

Factors Affecting Close Proximity of Older Parents and their Adult Children in Japan

Tomohiko YOSHIDA*

Abstract: Recent studies have begun to consider the proximity of young mothers to their parents and examining whether the close proximity improves the mothers' employment conditions. Such studies have consequently concluded that the result of any analysis supports a higher probability of gaining employment for mothers who are living close to their own or their husbands' parents. This paper aims to identify factors affecting this close proximity through the analyses of data regarding social aspects in Social Indicators and Housing and Land Survey of Japan. Through these analyses, variables such as dual-income households, hours of female working, and salaries of female part-time workers were found to not be significant as independent variables in the regression models. However, the factors that were found to affect the close proximity of the households of single older adults to their children were determined to be the child dependency ratio [positive], the ratio of family nuclei households [positive], the ratio of persons in primary industry [negative], and the number of retail stores per 1,000 persons [positive] at the prefectural level. In other words, if parents have young children in their family nuclei households, and if their single older parents are not working in a primary industry, the single older parent is more likely to live close to their adult children. In addition to this, the number of retail stores was accepted as an independent variable because such close proximity of households is common in more urbanized areas than rural areas.

Key Words: *Living close, Housing and Land Survey, single, older adults, parent and child*

1. Introduction

The Total Fertility Rate (TFR) of Japan has received considerable attention in recent years with many studies discussing the causes and consequences of the current as well as possible effective policies for improving it. Several of these studies, mainly those in the field of demography and sociology, have suggested measures such as introducing supports for young female workers or mothers. Kamata and Iwasawa (2009) explained using multiple regression models that the TFR of Japan reflects the ratio of persons employed in primary industry, the unemployment rate, the ratio of family nuclei households, the ratio of female university graduates, the ratio of females obtaining employment, the un-married female rate, the marriage rate to un-married of females, and the number of nursery schools per 1,000 persons.

* Professor of College of Policy Science, Ritsumeikan University
Email: tyoshida@sps.ritsumei.ac.jp
Received on July 24, 2019; accepted after peer reviews on January 31, 2020; published online: February 28, 2020.

Meanwhile, from the viewpoint of quantitative sociology, Tsutsui (2016) introduced a model predicting birthrate in 22 OECD countries as well as historical changes in various statistics regarding Japan. According to Tsutsui's model, TFR is explained by female labor force participation rate (FLP), male unemployment rate, and gross domestic products per capita. Tsutsui (2016) found that FLP is recently beginning to have a positive impact on TFR in these developed countries as evidenced by the OECD Statistics of 2012.

It was generally said that Tokyo's relatively low fertility rate was partly because of the higher un-married rate of young females and the lower fertility rate of married females in Tokyo that is approximately the same as the average in local areas. However, Hirohara, Hiroshima, and Shirakami (1995) warned that it was not sufficient to focus only on the fertility rate of married females. The fertility rate of married females only explains the childbirth in specific ages of mothers and in statistic years. To address this, Hirohara et al. (1995) proposed estimating the total number of children using data from the Population Census which provides the total number of children who live together in their houses. Consequently, by applying this method, Hirohara et al. (1995) concluded that there was a large gap between the fertility rate of employed females and unemployed females, particularly so in Tokyo. Tokyo not only showed the lowest TFR in Japan, but also the lowest level of employment rate among young females, the lowest fertility rate among female workers, and the lowest fertility rate among married females (Hirohara et al., 1995).

Recently, some studies have focused on the close proximity of young mothers to their parents and suggesting that the proximity improves the likelihood young mothers will gain employment. It can be considered as a weak and comprehensive reason for the fertility rate in Japan, but it may not have a direct effect on raising the fertility rate.

Fukui Prefecture is a well-known region where the relationships between older parents and their adult children are close, and it is thought to be natural for young mothers to keep working after the birth of children. It is often said that Fukui Prefecture is a successful case, and it is known as the "Fukui Model" in terms of the proximity of these two generations (Fujiyoshi, 2018).

From the viewpoint of urban sociology, Matsukawa (2015) found that the younger generation prefers the close proximity of older parents through a survey in "the New Towns" and discussed the importance of the proximity of these two generations for a new theory of urban sociology.

Hirakawa (2018) pointed out that, in the past studies, it was thought to be more important whether mothers were living together older parents in their houses because they were likely to obtain jobs because they had support for nursing their children. However, Hirakawa (2018) analyzed individual data from the Japanese Longitudinal Survey on Employment and Fertility using a linear probability model and concluded that the close proximity of mothers to their parents or their husbands' parents, rather than living together, significantly increases the probability that the mothers will obtain jobs.

Fukuda and Hisamoto (2012) analyzed the data from Japan General Social Surveys 2006, which was compiled by the University of Tokyo, and examined the working status of mothers by types of young nuclear families who were living close to their parents. Fukuda and Hisamoto (2012) consequently concluded that having children younger than six years of age generally restrains young females from working; however, multinomial logistic regression analyses indicates that the probability that young mothers will obtain employment increases when they live close to their parents (the children's grandparents). Interestingly, Fukuda and Hisamoto (2012) highlighted that a higher probability of obtaining employment can only be seen when the parents are living within 15 minutes of travel time, regardless of transport mode.

In this paper, the present author aims to examine factors that affect the proximity of parents and adult children households by some basic statistical data from the Population Census, Social Index, or Housing and Land Survey through linear regression analysis. Previous studies have analyzed the close proximity of parents and children households through specific surveys from the viewpoint of mothers' participation in the labor force, however, the present author seeks to analyze data from governmental

statistics focusing on the number of one-person households of older adults. Here, the term “older” means individuals who are at least 65 years of age, and the term “proximity” means so-called psychological distance, regardless of transport mode.

