prefecture.

to municipalities with more available long-term care facilities. Second, this study determines whether there a difference in the migration trend or strength of enrollment in long-term care facilities between elderly males and females. Ultimately, this paper focuses on the difference of the impact of welfare-induced migration between elderly males and females at the municipality level.

II. Background

Early studies on the welfare migration hypothesis investigated the extent of welfare migration while other studies have examined the inequality in program benefits of the Aid to Family with Dependent Children (AFDC) and its relation to migration. Studies such as Southwick (1981), Gramlich and Laren (1984), Blank (1988), Enchautegui (1997) and Borjas (1999) show a positive relationship between the level of welfare programs and migration, while Schroder (1995), and Levine and Zimmerman (1999) find that welfare programs have no effect on migration.[3] Recent studies, such as Gelbach (2004), McKinnish (2005, 2007), and Fiva (2009), have applied more sophisticated identification strategies to confirm the phenomenon of welfare migration. Studies have also been conducted on cases outside of the U.S. context. For example, Renaud (1977) focused South Korea, Ma and Chow (2006) and Giles and Mu (2007) examined these issues in China, Justman, Levy and Gabriel (1988) studies the Israeli context, and Lee (1989) focused on Malaysia. However, only a few studies have examined the relationship between welfare levels and interregional migration in Japan. One of these studies, Nakazawa (2007), calculated the net migration of the elderly in the

[3] A summary of the relevant earlier research is provided in Cebula (1979), while the more recent research is summarized in Moffitt (1992) and Hayashi (2006).

Tokyo metropolitan area between the years 2000 to 2005 by combining existing statistical materials. Results showed that migration of the late-stage elderly is influenced by the availability of long-term care facilities in each area.[4] Kawase and Nakazawa (2009) extended Nakazawa (2007) to a nationwide municipality level.

These studies analyze welfare-induced migration at the level of total movement; yet, they do not take into account possible gender differences in migration trends, with the exception of studies that have targeted the ADFC program or labor migration. Moreover, gender differences in migration trends have not yet been studied in terms of long-term care migration among the elderly in Japan. Examining any gender differences is crucial for a full understanding of migration patterns among the elderly, especially in Japan.

Takechi (1996) points out that a main factor prompting elderly migration is the difficulty older people face in living alone in rural areas. Another factor that might influence migration patterns is that females often live longer than males. Females may decide to migrate after their spouses die in order to avoid living alone. We might expect, then, that the migration trends for males and females to be different according to age. A recently conducted consciousness survey concerning long-term care among males and females supports this hypothesis. The Cabinet Office (2011) shows the results of the consciousness survey about long-term care for the elderly.[5] Results show a clear gender difference when participants were asked if they expect nursing care when long-term care is needed. The study found that 66% of males surveyed hoped to receive care from their spouse or partner, and only 10% expected to receive care from a home-helper or

[4] The Tokyo metropolitan area includes the following four prefectures: Chiba, Kanagawa, Saitama, and Tokyo.

[5] *The 7th International Comparison Finding about Elderly's Life and Consideration.* This survey was concluded in Japan. The respondent to the survey were people who were over 60 years old and did not live in any facilities.

facility. On the other hand, only 29.6% of the females surveyed hoped to receive care from their spouse or partner, while 20.3% of them hoped to receive care from a home-helper or facility. Thus, the aim of this paper is to investigate the gender difference in migration patterns among the elderly in Japan through data description and empirical analysis. In addition, this paper estimates the migration impact of the elderly males and females who will need long-term care in the various municipalities.

This paper is organized as follows. Section III calculates the net migration of each municipality by male, female, and age group. The interregional migration trend is also presented in this section. Section IV conducts an empirical analysis using municipality-level data and examines the relationship between the availability of long-term care facilities and the interregional migration among elderly males and females. Section V concludes the paper.

III. Calculation and depiction of interregional migration of the elderly

Calculation procedure of the number of net migration of the elderly

This study analyzes the migration trends among elderly males and females at the basic municipality (city, town, and village) level after the introduction of long-term care insurance in Japan. However, there is limited available data that can capture interregional migration in Japan, and migration between municipalities by age groups cannot be determined from the statistical data currently available to the public. It is therefore necessary to calculate the net number of migration among the elderly by combining existing statistics.

Therefore, this paper calculates net migration (population inflow minus outflow)

using data obtained from the *Basic Resident Register* (Ministry of Internal Affairs and Communications) and from the *Vital Statistics of Japan* (Ministry of Health, Labor and Welfare). Specifically, we combine population statistics from the *Basic Resident Register* and the number of deaths from the *Vital Statistics of Japan* in order to calculate net migration by age group for each municipality.

Population by age group in the *Basic Resident Register* is presented at five-year intervals. The entire population of a given age group will enter the next-older age group every five years. We compared the population in 2000 with the population in 2005, and the categorized the differences according to those who migrated in, those who migrated out, and those who died. For instance, a change in the number of persons aged 55–59 for a specific municipality from 2000 to 2005 is defined by the following expressions:

$$\text{I} \qquad N_{60-64}^{2005} - N_{55-59}^{2000} = -(D_{55-59}^{2000} + D_{56-60}^{2001} + D_{57-61}^{2002} + D_{58-62}^{2003} + D_{59-63}^{2004}) + (IM - OM)_{55-59}^{2000-2005}$$

In this expression, N is the total population of the age group, IM is the number of inflows, OM is the number of outflows, and D is the number of deaths. The superscript indicates the year of investigation, and the subscript indicates the age group. NM is assumed to be the number of net migration (the number of inflows minus the number of outflows) and thus we rewrite equation (1) as follows:

$$\text{II} \qquad \begin{aligned} NM_{55-59}^{2000-2005} &= \left(IM - OM\right)_{55-59}^{2000-2005} \\ \square\square\square\square\square\square &= (D_{55-59}^{2000} + D_{56-60}^{2001} + D_{57-61}^{2002} + D_{58-62}^{2003} + D_{59-63}^{2004}) + N_{60-64}^{2005} - N_{55-59}^{2000} \end{aligned}$$

We then obtained net migration from 2000 to 2005 according to age group by

combining the population by age group in the *Basic Resident Resister* with the number of deaths in the *Vital Statistics of Japan*[6] as shown in equation (2).[7] Finally, we are able to determine the net migration rate (NMR) by dividing the number of social increases according to age by population in 2000.

