RESIDENTIAL MOBILITY PATTERNS OF THE ELDERLY HOUSEHOLD IN SOUTH KOREA

By

Sangsuk Han

THESIS

Submitted to

KDI School of Public Policy and Management

in partial fulfillment of the requirements

for the degree of

MASTER OF PUBLIC POLICY

2016

RESIDENTIAL MOBILITY PATTERNS OF THE ELDERLY HOUSEHOLD IN SOUTH KOREA

By

Sangsuk Han

THESIS

Submitted to

KDI School of Public Policy and Management

in partial fulfillment of the requirements

for the degree of

MASTER OF PUBLIC POLICY

2016

Professor Seulki Choi

RESIDENTIAL MOBILITY PATTERNS OF THE ELDERLY HOUSEHOLD IN SOUTH KOREA

By

Sangsuk Han

THESIS

Submitted to

KDI School of Public Policy and Management in partial fulfillment of the requirements for the degree of

MASTER OF PUBLIC POLICY

Committee in charge

Professor Seul Ki, CHOI, Supervisor

Professor Jeong Ho, KIM

Professor Chang Yong, CHOI

Changyong Choi

Approval as of April, 2016

ABSTRACT

RESIDENTIAL MOBILITY PATTERNS OF THE ELDERLY HOUSEHOLD IN SOUTH KOREA

By

Sangsuk Han

The purpose of this study is to examine prefer residential of the elderly and the effects of the elderly household characteristics on their residential mobility to estimate housing demand of the elderly. This study uses Korea Labor Institute Panel Data and Logit and Regression model. The analysis results show that age, health and employment status effects on the elderly's residential mobility, the older, unhealthier, working elderly tend to move to rural regions.

ACKNOWLEDGEMENTS

It was not easy to complete this arduous thesis work. However, I am finally in the last stage of my thesis thanks to many people who have supported me. First of all, I want to thank my KDI school professors, in particular, Seulki Choi, my supervisor, and Jeongho Kim, my second supervisor, and Kyewoo Lee who taught ARS course. They have given their precious time, useful ideas with generous support for this thesis. I also want to express gratitude to my KDI school colleagues, especially Yoonjung Kwak. Thank you for your words of encouragement. You inspired me not to give up on this research. Last but not the least, I am grateful to my family, Hakjin Kim, my husband, Yoonseo and Yoonki, my children, and of course, my parents and parents-in-law. Without their help, I would not have been able to either finish or even start this thesis. I give thanks to all those who have helped me this journey.