2. Overview of Close Proximity of Parents and Children

Figure 1 shows the change of the number of households by family type with household member(s) 65 years of age and over in the Population Census. The change of the family types that have older adults in Japan since 1980 is clearly shown in Figure 1. “One-person” and “Aged Couple¹⁾” can be interpreted as relating to the grandparent generation, because this data only counts the number of households in which one or more of the members is older than 65 years of age. Meanwhile, “Three Generation” households comprise at least one member from the grandparent, parent, and grandchild generations, respectively. As a result of the increase of singles and couples of older adults, three-generation families (the black portions of the bar chart in the figure) have dramatically decreased in the figure. This change is closely related to an increase in small-size households, regardless of age groups and geographical regions.

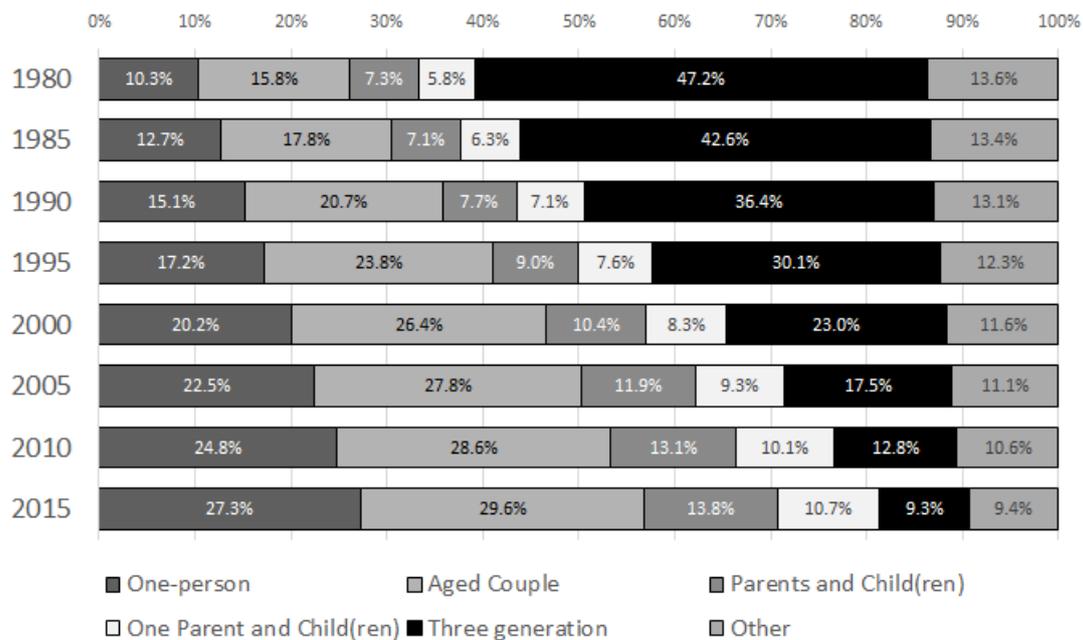


Figure 1. Number of Households by Family Type with Household Member(s) 65 Years of Age and Over (Private Households)

Source: Population Census of Japan 1980-2015

When discussing the proximity through statistics and related analysis, two aspects of proximity should be carefully distinguished. One aspect is the proximity which is obtained by the number of households comprising adult children and grandchildren. The other aspect is the proximity which is obtained by the number of households comprising grandparents. These two aspects of proximity can vary and have different meanings in terms of statistic context; however, the concept of close proximity does not imply any superiority between grandparents and adult children families. Unfortunately, aside from researches such as Fukuda and Hisamoto (2012) and Hirakawa (2018), we have few nationwide statistics in Japan that can enable us to discuss the proximity based on the number of families with adult children and grandchildren. However, if we wish to know the intergenerational relations in detail,

we can focus on the data of households with older adults who have children, and the data of domicile of the adult children in the Housing and Land Survey of Japan (HLS).

The HLS is conducted every five years and reports the number of households of older adults and domicile of the adult children who are living close to their parents. The adult children's domicile is tabulated in minutes from older adults' houses, and is stratified into the levels of "less than 5 minutes," "less than 15 minutes," "less than 1 hour," "over 1 hour," and "have no children," regardless of transport mode. HLS is based on the stratified random sampling of 220,000 regions comprising 3,700,000 households, but the number of sample households can be expanded based on the total estimated population and controlled within the acceptable errors.

In HLS 2013, the number of ordinary households was reported as being 52.3 million and the number of households with the members' age 65 or older was reported as being 20.9 million. Thus, the number of households having older adults is 39.9% to the total household. On the other hand, the households of one-person and a couple of older adults count 5.52 million and 5.88 million. Among the 5.88 million of the households of a couple of age 65 or older, there are totally 1.21 million households of older adults that have either member of age 65 or older, and there are 4.67 million households that have both members of age 65 or older.