III $$NMR_{55-59}^{2000-2005} = NM_{55-59}^{2000-2005} \Big/ N_{55-59}^{2000}$$

We can thus calculate the net migration numbers or rates of each age group for each municipality even though it is impossible to separate those who flow in and those who flow out.

Although the data year extends from 2000 to 2005, the number of individual municipalities decreased during this period because of the merging of municipalities during the Heisei era.[8] To deal with this problem, we incorporated data from 2000 to 2004 into the municipality for the period beginning April 1, 2005.

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[6] Since the *Vital Statistics of Japan* gathers data for deaths at five-year intervals, we cannot obtain the number of deaths for each year. Therefore, we assume that the number of deaths occurs in the middle of each age group (e.g., age 62 if the range is 60–64 years old). We assume a simple mean value for the number of deaths within an age group and derive the number of deaths each year by linear interpolation between age groups.

[7] The *Basic Resident Register* documents the population size as of March 31 for each investigation year. On the other hand, the number of investigation year deaths from January 1 to December 31 is gathered in the *Vital Statistics of Japan*. Someone who migrates into a given city after March 31 and dies by December 31 is counted only in the mortality data. It should be noted that there is a possibility of overestimating the number of deaths and thereby underestimating net migration.

[8] The number of municipalities decreased from 3,229 to 2,395 in this period.

Male and female elderly's migration pattern at prefecture level

To fully understand the migration patterns among elderly males and females, this study first draws the net migration rate (NMR) for each prefecture. Figure 1 shows the migration pattern and NMRs among males and females at the early-stage (age 65-74). The patterns are similar; however, female NMRs are lower in the some provinces. The correlation coefficient between male NMR and female NMR at the early-stage elderly at prefecture level is 0.814. The early-stage elderly outflow originated from the central area in metropolitan areas such as Tokyo, Aichi, and Osaka, as Nakazawa (2007) and Kawase and Nakazawa (2009) showed.

Fig. 1. Net migration rate of early-stage elderly (age 60–74; %)

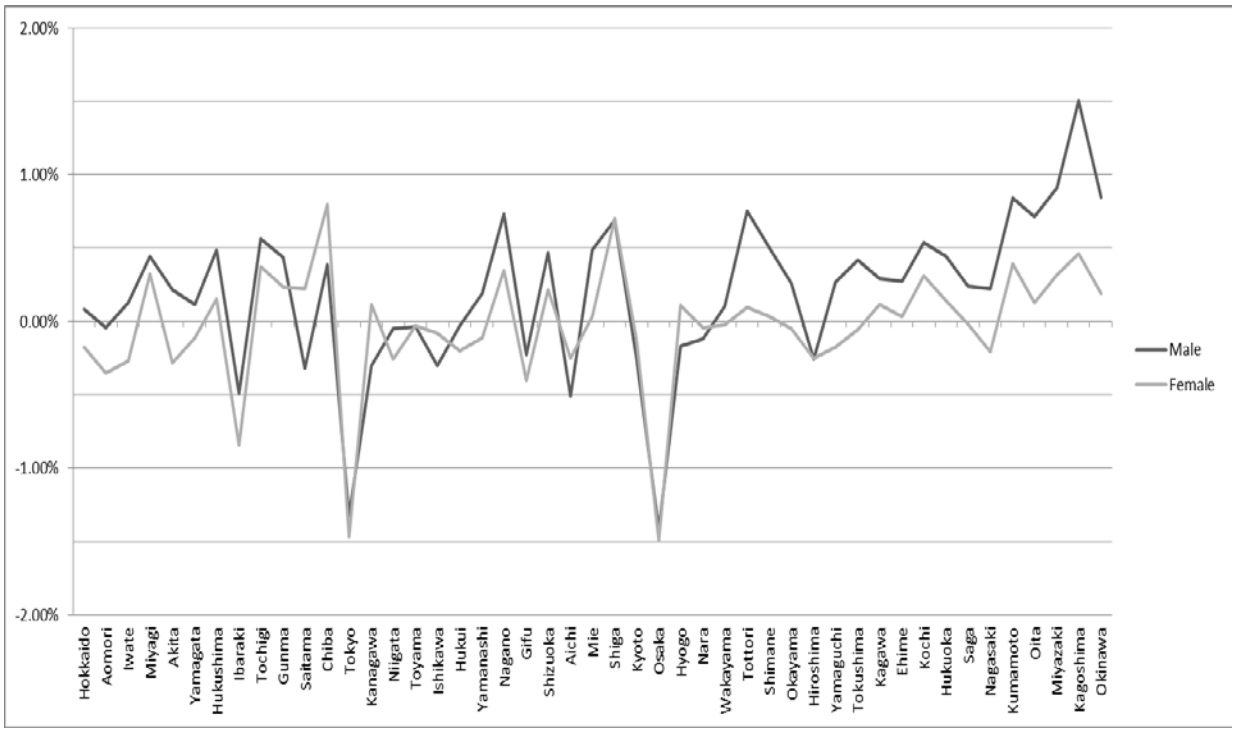


Fig. 2. Net migration rate of late-stage elderly (age 60–74; %)