TABLE OF CONTENTS

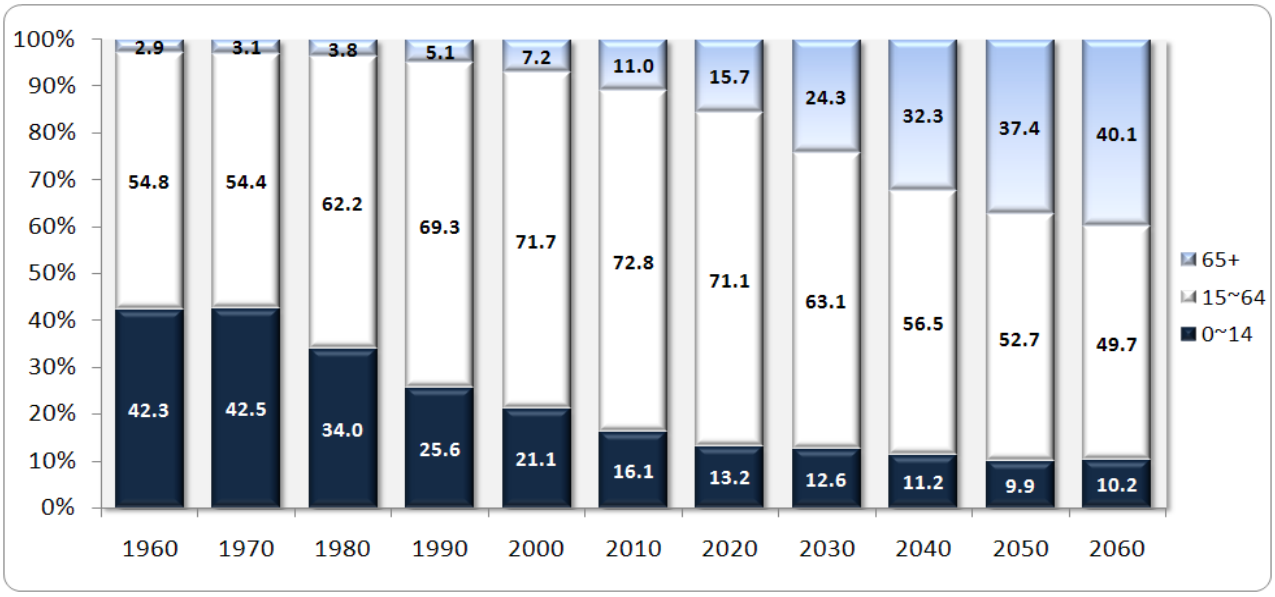
LIST OF TABLES

LIST OF Figures

1. INTRODUCTION

Recently, there have been drastic demographic changes including low fertility and population aging in South Korea. According to the National Statistics, South Korea entered its aging society in 2000, and with the future population projection 2010-2060 of National Statistics, it is estimated that South Korea will enter the aged society whether the elderly population will be 14% of the whole population in 2017 and to super-aged society that the elderly will be 20% of the whole population in 2026. National Statistics estimated that the number of the elderly household will be 40% in 2035.

Figure 1. Age composition of population (1960-2060)



(Source : The future population projection 2010-2060 of National Statistics)

On the other hand, household composition also has been changed rapidly. Before, three or four members households that were consisted with parents and children were great majority. But households with one or two members have been increased these days.

The majority of one or two members households are the elderly households due to the fast aging population. According to The elderly statistics (2015) of National Statistics, the total elderly households

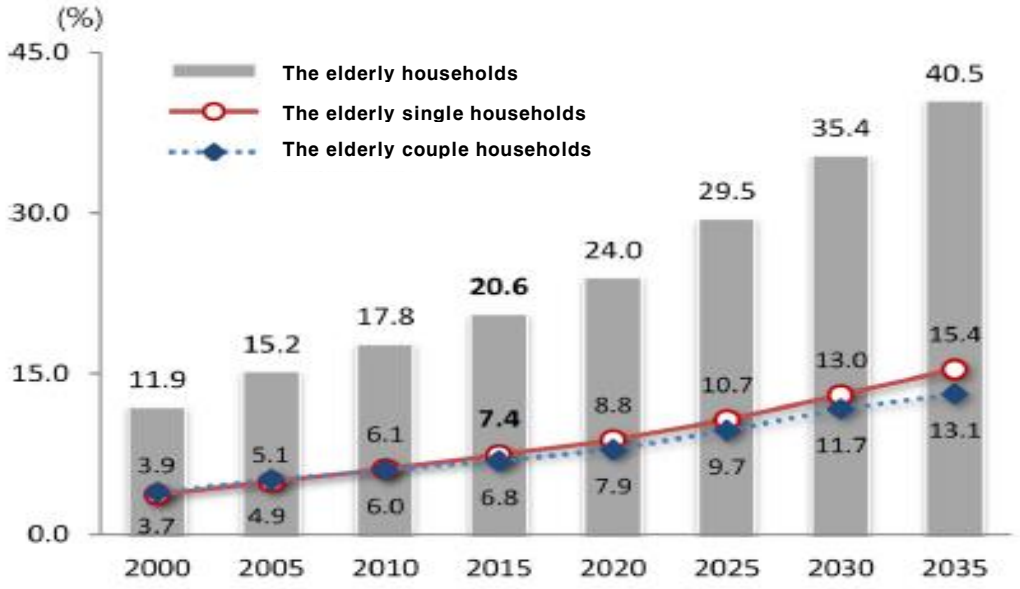
(householders' age is above sixty five) were 3.9million that occupied 20.6% of total households in 2015. And the number of one member households among the elderly households is 1.4million of total households that occupied 7.4% of total households. It is estimated that the total elderly households will be occupied 40.5% of total households, and one member households among the elderly households will be occupied 15.4% in 2035. According to the increase of the elderly households, the influence of the elderly households will be increased. So the demand estimation of the elderly households is important to establish proper housing policies and the elderly welfare policies.