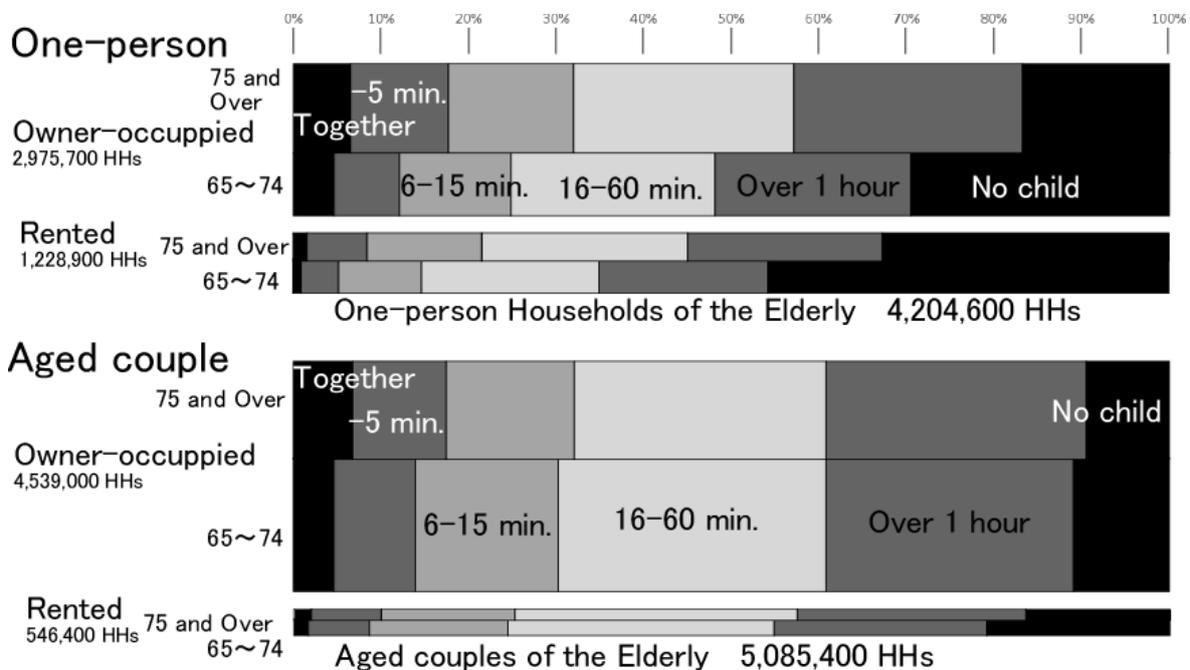


Figure 2. Ordinary Households by the One-person Households of a Person Age 65 or Older and of an Aged Couple by Domicile of the Main Earner's Children (Japan).

Source: Households of Housing and Land Survey in Japan 2013

Regarding the statistics of older adults in HLS, the tabulation of "Domicile of the Main Earner's Children" is available by family type. Figure 2 shows the exact composition of the households by domicile of the main earner's children, family type, tenure of dwelling, and age of the earner. Unfortunately, the category of "30 minutes" is not tabulated in this survey; however, close proximity to the adult children can be analyzed according to the "minutes" from the children's house, regardless of transport mode. If we define "15 minutes" or less as "close," approximately 25% of one-person households and 30% of the aged couple households are situated "close" to their adult children, and probably their grandchildren. Further, the older earners become, the more likely they are to live close to their parents, in any type of dwelling tenure. Additionally, households living in owner-occupied houses are more likely to live close to their children.

Table 1. Selected Tabulation of Older Adults of Japan (Unit: Household)

Households with and without members of Older Adults	
Ordinary households	52,298,000
without household members age 65 or older	31,408,300
with household members age 65 or older	20,889,700
Households with One and Two members of Older Adults	
Household of One-person age 65 or older	5,519,000
Household of a couple of age 65 or older	5,875,000
Either member of a couple of age 65 or older	1,208,100
Both members of a couple of age 65 or older	4,666,900

Source: Households of Housing and Land Survey in Japan 2013

Figure 2 also shows the households of the older adults who have “No child” (located at the right side of bar charts). Here, more one-person households in rented houses have no children than do aged couples. The total numbers of households in each family type in this figure (4.20 million and 5.08 million) are different from those shown in Table 1 (5.52 million and 5.88 million) despite the same survey in the same year. This is because there are some “unknown” households, that is households where it is not known whether there are children or not. It should be noted that the gap is more than a million households between “known” and “unknown.”

Figure 3 shows the locational distribution across Japan of the ratios of the one-person older adults who live within 15 minutes proximity to their children. Since there are “unknown” households where it is not known whether they have children or not, this number is removed from the total number of households of older adults when the ratio of the one-person older adults is calculated in Figure 3. The number of one-person older adults who live close to their children was divided by the total number of older adult households excluding the “unknown” households.

In Figure 3, the prefectures in the western part of Japan show a relatively high ratio of close proximity than do those in the east. This may be because more people living in the eastern prefectures such as Akita, Iwate, and Aomori, are living with their parents. Living with parents may be a popular way of intergeneration kinships in the Tohoku Region because of the dependence on farming in this region. Close living is the most popular in Okinawa Prefecture (27.9%), followed by the prefectures of Kagawa (27.4%), Wakayama (27.0%), Miyazaki (27.0%), and Mie (26.7%). On the other hand, the lowest ratio is in Iwate Prefecture (16.1%), followed by the prefectures of Tokyo (16.6%), Kanagawa (17.2%), Aomori (18.8%), and Akita (19.1%). There are two types of Prefectures that show low ratios of close proximity. The first type is rural areas such as the Tohoku Region where, as previously mentioned, living together is more popular, and the other is large metropolitan areas, such as Tokyo and Kanagawa, where many young singles are living.

Figure 4 again shows the distribution of the ratio of the one-person households of older adults who have children living less than 15 minutes from their children but focuses on the Kansai Metropolitan Area and surrounding areas because Kansai Metropolitan Area shows a higher percentage of households who prefer the close proximity of older parents to their adult children than Tokyo Metropolitan Area. Figure 5 shows the same region as Figure 4 but indicates areas where over 30% of the one-person households of older adults who live within 15 minutes proximity. Figure 5 also shows the Urbanization Promotion Area of Japan (UPA), which relates to areas defined by the City Planning Act as locations where urbanization will be completed within the next 10 years. Both figures are based on the same data from HLS 2013 and are tabulated by municipalities.