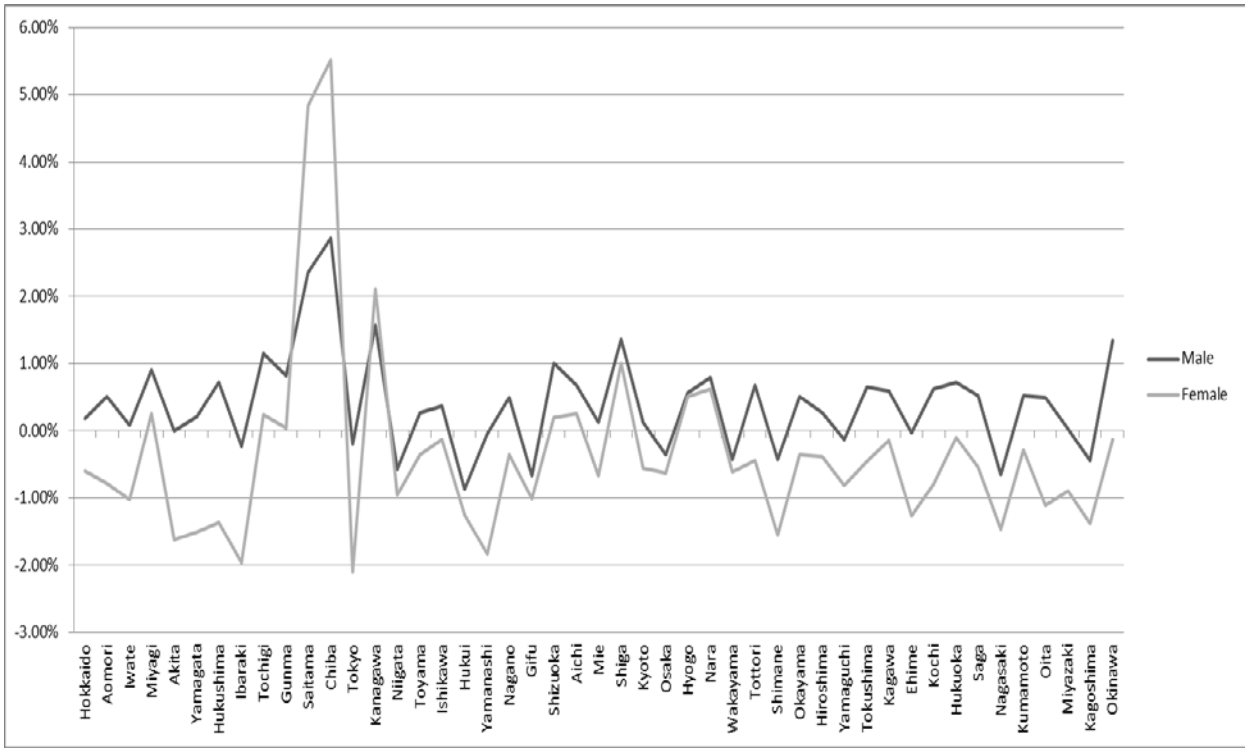


Figure 2 shows the migration patterns and NMRs for males and females at the late-stage (age 75 and over). The migration patterns are similar; however, the female migration pattern is more intense than the male migration pattern. In particular, elderly females at the late-stage migrated to the surrounding areas in the Tokyo metropolitan area. The difference in migration patterns is also illustrated in Figures 3 and 4 where the NMR of the late-stage elderly at the prefecture level is presented as a map. Note that the black color indicates NMR $\geq$ 2%, the dark gray color indicates 1 to 2%, the light gray color indicates 0 to 1%, and the white color indicates NMR $<$ 0%.

Fig. 3. Net migration rate of late-stage male elderly

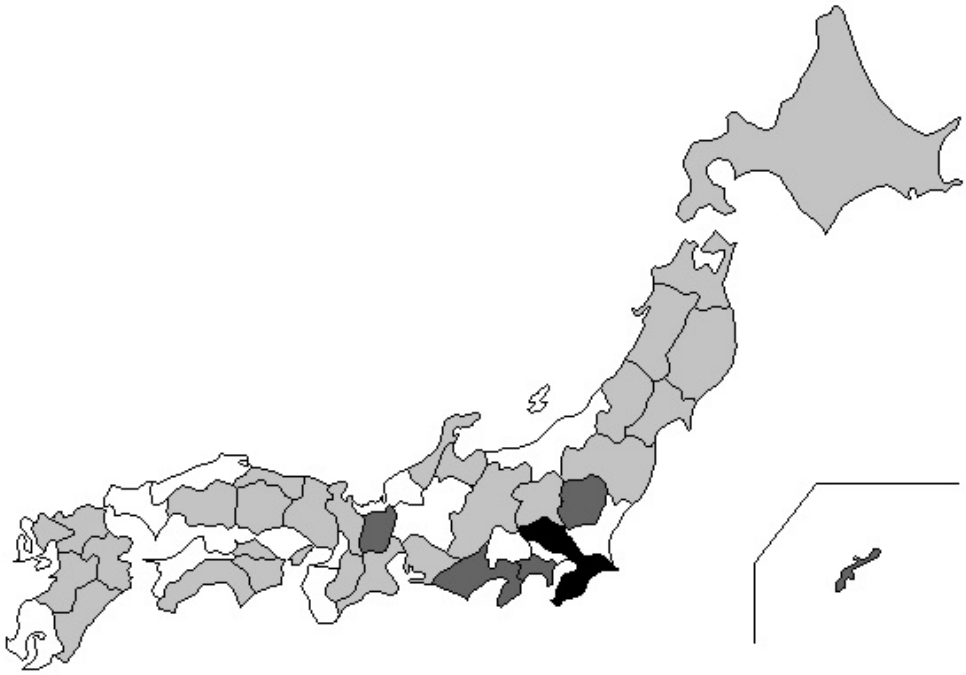
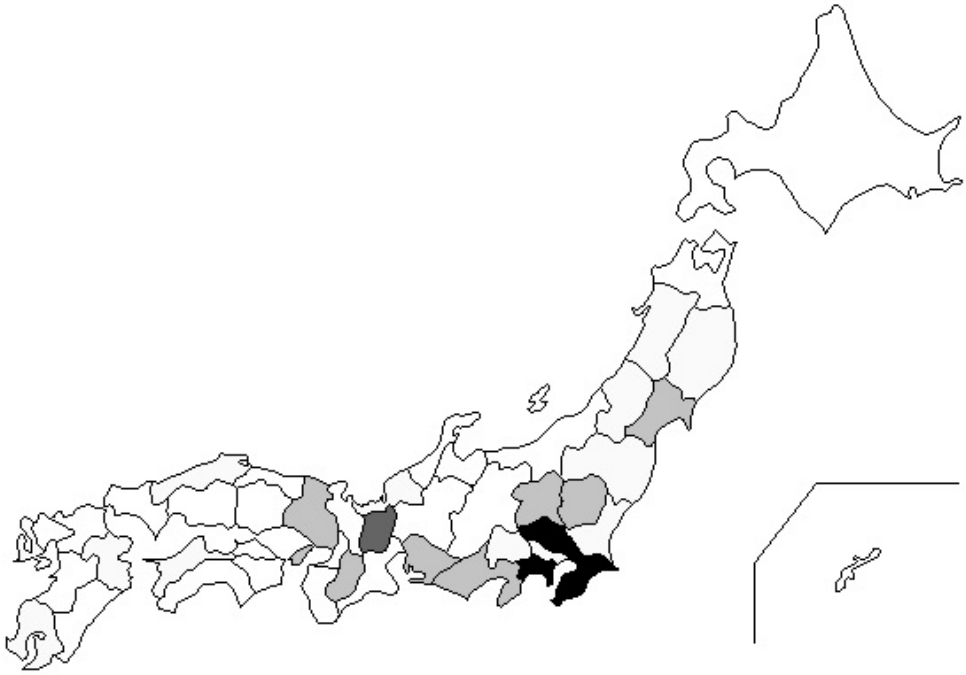