Table 1. **The elderly household tendency**

Year	Total households (A)	The elderly households (B)	Ratio (B/A)	The single elderly households (C)	Ratio (E/A)
2000	14,507	1,734	11.9	544	3.7
2005	15,971	2,432	15.2	777	4.9
2010	17,359	3,087	17.8	1,056	6.1
2015	18,705	3,852	20.6	1,379	7.4
2020	19,878	4,772	24	1,745	8.8
2025	20,937	6,172	29.5	2,248	10.7
2030	21,717	7,690	35.4	2,820	13
2035	22,261	9,025	40.5	3,430	15.4

(Unit : Thousand, Source : The elderly statistics (2015) of National Statistics)

Figure 2. The elderly household tendency



(Source : The elderly statistics (2015) of National Statistics)

Under this background, the purpose of this study is to examine prefer residential of the elderly and the effects of the elderly household characteristics on their residential mobility as one way to estimate housing demand of the elderly. Do the elderly continue to live in same regions, or move to other regions depending on their life course events? Do they prefer urban regions that offer convenient living conditions or leisurely rural regions? And how the characteristics of the elderly households affect their residential mobility?

The elderly households undergo several changes such as aging, retirement, living alone, changes of health status due to the nature of the life course. The changes in the life course of the elderly households cause many changes in their lives, and also would affect their residential mobility. Do life course events of the elderly households have any effect on residential mobility? Would the elderly move as their retirement, aging, change of marital status and health status? If they do, would they go to the urban areas or rural areas?

In South Korea, some studies about the elderly residential mobility have been done recently, which have resulted in a variety of opinions about the elderly residential mobility. In the past, people tended to think that the elderly lived in a country house in a rural area. Yoon and others (2005) said that surveys showed 58.2% of people in their 60s and more wanted to move rural areas. They surveyed 1,891 men and women over forty who lived in urban areas. Hong and others (2011) said that one's in 50s and 60s who lived in Seoul wanted to move to a rural area according to an analysis using domestic move statistics data (2001). But there have been many opposite opinions that the elderly want to live in urban areas. Kim and Han (2012), Lee and others (2013) and Ko and Choi (2014) said that the elderly want to move to urban areas.

But most of these domestic studies are based on not real data but surveys on future living conditions. The expected and potential answers of the surveys have limits, as all plans are not implemented generally. Therefore, it is necessary to do empirical analysis for the elderly residential mobility.

The remainder of this study is organized as follows. There are literature reviews of the elderly residential mobility in chapter II. And there are explanations of data and analysis methods in chapter III. This thesis will answer these two main questions like, "do the elderly move as the life course events happen?" and

“If so, where do the elderly move?” The main data quoted here is from Korea labor panel data of Korea Labor Institute. This is the representative panel data of South Korea that had surveyed income, consumption and job information of 5,000 households and individual of the households from 1998. There are analyses results of the effects of the elderly household characteristics on their residential mobility in chapter IV. The ordered logit model and regression model were used to analyze the effects of the dependent variables – age, employment status, health status, marital status, monthly expenditure, housing ownership and housing types - on residential mobility. Finally, there are conclusions of the analysis in chapter V.

2. Literature Review

Three conceptual frameworks, the push-pull model, life-cycle approach and the life-course approach have contributed to recent researches on the elderly residential mobility. The push-pull model states that migrants move in response to interaction of attractive and unattractive characteristics of origins and destinations. Attractive characteristics encourage in-migration and discourage out-migration, while unattractive characteristics work as counteractively. As a model of group behavior, the push-pull model is based on the assumption that all people have the same preferences of origin and destination characteristics. The push-pull model didn't explain the diverse residential mobility recently, although each household – especially the elderly household - has different preferences according to their composition or characteristics (Walters 2002).

Rossi's life-cycle model (1955) was based on the assumption that residential mobility follows the household life cycle. Rossi said that residential mobility arises due to increasing housing demand in response to family composition changes as life-cycle in his research about Philadelphia's four residential districts. He claimed that residential mobility is changed in accordance with the householder's age and family transition path that proceeds in a fixed manner according to the biological age. It is assumed an orderly progression can capture the common characteristic of entire population migration. But diversity of families was neglected in Rossi's model due to a fixed path of life cycle. Rossi's model ignored different occurrences and types of events according to family characteristics (Geist and McManus 2008).