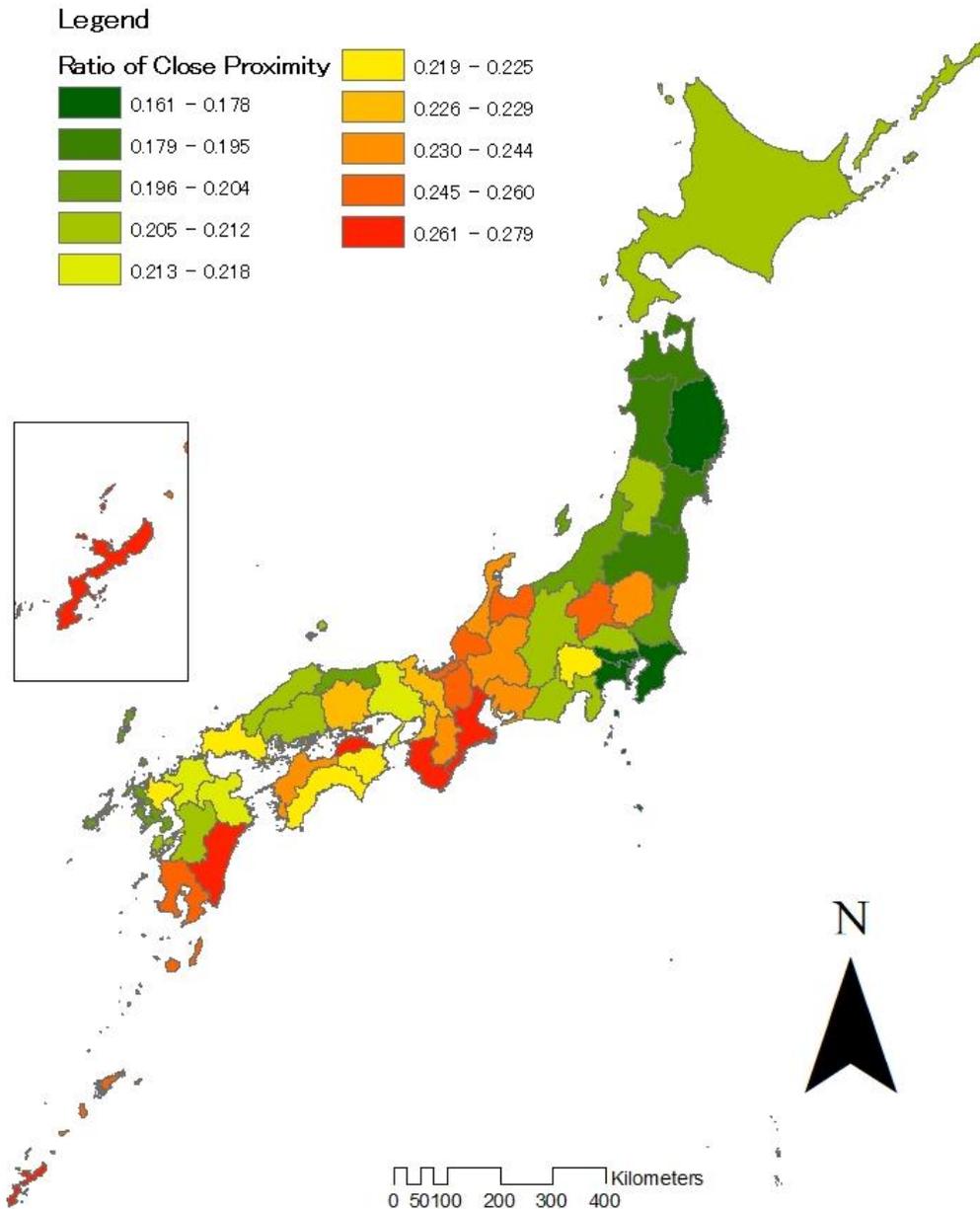


Figure 3. Distribution of Ratio of the One-person Households of Older Adults Who have Adult Children Living in Less than 15 Minutes by Prefectures of Japan (Jenk's Natural Break)

Source: Households of Housing and Land Survey in Japan 2013

In Figure 5, there are 25 municipalities in Kansai Metropolitan Area in which over 30% of the one-person households of older adults live close to their children. As seen near the bottom of the map, Tanabe City and Gobo City in Wakayama Prefecture show a high ratio of close proximity in the metropolitan area and are located relatively far from the UPA. However, the other 23 municipalities are clearly located on the outer fringes of the UPA. The highest ratios regarding close proximity are in Seika Town, Kyoto (41.2%), Mihara Ward, Sakai City, Osaka (40.4%), Kashiwara City, Osaka (37.9%), Takasago City (36.6%), and Harima Town, Hyogo (36.6%). On the other hand, the lowest ratios are observed in Kyotamba Town (0.0%), Naniwa Ward in Osaka (9.5%), Oyamazaki Town in Kyoto (10.3%), Kanan Town in Osaka (10.9%), and Nishinari Ward in Osaka City (12.1%).

A previous study in the U.S. reported that rural parents appear more isolated and the older adults in the rural area tend to be admitted nursing homes at a younger age in an urban area after moving from the rural area because rural parents have fewer children the close proximity (Lin and Rogerson 1995, p.326). In other words, close proximity is common in urban areas, which can be considered a phenomenon caused by the urban way of living.