Fig. 4. Net migration rate of late-stage female elderly



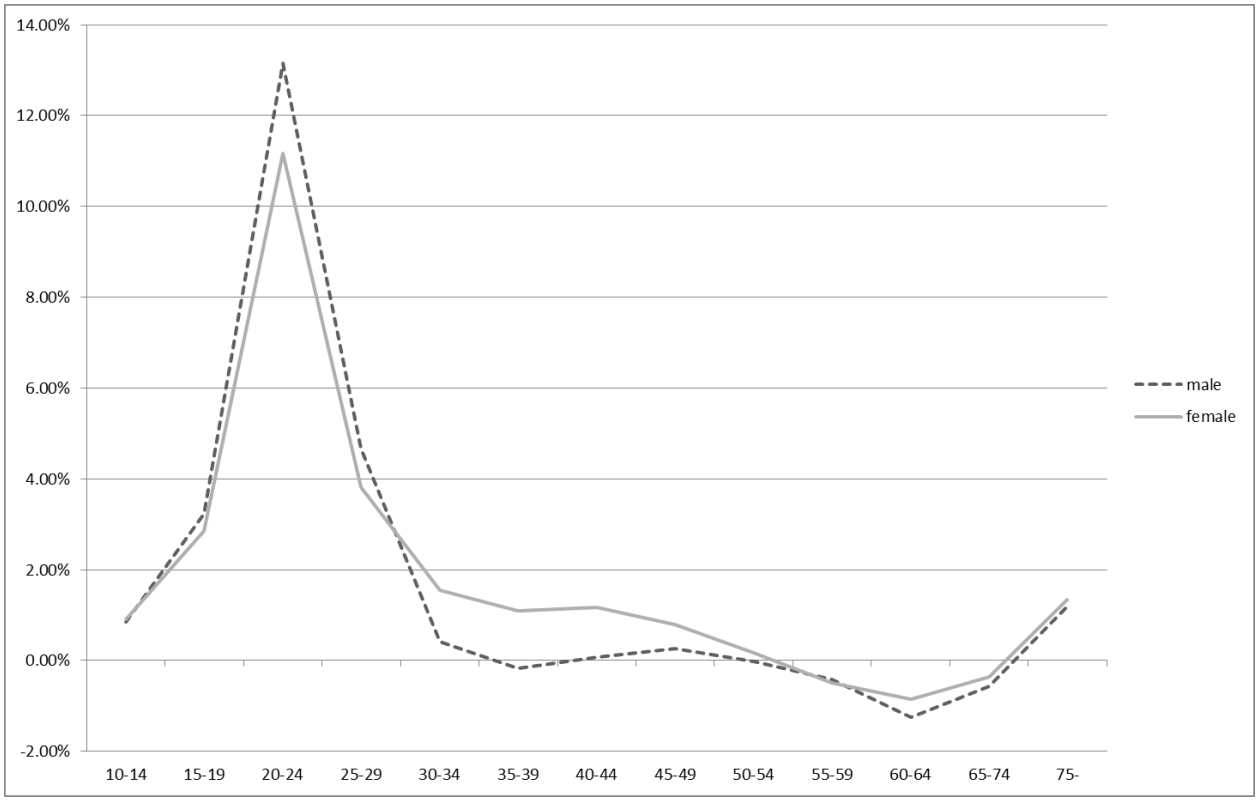
These two figures clearly show the differences in migration pattern between elderly males and females. While the male migration pattern is scattered widely across the entire country, the female migration pattern is concentrated in metropolitan areas such as Tokyo, Nagoya, and Osaka, and there is net outflow from provinces.[9] The gender difference in migration patterns at the prefecture level can be explained by the concept of the U-turn movement, namely the trend for people to return to their birthplace after retirement. The migration pattern with U-tern movement is strong for elderly males and both genders at the early-stage.

Migration pattern in metropolitan and other areas

As the results of this study show, migration patterns among males and females are relevant for the large metropolitan areas in Japan, especially Tokyo. Figure 5 shows the net number of migration in the Tokyo metropolitan area by gender and age. For the younger generation (age 20-30), the rate of migration is comparatively higher than other generations. This generation moves to Tokyo metropolitan area to find opportunities to study and work. In their 20s, the male inflow trend is stronger than the female trend. On the other hand, in their 30s and 40s, the female inflow trend is stronger than the male trend. The retirement generation and the early-stage elderly show outflow from the area while the late-stage elderly show inflow back to the area.