Since 1980s, many researchers highlighted the heterogeneity of the elderly residential mobility (Don E. Bradley, 2011). Meyer and Speare (1985) and Litwak and Longino (1987) argued that the pattern of the elderly residential mobility depends on the life course events. They conceptualized the diversity of the elderly residential mobility types as reflecting the needs and motivations created by life-course transitions. Meyer and Speare (1985) classified the elderly residential mobility as "amenity mobility", "assistance

mobility" and "mobility in preparation for aging" in their research using a data set from adult residents in Rhode Island. They (1985) said that there were many "amenity moves" in case of younger, married, richer elderly householders. But when the elderly get older and their health get worse, the elderly household move because they need assistance. And they said that "assistance mobility" was associated with older age, unmarried status, frequent mobility history, and renter status. "Mobility in preparation for aging" is more likely for unmarried, frequent mobile residents.

Litwak and Longino (1987) examined the compositions of the elderly residential mobility patterns between Florida (amenity-rich states) and selected states in the Northeast and Midwest using data from the 1980 Census. As a result, the characteristic of migration to Florida was the amenity seeking type. In contrast, leaving Florida for New-York, New Jersey, Pennsylvania, or Ohio, was more likely to pattern associated with assistance seeking type. Migrants to Florida were younger, married, without disability, living independently, over poverty. But peoples leaving Florida were the opposite.

The life-course model has been effective in showing how mobility rates vary in response to life-course events and how the elderly peoples' characteristics affect their residential mobility. It has also been used to divide the elderly into distinctive groups, each with a unique set of their characteristics (Walters 2002).

After emergence of life-course model, there have been many analysis of the elderly migration based on the life-course model. Don E.(2011) updated and extended Litwak and Longino's study (1987) using data from the American Community Survey Public Microdata Sample(PUMS) 2005-2007, which includes records for 3% of adults in U.S households. As a result of the study, the elderly migration follows the original pattern described by Litwak and Longino (1987). Florida's later-life migration exchanges with New-York, New-Jersey, Pennsylvania, and Ohio in 2005-2007 continue to follow in 1987.

In Roger's (1988) study, the migration rates of married persons (above fifty) are lower than those of nonmarried individuals. Roger examined in data from Belgium 1970, Great Britain 1980-1981, the Netherlands 1983, Italy 1980-1982, and Japan 1979-1980. And Rogers said that nonmarried persons are more likely to move to receive assistance from friends and relatives to require institutional accommodation,

because they are more socially isolated.

John and Stephen (1999) analyzed the elderly migration in Britain using data from the British Household Panel Survey (BHPS) in 1990s. As the result of the probit models of residential mobility, higher income, or older age, are each related to lower migration rates for owners but not for tenants. Health limitations significantly increase mobility among renters, but not among owners. For both owners and tenants, having lost a spouse, or having a spouse who left employment, each increase migration rate. This study proved that the residential mobility of the elderly is associated with other life events.

Among recent domestic studies, Lim (2013) analyzed the factors that effect on residential mobility of adults (above twenty). She said that residential mobility of the elderly decreases when an elderly householder has a job or a spouse or if getting older. She analyzed with Korea labor panel data (1998-2010).

Chung and Lee (2013) examined the elderly (above fifty five) using probit model and KLIPS data (2005-2008). As a result, the elderly residential mobility was affected by education level and health status of householder. But marital status and employment status didn't significantly effect on migration.

Lee and others (2013) and Ko and Choi (2014) also said that the elderly move to urban area. Lee and others examined the effect of aging, being single and being engaged with economic activity on the elderly migration. They used population, housing census and household travel survey data (2006, 2010). And the dependent variable is employment accessibility index. The elderly who is older, or doesn't have economic activities, prefers an urban area where the aged people can enjoy good living environment and have more job opportunities. The solitude effect doesn't have any significant roles in deciding the location of residence.