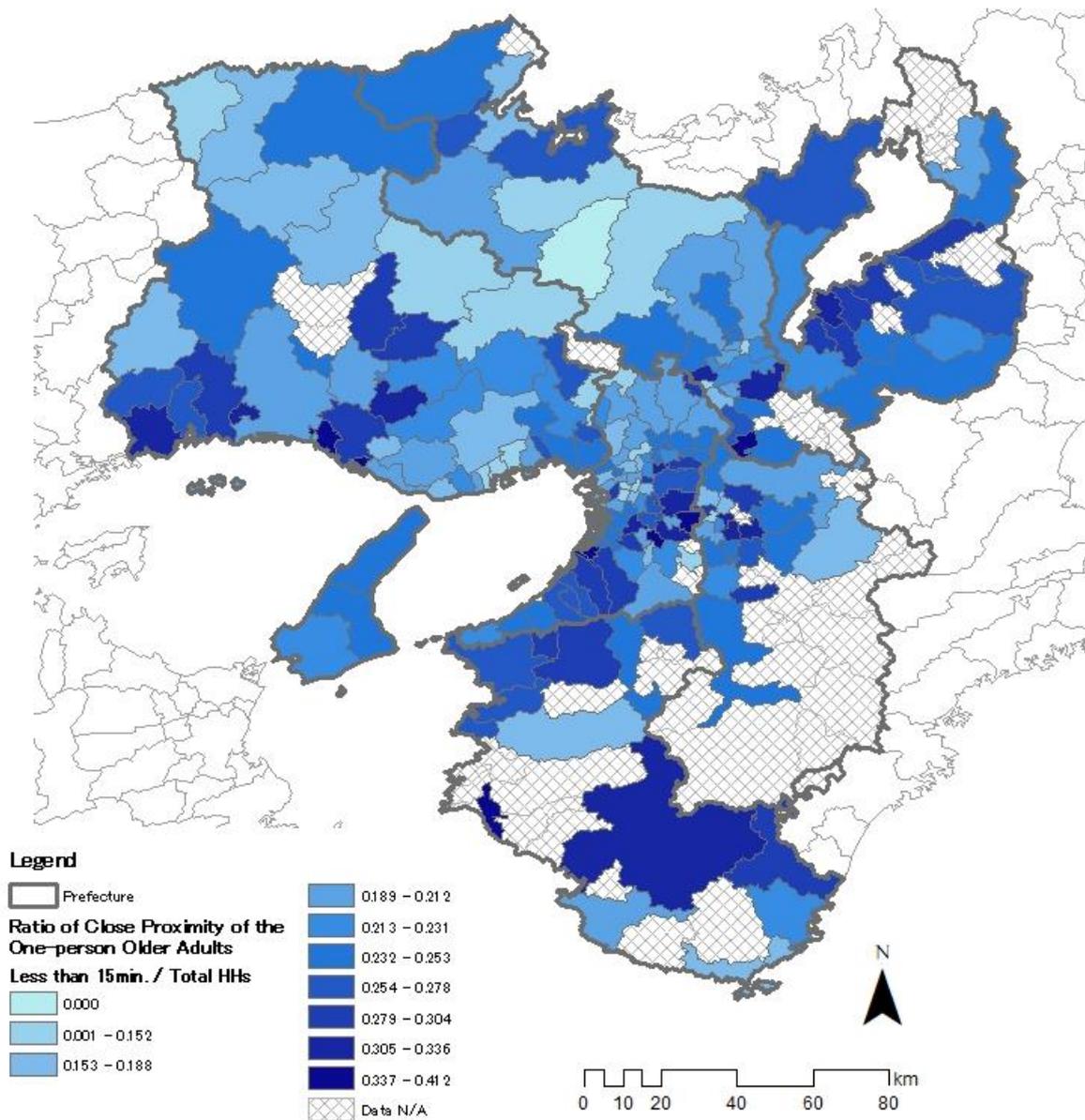


Figure 4. Distribution of Ratio of the One-person Households of Older Adults Who have Adult Children Living in Less than 15 Minutes in Kansai Metropolitan Area and Surrounding Areas (Jenk's Natural Break)