[9] Figure 4 shows prefectures where net migration is positive: from the north, Miyagi, Tochigi, Gunma, Saitama, Chiba, Kanagawa, Shizuoka, Aichi, Shiga, Nara, and Hyogo.

Fig. 5. NMR in the Tokyo metropolitan area



To analyze gender differences in the migration patterns in metropolitan areas, Table 1 shows migration data for the three metropolitan areas according to a detailed municipality division by gender and age. For the late-stage elderly, the migration patterns in the three metropolitan areas are similar. For these areas, the pattern among the early-stage elderly is net outflow while the pattern among the late-stage elderly is net inflow. Specifically, the late-stage elderly show outflow from the central areas of the metropolitan areas and inflow to the surrounding municipalities.

Table 1. Number of net migration in three metropolitan areas

	age 15-24	age 25-34	age 35-44	age 45-54	age 55-64	age 65-74	age 75+
Male							
Tokyo metropolitan area							
Total	191,522	76,697	-1,300	2,662	-16,925	-7,522	7,221
23 wards+gov.designated cities	127,225	88,629	1,528	2,661	-11,635	-8,813	-2,235
Other cities	71,418	-4,369	-6,007	-617	-7,323	-543	8,514
Towns and villages	-7,121	-7,563	3,180	619	2,033	1,834	942
Nagoya area							
Total	4,978	12,423	2,483	-526	-2,796	-1,337	595
Nagoya city	7,875	3,502	-646	-632	-1,685	-238	-102
Other cities	562	8,762	1,215	-205	-1,371	-998	723
Towns and villages	-3,458	159	1,915	311	260	-101	-26
Osaka area							
Total	19,189	-39,765	-15,515	-4,872	-11,545	-5,985	214
Osaka city	15,379	6,430	-4,478	1,064	-62	-168	-1,202
Other cities	8,902	-41,256	-12,966	-6,243	-12,220	-6,051	1,169
Towns and villages	-5,092	-4,939	1,930	308	737	235	246
Female							
Tokyo metropolitan area							
Total	157,986	76,021	23,305	10,846	-14,006	-4,752	10,018
23 wards+gov.designated cities	113,648	90,704	15,984	4,389	-13,966	-9,944	-9,060
Other cities	52,318	-5,442	5,248	5,967	-2,607	4,186	16,770
Towns and villages	-7,981	-9,242	2,074	491	2,566	1,007	2,308
Nagoya area							
Total	-769	-2,597	110	-153	-653	-1,235	-784
Nagoya city	7,774	2,217	-588	-484	-1,538	-189	-1,240
Other cities	-4,805	-3,271	79	84	127	-683	328
Towns and villages	-3,737	-1,543	618	246	758	-364	128
Osaka area							
Total	38,101	-16,677	-8,499	309	-8,760	-6,171	-1,419
Osaka city	20,709	6,741	-3,005	819	-1,511	-2,217	-3,645
Other cities	21,997	-19,294	-6,836	-669	-8,049	-3,986	1,910
Towns and villages	-4,604	-4,124	1,343	159	800	31	315

This feature of migration according to age has been reported in previous studies; however, this paper contributes to previous studies by focusing on the gender difference in migration patterns. In terms of the male and female migration trends in these areas, the trend of female outflow from the central areas is notable. Moreover, the female

late-stage elderly net number of inflow to other cities in the Tokyo metropolitan area is twice the male net number of inflow.

A question emerges from this data: How do the male and female migration pattern form outside of metropolitan areas? To address this question, this study focuses on migration patterns in local central cities and surrounding municipalities, excluding the metropolitan areas. Local central cities in this paper are defined as government-decreed cities and core cities.[10] Table 2 indicates elderly male and female net numbers of migration in local central cities and the surrounding municipalities that belong to the same prefectures. Both the early-stage and late-stage elderly show inflow into the local central cities. However, the elderly early-stage male group flows into the surrounding municipalities while the elderly late-stage female group leaves the surrounding municipalities. Overall, females tend to move to the big cities more than males while the males tend to move to more diverse places. This tendency is more salient for the late-stage elderly female migration pattern.

[10] Government-decreed cities are the major cities specified by government ordinance and usually exceed a population of one million. Core cities are also government-decreed cities specified by government ordinance and usually exceed a population of 300,000.

Table 2. Number of net migration in the local central cities and surrounding area

		Local Centaral city				Surrounding municipalities			
		Male		Female		Male		Female	
Preferecture	Local Centaral city	age 65-74	age 75+	age 65-74	age 75+	age 65-74	age 75+	age 65-74	age 75+
Hokkaido	Sapporo+Asahikawa	1,441	1,765	1,762	2,927	-1,214	-1,495	-2,262	-3,792
Miyagi	Sendai	199	348	247	500	275	154	99	-356
Akita	Akita	58	74	-16	59	87	-75	-235	-264
Hukushima	Koriyama+Iwaki	111	121	50	-42	433	324	145	-722
Tochigi	Utsunomiya	-9	120	-14	87	517	435	353	26
Toyama	Toyama	-13	114	83	-69	-8	-22	-104	-158
Ishikawa	Kanazawa	-178	51	48	139	16	65	-102	-216
Nagano	Nagano	5	124	4	133	835	232	467	-577
Shizuoka	Shizuoka+Hamamatsu	107	177	17	192	576	581	345	78
Nara	Nara	64	152	103	277	-138	100	-136	95
Wakayama	Wakayama	-127	65	-121	-21	188	-203	105	-357
Okayama	Okayama+Kurashiki	7	360	4	443	247	-72	-64	-819
Hiroshima	Hiroshima+Fukuyama	-297	253	-199	453	55	-96	-89	-856
Kagawa	Takamatsu	1	67	-12	-12	139	103	78	-59
Ehime	Matsuyama	36	140	107	151	138	-152	-82	-1,014
Kochi	Kochi	46	131	43	-42	206	44	142	-397
Hukuoka	Hukuoka+Kitakyusyu	163	266	-4	-110	760	547	368	-151
Nagasaki	Nagasaki	-219	-93	-267	-366	394	-198	62	-914
Kumamoto	Kumamoto	101	321	179	341	691	-33	283	-641
Oita	Oita	94	147	81	296	313	15	7	-969
Miyazaki	Miyazaki	60	96	104	79	505	-88	141	-670
Kagoshima	Kagoshima	113	84	34	231	1,359	-345	548	-1,831
Total		1,765	4,886	2,233	5,645	6,376	-180	69	-14,564