Kim and Han (2012) examined migration regions of the elderly who live in Seoul. The dependent variable is a migration region (whether it is an urban, suburban, or rural area), they used city density to divide urban area and rural area. And as a result, the elderly above seventy-five move to urban area more than other age groups (from fifty-five to seventy-four). This study used domestic move statistics data (2000-2010).

Ko and Choi (2014) examined influence of aging, deterioration and solitary condition on the elderly migration and migration regions. As a result, the elderly is older, or have higher income, or is tenants, or doesn't have a spouse, moves frequently than others. Health status doesn't effect on migration but it effects on migration regions. It means unhealthy elderly move to an urban area more than the others, because they can get help or have easy access to hospitals. This study used "the elderly housing survey (2007)" and migration data in the survey is not real data but a survey results on hope for migration.

As mentioned above, this study wants to analysis the elderly residential mobility based on life course model. This study analyses the relation between the elderly residential mobility and their life course events – aging, retirement, living alone, health worsening.

Several domestic studies have been based on life-course model, but they have some limits. Some studies analyzed only data from the capital area, or didn't use real data but surveys about future migration. But the expected and potential answers of the surveys have limits, since all plans are not implemented generally. Therefore, this study examins the relation of the elderly migration and events of the elderly using real migration data in South Korea.

3. Data and Methodology

This paper examines the elderly residential mobility as their life course events – such as aging, retirement, living alone and health worsening. To examine them, first, ordered logit model was used to examine whether the elderly move or not in accordance with their life course event. Second, regression model was used to examine where the elderly move according to the elderly life course events.

Most data in this study are from Korea Labor Income Panel Study (KLIPS). Population and Housing Census of National Statistics or Living condition Census of MOLIT (Ministry of Land, Infrastructure and Transport) have a lot more samples than KLIPS data. But there are not detailed information needed in this

analysis such as an address of a household or whether it moved or not. Although the number of sample of KLIPS is far fewer than them, KLIPS has detail household information needed in this analysis and it has been surveyed every year since 1998, so it enables time-series analysis. But KLIPS has also limitation, because the samples of KLIPS were not exactly the same every year, so many samples were lost in making process of panel data during longer time intervals and this can be dropping the quality of analysis. Therefore, this study didn't analyze using panel data, but compared analysis results of the past and latest data. Initial KLIPS data don't have some information needed in this study, so year 2004 where all the information needed in this study is found and the latest data – year 2012 – were used in this study.

The target of this study is the elderly householders who can decide to move themselves. So, in this study, the elderly households mean that the householders that are over 65, and the total samples are limited to the householders who are over 40 to compare with the elderly and the middle age.

The dependent variables from literature review are largely three categories – household characteristics, economic levels of households and housing characteristics. First, householder characteristics are age, employment, health and marital status of householders and economic level of household which is monthly expenditure of household. And housing characteristics are housing ownership and housing type. The independent variable is whether move or not (binary data) in the first analysis, and population density (discrete and continuous variable) of residences to examine degree of urbanization in the second analysis.

The householder data – age, marital status, employment status, health status - were extracted from household members from the survey data of KLIPS. Employment status is dummy variable that the employee is 1, but the unemployed is 0. Marital status is also dummy variable. The original marital data has five statuses – "unmarried", "married and has a spouse", "separation", "divorce" and "bereavement". "Married and has a spouse" among them is "1", and the others are "0". Health status is also dummy variable. The original health status has also five statuses – "very healthy", "healthy", "normal", "unhealthy", "very unhealthy". "Very healthy", "healthy", "normal" among them is "1", and the others are "0".

And monthly expenditure, housing ownership and housing types were from household data. Monthly living expenditure information was used to measure wealth level of the households. Monthly living

expenditure includes only general living costs such as food expenses, housing expenses, expenses for clothing but excludes special expenses such as expenditure for wedding or car accidents. Housing ownership is a dummy variable. It is “1” when the housing type is owner occupation, but is “0” when the housing types are jeonse, monthly rent and etc. Housing type is also a dummy variable. It is “1” when the house is an apartment, but is “0” when the housing types are the others.