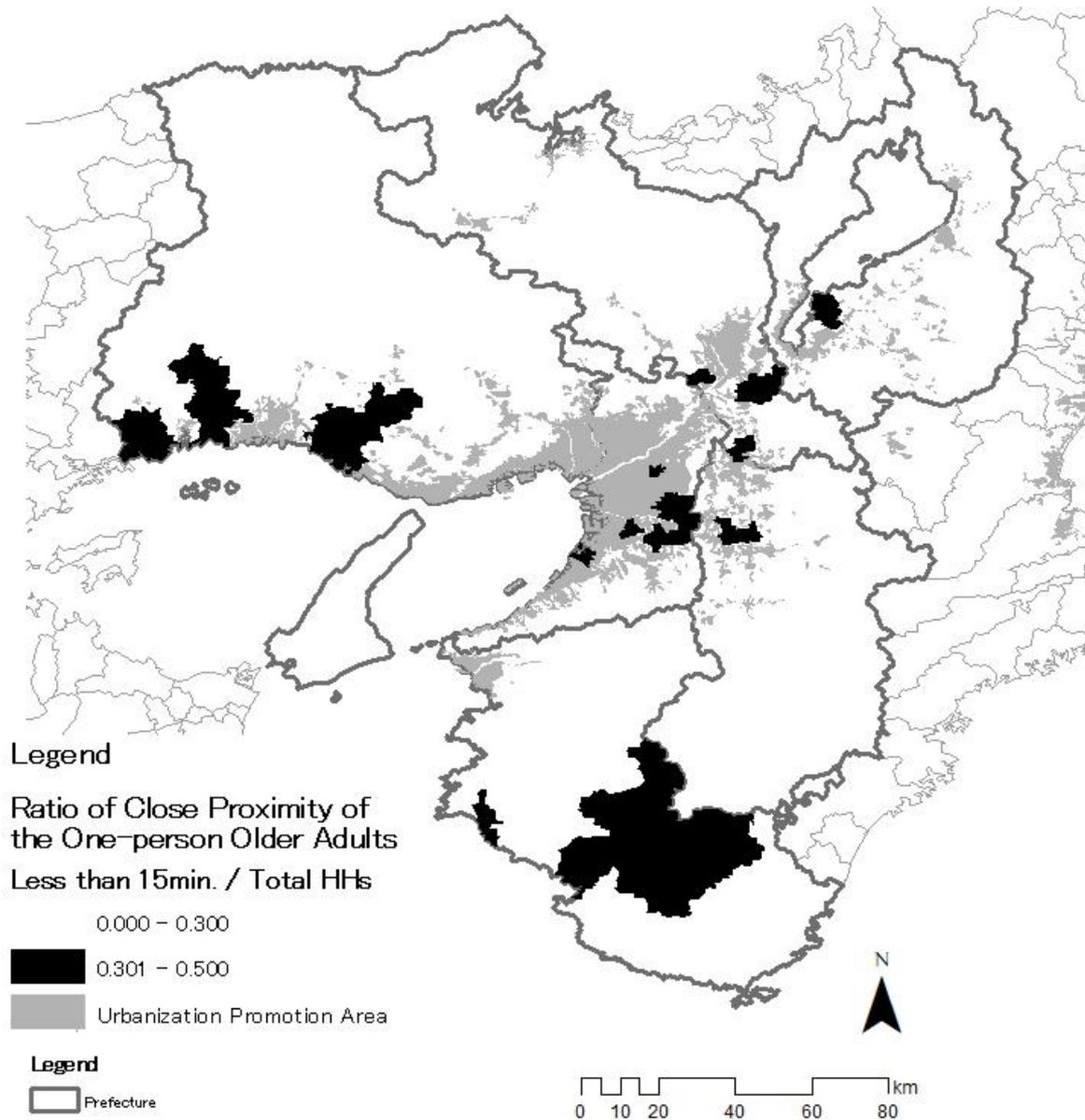


Figure 5. Locational Distribution of Ratio more than 30% of the One-person Households of Older Adults Living in Less than 15 Minutes in Comparison with Urbanization Promotion Area by Municipalities.

Source: Households of Housing and Land Survey in Japan 2013

3. Hypotheses, Method, and the Model

In this chapter, the present author tries to analyze the factors that affect the close proximity of parents' and their children's households in Japan through linear multiple regression analyses. For this purpose, the section begins with the presentation of four hypotheses, and this is followed by determining the independent variables.

- (1) The model will be explained by data of family nuclei households²⁾ because close proximity is directly caused once a younger member and older household members separate their domiciles. A general process is parents and children trying to separate their houses, daily living, and family budget so that the children can become independent adults.
- (2) The model will also be explained by data regarding small children. As discussed in Section 1 of this paper (Introduction), the existence of children younger than six years of age generally restrains young mothers from working, and the probability that young mothers will find jobs increases when they live close to their parent(s).
- (3) The model will also consist of variables related to the working conditions of householders including the father and/or mother. This is also discussed in Section 1 with close proximity enabling mothers to find jobs.
- (4) The model will also consist of variables related to the convenience of daily living. There are many variables that show the degree of convenience in daily living; examples include urban infrastructures, such as roads, water supply, ownership of a vehicle, and retail stores.

Based on the above hypotheses, independent variables were determined from governmental statistics recorded in “Social Indicator by Prefectures” and “Social Indicator by Municipalities” which are tabulated for both by prefectures and municipalities. The “Social Indicator” comprises various governmental statistic sources, categorized into 13 fields: Population and Households, Natural Environment, Economic Base, Administrative Base, Education, Labor, Culture and Sports, Dwelling, Health and Medical Care, Welfare and Social Security, Safety, Family Budget, Daily Time. The present author selected 293 variables from seven of the categories; namely: Population and Households, Economic Base, Labor, Dwellings, Health and Medical Care, Welfare and Social Security, and Family Budget.

Each correlation coefficient among these 293 variables was checked and, for each group of variables that were considered to be in a strong correlation or to have tradeoff relations, specific representative variables was selected; for example: Ratio of owned/rented houses, Ratio of population with 0-15 years old/16-64 years old/65 and over, Ratio of persons employed in the primary/secondary/tertiary industry, and Monthly income per person/per household. This process resulted in the creation of 40 variables among the seven categories³⁾.

Using the SPSS application, after applying both stepwise and forced entry processes as the methods for variable entry and removal, the models shown in Table 2 and Table 3 were obtained. These tables show the results of multiple regression analyses of the ratio of one-person households of older adults for prefectures (Table 2) and in municipalities (Table 3). For both, the dependent variable is the ratio of one-person households of older adults who have a child(ren) living less than 15 minutes away, and the ratio is determined by dividing the value by the total number of households comprising one-person households of older adults. The results shown in Table 2 and Table.3 are actually sourced from the same multiple regression model; however, Table 2 is tabulated using prefectural data, while Table 3 is tabulated using municipal data comprising city, ward, town, and village of Japanese administrative bodies.