IV Empirical analysis of male and female migration

The analytical framework and regression model

What is the motivation behind the migration of the elderly? This paper assumes that the motivation for migration among the elderly is neither job-related nor school-related. Moreover, the elderly's motivation to move might be low unless there would also be a change in their living arrangements. The biggest causes of change in living conditions

for the elderly are the death of a spouse, sickness, and the need for long-term care. As previously mentioned, there is a shortage of long-term care facilities in Japan, and many elderly are waiting for admission to these facilities in many municipalities. This paper hypothesizes that the elderly who live alone and feel the need for long-term care may want to move to municipalities that have greater availability in long-term care facilities compared to other municipalities.

Thus, this paper presents three factors to construct the empirical model. The first factor has to do with the availability of the long-term care facilities to accommodate the elderly. The second factor involves the cost that incurs when the elderly migrate. The third factor has to do with the state of the elderly and the possibility of family support. The regression model for the elderly's inter-municipal migration is as follows;

(4)

$$NMR_i = \beta_0 + \beta_1 Welfare_i + \beta_2 Healthcare_i + \beta_3 Sanatorium_i + \beta_4 Private_i + \beta_5 Doc_i + \beta_6 Premium_i + \beta_7 PHouse_i + \beta_8 Hsize_i + \beta_9 Alone_i + \beta_{10} D\_GD_i + \beta_{11} D\_Core_i + \beta_{12} D\_Tokyo_i + \beta_{13} D\_Nagoya_i + \beta_{14} D\_Osaka_i + \varepsilon_i$$

where NMR is the net migration rate based on the calculated migration data of the elderly from 2000 to 2005. This paper estimates the regression model (4) separately for each gender, the early-stage elderly (age 65–74), and the late-stage elderly (age 75 and over), respectively. To avoid the problem of causal relation, this paper uses independent variables collected from data in 2000.

The independent variables that show the availability of the long-term care facilities

to accommodate the elderly are as follows. *Welfare* is the capacity of welfare facilities (*Kaigo Rojin Fukushi Shisetsu*) where long-term care is mainly offered, *Healthcare* is the capacity of healthcare facilities (*Kaigo Rojin Hoken Shisetsu*) where long-term care and rehabilitation are mainly offered, and *Sanatorium* is the capacity of sanatorium-type medical care facilities (*Kaigo Ryoyo-gata Iryo Shisetsu*). These facilities are established and managed by non-profit corporations or local public governments. *Private* refers to the welfare facilities that are established and managed by for-profit corporations. Each variable is divided by the number of aged people in each municipality. These variables show the quantitative values of each facility, and these valuables mean the possibility for elderly inflow into these facilities. *Doc* represents the number of doctors in hospitals per person. This value shows the level of medical service. It is a proxy for hospitalization of the elderly for non-medical reasons that results from a shortage of long-term care insurance facilities.

The independent variables that show the costs incurred when the elderly migrate are as follows. *Premium* is the long-term care premium for the elderly in each municipality. This variable shows the burden that results from local long-term care service. *PHouse* is the average land price for a residential quarter. These variables represent the cost factor of moving in each municipality.

The independent variables that show the state of elderly and the possibility of family support are as follows. *Hsize* is the average number of persons per household, and *Alone* is the percentage of elderly who live alone (number of aged single households as a percentage of all households). The former shows the strength of family support, and the latter shows the opposite, namely weak family support.

As previously discussed, the migration patterns among males and females is

different in each municipality, especially between metropolitan and local areas. This paper adopts dummy variables that reflect the municipalities' characteristics. D_GD is a dummy variable that shows government-decreed cities and D_Core is a dummy variable that shows core cities. D_Tokyo is a municipality included in the Tokyo metropolitan area and D_Nagoya is a municipality included in the Nagoya area. D_Osaka is a municipality included in the Osaka area. ε is the error term.

Data

The dependent variables used for the net migration rate by gender and age were calculated in Section III. The dependent variables are NMR for male and female early-stage elderly and NMR for male and female late-stage elderly.

Data on long-term care facilities were obtained from the *Survey of Institutions and Establishments for Long-term Care* (Ministry of Health, Labor and Welfare). The number of doctors was taken from the *Survey of Medical Institutions* (Ministry of Health, Labor and Welfare). The average land price of residential quarters was taken from the *Public Notice of Land Prices* (Ministry of Land, Infrastructure, Transport, and Tourism). The numbers for populations and households were obtained from the *Population Census* (Ministry of Internal Affairs and Communications).

The survey data for long-term care insurance premium for the elderly during this period is not available to the public. Therefore, we surveyed all prefectures and collected the insurance premium data.

Table 3. Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max
Dependent variables				
Net migration rate of early-stage eldery				
Male	0.004	0.025	-0.196	0.210
Female	-0.001	0.021	-0.219	0.151
Net migration rate of late-stage eldery				
Male	0.001	0.048	-0.342	0.667
Female	-0.007	0.068	-0.440	0.738
Independent variables				
Welfare	0.019	0.020	0.000	0.243
Healthcare	0.011	0.017	0.000	0.191
Sanatorium	0.004	0.011	0.000	0.194
Private	0.001	0.009	0.000	0.281
Doc	0.001	0.002	0.000	0.035
Premium (Yen)	2,795	385	1,533	4,100
Phouse (Yen)	50,394	75,531	1,400	1,510,000
Hsize	3.043	0.458	1.701	4.566
Alone	0.078	0.042	0.007	0.291

Summary statistics are presented in Table 3. The average net migration rate for the male early-stage elderly is 0.4%, and the same rate for the late-stage elderly is 0.1%. The maximum rate of the male early-stage elderly migration is about 21%, and that of late-stage elderly increases to 66.7%. On the other hand, the average net migration rate for the female early-stage elderly is -0.1%, and for the late-stage elderly, this rate is -0.7%. The maximum rate of the female early-stage elderly migration is about 15.1%, and that of late-stage elderly increases to 73.8%. Overall, the variation of the NMR from early-stage to late-stage has expanded.