Besides KLIPS data, population density of residence was from Korea City Statistics in 2008. Population density of a city is used to examine whether the migration is move to urban area or rural area, because there is no index that expresses urbanization in South Korea. But the population density can be an urbanization index because the high-density regions are generally more developed more the low -density regions. So we can say that the regions with high-density are more urbanized and bigger than those with lower-density. This study compared the analysis results of the past (year 2001) and the present data (year 2012) in order to compare changes over time and the analysis results of the elderly (over age 65) and the middle aged (age 40~64).

4. Empirical analysis

4.1. Basic Statistics of the elderly residential mobility tendency

In the statistical data of KLIPS of year 2001 and year 2012, most of elderly didn’t move to other regions. 90.5% of the total elderly didn’t move and the elderly move ratio (9.5%) was lower than that of the middle age (14.1%) in 2001. And it tended to be enhanced in 2012. 96.5% of the total elderly didn’t move and the elderly move ratio (3.5%) was lower than that of the middle age (8.7%) in 2012. The more elderly didn’t move in 2012 than in 2001.

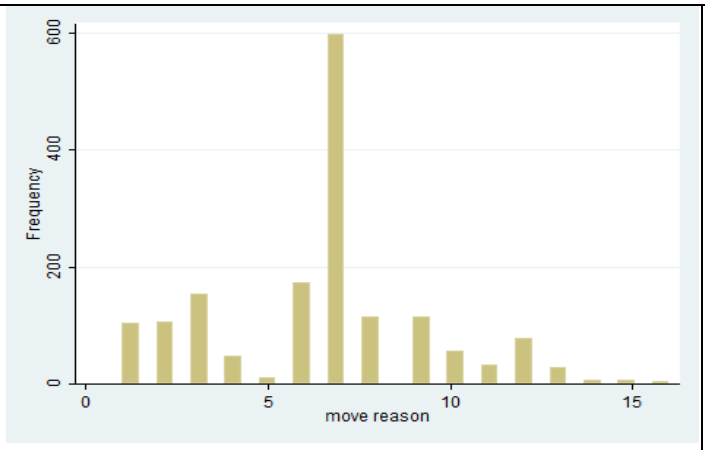
The majority move reasons are indifferent between the middle age and the elderly. But that is

different between tenants and house owners. Below Figure 1 is the graph that presents move reasons in 2012 (This question is not surveyed in 2001.). The majority among reasons for tenants is cheap rent. But the majority among reasons for house owners is to have one's own home.

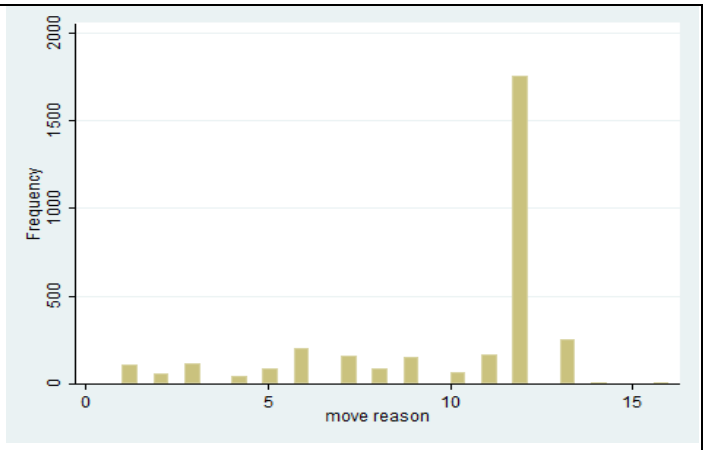
Table 2. Move ratio of the elderly in 2001 and 2012

	2001		2012	
	The middle age	**The elderly**	**The middle age**	**The elderly**
Not move	1,615 (85.90%)	793 (90.50%)	2,919 (91.3%)	1,640 (96.5%)
Move	264 (14.10%)	83 (9.50%)	278 (8.7%)	60 (3.5%)
Total	1,879 (100%)	876 (100%)	3,197 (100%)	1,700 (100%)

Figure 2. Move reasons (The reason description is in appendices)



Move reasons of tenants



Move reasons of house owners

We can see the elderly's life course events through the comparison table 2 to table 3. Rates of unemployed, single, unhealthy people are significantly increased among the elderly than the middle age. The rate of housing owners is higher in the elderly than in the middle aged and the rate of residents in an apartment is higher in the middle aged than in the elderly. Therefore we can say that the elderly don't sell their house but still have their houses, and they prefer other types of housing besides apartments. On the other hand, monthly expenditure of the elderly is much less than that of the middle ages'. Especially, monthly expenditure of the elderly was about half of the middle ages' in 2001. And the mean values of age

and monthly expenditure are significantly increasing in 2012 more than in 2001. It is possibly because of effects of the aging society and economic growth of South Korea.