In the stepwise process, variables like the “Ratio of dual-income households”, “Hours worked [monthly average, female]”, and “Salary of part-time workers [hour, female]” were not significantly accepted as independent variables. It indicates that the working condition of mothers cannot be a significant factor for explaining their close proximity to older parents at the prefectural level.

The tables show the obtained statistics, such as unstandardized coefficient with standard errors, standardized coefficient (Beta), t-value, significance probability, and collinearity statistics with tolerance and variance-inflation factors (VIF), adjusted R squares, and F-values.

Table 2. Multiple Regression Model of Close Proximity Ratio of the One-person Households of Older Adults (Prefecture)

Coefficients by Type of Cases:		47 Prefectures						
Dependent Variable: Ratio of One-person Households of Older Adults who have Children Living less than 15 minutes away	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics		
	B	Std. Error	Beta			Tolerance	VIF	
Constant	-.230	.059		-3.925	.000 **			
Child Dependency Ratio[=Population under 15 years old *100/Population 15-64 years old]	.006	.002	.308	2.727	.009 **	.694	1.442	
Ratio of Family Nuclei Households	.004	.001	.473	4.168	.000 **	.686	1.458	
Ratio of Persons Employed in Primary Industry	-.004	.001	-.442	-3.469	.001 **	.543	1.841	
Retail stores(per 1,000 persons)	.014	.003	.671	4.611	.000 **	.417	2.397	
Note: Significance Level: *5%, **1%								
	Adjusted R Square	F						
	.594	17.830						

Table 3. Multiple Regression Model of Close Proximity Ratio of the One-person Households of Older Adults (City, Ward, Town, and Village)

Coefficients by Type of Cases:		199 Municipalities in Kansai Metropolitan Area						
Dependent Variable: Ratio of One-person Households of Older Adults who have Children Living less than 15 minutes away	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics		
	B	Std. Error	Beta			Tolerance	VIF	
Constant	.000	.041		.006	.995			
Child Dependency Ratio[=Population under 15 years old *100/Population 15-64 years old]	.007	.002	.336	3.665	.000 **	.479	2.088	
Ratio of Family Nuclei Households	.149	.066	.231	2.256	.025 *	.384	2.605	
Ratio of Persons Employed in Primary Industry	-.281	.091	-.209	-3.069	.002 **	.871	1.148	
Retail stores(per 1,000 persons)	.002	.001	.155	1.783	.076	.532	1.880	
Note: Significance Level: *5%, **1%								
	Adjusted R Square	F						
	.201	13.461						

In this model, four independent variables were finally obtained as “Child Dependency Ratio”, “Ratio of Family Nuclei Households”, “Ratio of Persons Employed in the Primary Industry,” and the number of “Retail Stores per 1,000 persons.” Regarding hypothesis (1), the ratio of family nuclei households to the total number of households is obtained. This simply showed the percent of nuclei families to the total. As for hypothesis (2), child dependency ratio is obtained. This ratio was calculated using the following equation, which showed the degree of dependency of children to the productive age group.

$$\text{Child Dependency Ratio} = \text{Population under 15 years old} * 100 / \text{Population 15-64 years old}$$

Regarding hypothesis (3), the ratio of persons employed in primary industry was obtained. Working in the primary industry has a negative impact on the close proximity of older adults. Thus, close proximity between parents and children may not be prevalent in agricultural societies but is common in urbanized and industrialized societies. Regarding hypothesis (4), the number of retail stores per 1,000 persons was obtained. The results here were consistent with the result of hypothesis (3). These analyses indicate that close proximity between parents and children symbolizes a new phenomenon in industrialized societies and in moderately urbanized regions unlike in rural areas such as Tohoku Region or heavily urbanized areas such as Tokyo Metropolitan Area. In other words, it may not be a typical phenomenon in rural areas and in city centers, but is common in the suburbs of urban areas, as shown in Figure 5.

Table 3 reflects the results of employing “the forced entry process” in regard to the independent variables for the regression analysis for the prefecture-level. The regression model seems to explain fewer factors at the municipal level than at the prefectural level. The results shown in Table 3 indicate that the significance of the four hypotheses is much lower than that in Table 2; particularly that for the number of retail stores per 1,000 persons. Further, the F-value and Adjusted R Square value are also less significant in this regression model than in the model for prefectures. Considering this, it should be noted that the regression model in this chapter is more suitable for the hypotheses at the prefectural level than at the municipal level. In the statistical context, both models are definitely significant at the prefectural and municipal level, however, it is clear that the phenomenon of living close is not always limited to the boundaries of municipalities, seemingly expanding into an inter-municipal phenomenon.

4. Conclusion

Recent studies have begun considering the close proximity of young mothers to their parents and examining whether close proximity improves mothers’ employment conditions. Both Hirakawa (2018) and Fukuda et al. (2012) concluded that mothers who live close to their own or their husbands’ parents have a higher probability of obtaining employment.

This paper sought to find the relations between close proximity and the hours of mothers working referring to some previous studies, however, the direct relations couldn’t be observed. The variables like the “Ratio of dual-income households”, “Hours worked [monthly average, female]”, and “Salary of part-time workers [hour, female]” were not significantly accepted as independent variables in the regression models.

Nevertheless, the analyses performed in this paper clearly showed that the factors affecting close proximity are “Child Dependency Ratio” [positive], “Ratio of Family Nuclei Households” [positive], “Ratio of Persons Employed in Primary Industry” [negative], and the number of “Retail Stores per 1,000 persons” [positive] at the prefectural level. In other words, if parents have young children in their family nuclei households, and if their one-person households of older parents are not working in primary industries, the single older parents are more likely to live close to their adult children. In addition to this, the number of retail stores was accepted as an independent variable, possibly because close proximity is a typical phenomenon in more urbanized than the rural areas.