The welfare facilities cover 1.9% of the aged population. The healthcare facilities cover 1.1%, and the sanatorium-type medical care facilities cover 0.4% of this

population. However, these facilities were distributed from zero to about 20% among municipalities in the year 2000. The private care facilities cover 0.1% of the aged population. The number of entries into the private facilities was lower than the non-profit established facilities in 2000. The number of doctors for each population is 0.1%; doctors did not exist in 39 municipalities.

The average long-term care insurance premium for the elderly is 2,794 yen per month. The maximum premium is 4,100 yen and the minimum is 1,533 yen. The average size of households is 3.0 people, and 7.8% of all households are aged single-person households.

Estimation results

Table 4 shows the estimation results for equation (4) for 2,018 nationwide municipalities. The estimation method this paper employed is ordinary least squares (OLS) with robust standard errors.

Regression results for the early-stage elderly are not clear. The male *Welfare* and *Healthcare* coefficients are positively significant; however, the *Welfare* coefficient's significance is not that strong. The coefficients for the long-term care facilities for the female regression result are all insignificant. On the other hand, the coefficients of *Doc* are both significant. The early-stage elderly might be considering the issue of enhancement of medical treatment in terms of long-term care. As predicted, when the necessity of long-term care is compared with the necessity of medical treatment, the former might become more important after the person reaches a certain age.

The coefficients of the long-term care premium for the elderly are both negative but not significant. The coefficients of the *Phouse* are both negative and significant. The

high average land price of residential quarters functions as a barrier for the early-stage elderly's inflow. The coefficients of the *Hsize* are both positively significant. If a family size is large, there is a greater tolerance of domestic support, and this becomes a factor that can control the elderly's outflow. This result shows that NMR decreases as the average family size also decreases. The coefficient of the *Alone* is significantly positive only for the male early-stage elderly. We assumed that when elderlies live alone and want long-term care, they move to municipalities that have a greater availability of long-term care facilities. This result is contrary to our assumption. The early-stage elderly's migration might not be motivated by a placement in long-term care facilities only.

These results show that for the early-stage elderly, the possibility that the need for long-term care leads to migration is not so clear. This is particularly true for females, given that the migration for early-stage female elderly was not triggered by the need for long-term care facilities, who tended to move to big cities more than males.

Regression results for the late-stage elderly are clearer than the early-stage regression results. The fits of the regressions are high when compared with the early-stage regression results. Many coefficients of long-term care facilities are positively significant. In particular, the triggering effect of long-term care facilities on late-stage female migration is stronger and more significant than the effect for males. Moreover, the coefficient of private long-term care facilities is positively significant.

The coefficient of the *Alone* is significantly negative for both the male and female regression results. This result shows that when the late-stage elderly live alone, they move to municipalities that have a greater availability of long-term care facilities. In addition, the coefficient of this variable for the female regression result is stronger than

that of the male result.

The coefficients of the dummy valuables are all positively significant for the female regression result. Moreover, the coefficients are all stronger than the male results.

Table 4. Regression results of welfare migration

	Net migration rate of early-stage elderly		Net migration rate of late-stage elderly	
	Male	Female	Male	Female
Welfare	0.070 *	0.038	0.639 ***	1.209 ***
	(1.68)	(1.25)	(9.27)	(10.15)
Healthcare	0.093 ***	0.048	0.134 *	0.481 ***
	(2.69)	(1.38)	(1.65)	(5.38)
Sanatorium	0.037	0.028	0.240 ***	0.346 **
	(0.59)	(0.49)	(2.57)	(2.29)
Private	0.000	0.000	0.000	0.000 *
	(0.93)	(1.19)	(0.98)	(1.82)
Doc	0.741 *	1.066 *	0.771	-1.163
	(1.7)	(2.23)	(0.94)	(-1.28)
Premium	-1.62e-6	-2.82e-6	-4.08e-6	-8.30e-6 *
	(-0.79)	(-1.59)	(-1.22)	(-1.89)
Phouse	-5.18e-8 ***	-3.33e-8 **	-7.55e-10	-2.53e-8
	(-4.23)	(-2.35)	(-0.02)	(-0.63)
Hsize	0.009 ***	0.007 ***	0.008 *	0.005
	(3.86)	(3.73)	(1.79)	(0.9)
Alone	0.074 ***	-0.007	-0.287 ***	-0.485 ***
	(3.36)	(-0.38)	(-6.43)	(-8.96)
Dummy_Government-decreed cities	0.009 ***	0.110 ***	0.019 ***	0.037 ***
	(2.95)	(3.18)	(3.02)	(3.57)
Dummy_Core cities	0.001	0.006 ***	0.014 ***	0.021 ***
	(0.71)	(3.74)	(4.16)	(4.33)
Dummy_Tokyo erea	0.012	0.011 ***	0.017 ***	0.035 ***
	(5.17)	(4.82)	(4.66)	(6.73)
Dummy_Nagoya erea	-0.002	0.001	0.010	0.017 ***
	(-0.86)	(0.39)	(1.46)	(2.64)
Dummy_Osaka erea	-0.001	0.002	0.001	0.007 *
	(-0.47)	(1.04)	(0.38)	(1.67)
Constant	-0.025 **	-0.018 *	-0.010	0.001
	(-2.22)	(-1.82)	(-0.47)	(0.04)
Adj R-squared	0.058	0.060	0.183	0.278
Number of observations	2,018	2,018	2,018	2,018

Note: Robust standard errors are in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively.