Table 3. Move Frequency as the household characteristics in 2001

Variables		Frequency or Value					
		The middle ages			The elderly		
		Sum (%)	Not Move	Move	Sum (%)	Not Move	Move
Employment	not employed	305 (16.2)	256	49	539 (61.5)	483	56
	employed	1,574 (83.8)	1,359	215	337 (38.5)	310	27
Marital status	single	304 (16.2)	245	59	296 (33.8)	265	31
	couple	1,575 (83.8)	1,370	205	580 (66.2)	528	52
Health status	unhealthy	370 (19.7)	323	47	434 (49.5)	398	36
	healthy	1,509 (80.3)	1,292	217	442 (50.5)	395	47
Housing Ownership	tenant	663 (35.3)	496	167	223 (25.5)	172	51
	house owner	1,216 (64.7)	1,119	97	653 (74.5)	621	32
Housing Type	besides apartments	1,179 (62.7)	1,023	156	702 (80.1)	645	57
	apartments	700 (37.3)	592	108	174 (19.9)	148	26
Age	Mean		47.3	48.6		67.9	67.6
	Std. Dev.		5.12	5.72		6.28	6.12
	Min		40	40		60	60
	Max		59	59		88	82
Monthly Expenditure (unit: 10,000won)	Mean		143.2	138.3		76.3	75.7
	Std. Dev.		95.26	82.4		60.22	52.06
	Min		10	10		4	7
	Max		900	1,270		500	260

We can see that unemployed and younger people move more than the others among the elderly in table 2 and table 3. But the reverse is in the case of the middle aged. Employed and older people move more than the others among the middle aged. But they have something in common. People who are healthy, have a spouse, tenants, residents in other types of housing besides an apartment, have lower consumption move

more than the others between all the elderly and the middle aged.

Table 4. Move Frequency as the household characteristics in 2012

Variables		Frequency or Value					
		The middle ages			The elderly		
		Sum (%)	Not Move	Move	Sum (%)	Not Move	Move
Employment	not employed	452 (14.2)	417	35	1,100 (64.7)	1,058	42
	employed	2,738 (85.8)	2,502	236	600 (35.3)	582	18
Marital status	single	774 (24.3)	684	90	778 (45.8)	743	35
	couple	2,416 (75.7)	2,235	181	922 (54.2)	897	25
Health status	unhealthy	338 (10.6)	319	19	696 (40.1)	677	19
	healthy	2,852 (89.4)	2,600	252	1,004 (59.1)	963	41
Housing Ownership	tenant	1,208 (37.9)	1,025	183	426 (25.1)	391	35
	house owner	1,982 (62.1)	1,894	88	1,274 (74.9)	1,249	25
Housing Type	besides apartments	1,625 (50.9)	1,467	158	1,222 (71.9)	1,178	44
	apartments	1,565 (49.1)	1,452	113	478 (28.1)	462	16
Age	Mean		51.8	49.5		73.7	91
	Std. Dev.		7.16	6.80		0.23	6.31
	Min		40	40		65	65
	Max		64	64		100	72.78
Monthly Expenditure (unit: 10,000won)	Mean		256.7	231.3		114.41	110.83
	Std. Dev.		145.27	125.25		91.92	75.24
	Min		20	30		9	30
	Max		1,800	700		860	350

There are city density statistics following dummy variables – employment, health, marital status and housing ownership, housing type - in table 4 and table 5. Comparing the mean values of the results, the unemployed, single, healthy people, tenants, residents in an apartment live in more urbanized area more than the others. And this tendency is same between the middle age and the elderly in 2001 and 2012.