The regression model in this paper does not completely explain the reasons for close proximity between parents and children. For instance, the causes of some phenomena such as the higher distribution of close proximity in western Japan or in the suburbs of metropolises remain unknown. We should be careful of a fallacy of composition in this context, and this model should be considered to have a limitation in terms of a lack in addressing geographical variations. In order to explain all the phenomena discussed in the first part of this paper, it is necessary to wait for future studies.

Acknowledgment: This work was supported by JSPS Grant-in-Aid for Scientific Research (B), and the Grant Number is 15H04105.

Notes

- 1) “Aged Couple” is defined in Housing and Land Survey and meaning an older adult or a couple who have at least an older member. The present author basically follows the existing statistics in all the names of variables in this paper. However, “the elderly” is only replaced to “older adults” because there are some arguments in the field of gerontology that the terms of “elderly” and “aged” should be replaced in academic journals (Putnam, 2015).

- 2) The “Family nuclei households” is used by the Social Indicators. The present author follows the Social Indicators and uses the “Family nuclei households” in this chapter accordingly. The “Family nuclei households” consists of A married couple only, A married couple with their child(ren), and Father or mother with his/her child(ren).
- 3) Selected 40 variables are as follows; Population [5 variables] (Rate of day to night population, Ratio of DIDs (Densely Inhabited Districts) population, Child Dependency Ratio [=Population under 15 years old *100/Population 15-64 years old], Total fertility rate, Rates of net migration change); Dwelling [13 variables] (Members per private household, Ratio of family nuclei households, Ratio of dual-income households, Rate of marriages per 1,000 persons, Ratio of vacant house, Floor area of rented houses per dwelling, Monthly rent owned by private corporations per 3.3 sq.m., Ratio of households covered by piped water supply system, Retail stores per 1,000 persons, Eating and drinking places per 1,000 persons, Post offices per inhabitable area 100 sq.km, Ratio of local roads paved, Passenger cars for private use per 1,000 persons); Welfare [3 variables] (Persons assisted by livelihood protection per 1,000 persons monthly average, Homes for the aged per 100,000 persons 65 years old and over, Capacity of institutions for livelihood protection per 1,000 persons assisted); Medical and Health [5 variables]; (National medical expenses per person, Outpatients per 1,000 persons, New inpatients general hospitals per 100,000 persons, Standardized death rate (Base period population = 1930) (per 1,000 persons), Pharmacies per 100,000 persons); Labor [9] (Labor force participation rate, Ratio of persons employed in the primary industry, Unemployment rate, Ratio of employment to part-time job applications [regular], Ratio of the aged general worker [65 years old and over], Rate of new high school graduates getting jobs, Ratio of persons who changed jobs, Hours worked [monthly average, female], Salary of part-time worker [hour, female]); Family Budget [1 variable] (Monthly income per household [workers' households]; Economic Base [4 variables] (Prefectural income per capita, Value of manufactured goods shipments, etc., Outstanding of deposits of domestically licensed banks, Regional Difference Index of Prices [All items]).

References

- Fujiyoshi, M. 2018. *Fukui Moderu: Mirai wa chihou kara hajimaru*, Bungei Shunju (only in Japanese).
- Fukuda, J. and Hisamoto, N. 2012. The Effect on the Employment of Child-Raising Women of Living in Proximity to Mothers vs. Living Together. *Social Policy and Labor Studies*, Vol.4, Issue.1, pp.111-122.
- Hirohara, M., Hiroshima, K., and Shirakami, R. 1996. A study on the big city's housing policy for the recovery of birth rate, *Housing Research Foundation Annual Report*, Vol.22, pp.321-328.
- Hirakawa, M. 2018. *Sofubo ni yoru hoikuno riyou kanousei to hoikusho niyoru hoiku no riyoukanousei ga hahaoya no syuugyou ni ataeru eikyou*, *Japan Pension Review (Web Journal)*, Vol.10, pp.53-67(only in Japanese).
- Lin, G. and Rogerson, P. A. 1995. Elderly Parents and the Geographic Availability of their Adult Children, *Research on Aging*, Vol.17, issue.3, pp.303-331.
- Shmueli, G. 2010. To Explain or to Predict? *Statistical Science*, Institute of Mathematical Statistics, Vol. 25, No. 3, pp.289–310
- Kamata, K. and Iwasawa, M. 2009. Spatial Variations in Fertility: Geographically Weighted Regression Analyses for Town-and-Village-level TFR in Japan, *The Journal of Population Studies*, Vol.45, pp.1-20.
- Matsukawa, N. 2015. *Toshi Kyojuu to Kazoku: Kansai toshi-ken ni okeru <Kinkyo> no jittai*, Doctoral Dissertation, Kwansei Gakuin University (only in Japanese).
- Putnam, M. 2015. Replacing the Elderly with Older Adults in JGSW Publications, *Journal of*

Gerontological Social Work, Vo.58, Issue.3, pp.229-231

Tsutsui, J. 2016. Dual-earner Couple Society as a Solution: From a Perspective of Studies on Childbirth, *Sociological Theory and Methods*, Vol.31, No.1, pp.84-93.

Yoshida, T. 2012.Characteristics of Detached Housing Demand of Children Families Living Close to their Parents on Urban Fringe Areas - A Case Study of Kyoto City -, *Housing Study Review, Architectural Institute of Japan*, Vol.7, pp.201-206.