Ultimately, this study finds three results through regressions. First, the hypothesis that the elderly want to move to municipalities where long-term care facilities are more readily available is more suitable for the late-stage elderly. However, the result for the male early-stage elderly regression somewhat adjusts to the hypothesis. Second, the inducement or triggering effect for the late-stage elderly is stronger among females than males. Third, the migration pattern of females shows a tendency to concentrate in the big cities.

Influence of migration on care needs in municipalities

As the elderly migrate to long-term care insurance facilities, this migration can affect and influence the state of long-term care in the various municipalities to which the elderly are migrating. In this section, we clarify this hypothesis in terms of the notions of "aging-in-place" and "net migration".[11]

In the long-term care insurance system, to be eligible for long-term care insurance benefits, an insured elderly person must undergo evaluation for his or her needs and receive certification by the Certification Committee for Long-term Care Need in the municipality. The committee judges which stage of care is appropriate for the applicant, taking into consideration the evaluation results of the applicant's mental and physical conditions. The national criteria for the certification are established objectively, and care needs are categorized into five stages of long-term care (stages 1–5, for the most

[11] Rogers and Woodward (1988) show that the special (geographical) distribution of the elderly population is composed of two factors. The first factor has to do with the residents of the region who become elderly (aging-in-place). The second factor is net migration (inflow).

serious disorders).

This paper uses two indicators of change in the state of long-term care needs in a given municipality. The first indicator is the increasing rate of the number of people who receive certification for long-term care need from 2000 to 2005. This indicator shows the increasing rate of people who need long-term care services. The second indicator is focused on the increasing rate of the number of people who are categorized as Stage 3 or beyond of long-term care needs from 2000 to 2005. Generally, most of elderly who are in long-term care facilities are categorized as Stage 3 or beyond. This indicator shows the proportion of serious disorders among the elderly.

This paper employs these indicators as dependent variables while the independent variables include the increasing rate of the number of aging-in-place and the net migration rate from 2000 to 2005 among males and females. The estimation method we employed is ordinary least squares (OLS) with robust standard errors. The regression coefficients are reported in Table 5.

The regression result of the increasing rate of the number of people certified for long-term care need from 2000 to 2005 shows that the aging-in-place and net migration effects for males are stronger at the early-stage than the late-stage. On the other hand, for females, the aging-in-place and net migration effects are both positively significant only for the late-stage. Males might need long-term care in the early-stage because the average life expectancy for men is shorter than for women. Females who live longer than males might move to long-term care facilities at the late-stage, after their spouses have died.

This trend becomes clearer in the later regression results. For females at the late-stage, the aging-in-place and net migration effects are both positively significant.

This result means that the municipalities into which late-stage elderly female flow have greater availability of long-term care facilities. In addition, the welfare migration among late-stage elderly females might increase as the need for long-term care increases.

Table 5. Regression results of migration impact

	the increasing rate of the number of people who are certified for long-term care need from 2000 to 2005		the increasing rate of the number of people who are categorized over 3rd degree from 2000 to 2005	
	Coef.	t	Coef.	t
Male				
Rate of aging-in-place				
early-stage	0.280	3.65 **	0.075	0.70
late-stage	0.204	2.56 *	0.089	0.94 *
Net migration rate				
early-stage	0.620	2.04 **	-0.052	-0.13
late-stage	0.208	1.14	0.315	0.86
Female				
Rate of aging-in-place				
early-stage	0.007	0.07	0.027	0.23
late-stage	0.351	4.47 ***	0.289	2.86 ***
Net migration rate				
early-stage	-0.057	-0.19	-0.497	-1.04
late-stage	0.291	2.79 ***	0.369	2.91 ***
constant	0.173	7.57 ***	0.187	6.67 ***
Adj R-squared	0.139		0.039	
Number of observations	1,907		1,907	

Note: Robust standard errors are in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% level, respectively.

V Conclusion

This paper aimed to clarify differences in the patterns of welfare-induced migration among elderly males and females in Japan through empirical analysis. The hypothesis of this paper is that the need for care arises among elderly as a result of the loss of spouses and partners, and in this case, elderly often migrate to municipalities that have

a greater availability of long-term care facilities. Females tend to live longer than males, thus the migration patterns for long-term care facilities is expected to be more salient among females, especially those at the late-stage.

There are no available statistics to capture the inter-municipal migration patterns by gender and age in Japan. Therefore, this paper calculated the net migration data by gender and age group using plural statistical materials. The net migration data shows that females flow into the big cities at greater rates than males. Moreover, there was a greater flow into cities among the late-stage elderly.

Results also showed a clear gender difference for both the early-stage and late-stage elderly. Results also revealed that the hypothesis of welfare migration is more appropriate for the late-stage elderly rather than the early-stage elderly. In addition, results confirmed that welfare-induced migration was a trend among males, especially those at the early-stage. The effect of the long-term care facilities was found to be the strongest for migration patterns among late-stage elderly females. In addition, the pattern for female migration showed consistent inflow to the larger cities.

We also performed a regression analysis to confirm the effects of aging-in-place and net migration for long-term care needs in each municipality. Findings show that the number of elderly who need long-term care increases because of increasing aging-in-place and net migration, along with the effects of welfare migration among the late-stage elderly females.

There are several important implications that arise from the findings of this study. If the elderly continue to migrate in hopes of receiving long-term care services in a given municipality, and this migration has the effect of lowering the quality of this care, the long-term care insurance system in Japan is in danger of becoming a ‘race to the

bottom.’

In the current context of the aging baby-boom generation, the trend of elderly migration is only becoming stronger in Japan. Elderly migration is a key factor that will shape the future of Japan’s long-term care insurance policy. Future studies should continue to explore the connection between gender, age, long-term care availability, and interregional migration in Japan. Japanese long-term care insurance system is managed at each municipality level. The expansion of the welfare migration may make it impossible to continue the Japanese long-term care insurance system.

We think that the implications in this paper should be verified for another country. The increase in elderly population and requirement of long-term care for elderly is a matter of concern in many other countries. In the future, it would be interesting to conduct a comparative study for other countries that have similar or different family support and long-term care system for elderly as Japan.

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