Table 5. City density (log value) of residence regions in 2001

Variables		The city density (log value) of residence regions							
		The middle ages				The elderly			
		Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max
Employ -ment	not employed	8.48	1.41	4.09	10.28	8.15	1.62	4.17	10.28
	employed	8.35	1.55	4.09	10.28	7.58	1.86	4.09	10.28
Marital status	single	8.38	1.50	4.71	10.28	7.96	1.76	4.17	10.28
	couple	8.37	1.53	4.09	10.28	7.91	1.73	4.09	10.28
Health status	unhealthy	8.14	1.60	4.09	10.28	7.82	1.74	4.17	10.28
	healthy	8.43	1.50	4.09	10.28	7.99	1.74	4.09	10.28
Housing Ownership	tenant	8.61	1.42	4.65	10.28	8.49	1.49	4.09	10.28
	house owner	8.24	1.57	4.09	10.28	7.74	1.78	4.09	10.28
Housing Type	besides apartments	8.34	1.60	4.11	10.28	7.80	1.79	4.09	10.28
	apartments	8.44	1.39	4.09	10.28	8.44	1.40	4.74	10.28

Table 6. City density (log value) of residence regions in 2012

Variables		The city density (log value) of residence regions							
		The middle ages				The elderly			
		Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max
Employ -ment	not employed	8.05	1.74	2.94	10.28	7.74	1.86	2.94	10.28
	employed	7.92	1.69	2.94	10.28	6.99	1.92	3.40	10.28
Marital status	single	7.91	1.75	2.94	10.28	7.40	1.90	2.94	10.28
	couple	7.94	1.68	3.14	10.28	7.54	1.92	3.40	10.28
Health status	unhealthy	7.85	1.82	2.94	10.28	7.35	1.93	2.94	10.28
	healthy	7.94	1.69	2.94	10.28	7.56	1.90	2.94	10.28
Housing Ownership	tenant	8.18	1.64	2.94	10.28	7.98	1.74	2.94	10.28
	house owner	7.78	1.72	2.94	10.28	7.30	1.94	2.94	10.28
Housing Type	besides apartments	7.88	1.84	2.94	10.28	7.21	1.97	2.94	10.28
	apartments	7.99	1.54	3.37	10.28	8.15	1.58	4.09	10.28

4. 2. The effects of the elderly life cycle events on the elderly residential mobility

Ordered Logit model was used to examine if the effects of the elderly life course events on whether the elderly move or not. The independent variable is whether move or not, and the dependent variables are an elderly householder's characteristics – age, status of employment, health and marital – and economic level of an household – monthly expenditure – and housing characteristics – housing ownership and a housing type. And the analysis results of the middle age and the elderly were compared and the analysis results of the year 2001 and year 2012 were compared.

Table 7. The elderly move Logit model

	The effects on move (2001)			The effects on move (2012)		
	(1)	(2)	(3)	(4)	(5)	(6)
Age	0.989	0.993	1.000	0.963	0.967	0.972
	(0.020)	(0.021)	(0.021)	(0.023)	(0.024)	(0.024)
Employment	0.691	0.689	0.718	0.663	0.666	0.647
	(0.179)	(0.179)	(0.200)	(0.203)	(0.205)	(0.206)
Marital status	0.826	0.773	1.067	0.507*	0.460*	0.548
	(0.202)	(0.203)	(0.298)	(0.141)	(0.139)	(0.170)
Health status	1.407	1.371	1.427	1.766	1.693	1.918*
	(0.342)	(0.336)	(0.369)	(0.523)	(0.509)	(0.589)
Monthly		1.135	1.332		1.194	1.586
Expenditure		(0.204)	(0.255)		(0.259)	(0.374)
Housing			0.149***			0.196***
ownership			(0.038)			(0.056)
Housing_type			2.011**			0.731
			(0.545)			(0.227)
N	876	876	876	1700	1700	1700
Log Likelihood	-272.366	-272.119	-240.398	-253.791	-253.462	-236.887

Exponentiated coefficients; Standard errors in parentheses ; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In 2001 analysis, the elderly life course events don't affect on their move, but the housing characteristics - the housing ownership and housing type - affect significantly on move. But in 2012 analysis, marital status and health status of the elderly householders and housing ownership affect significantly. Before considering housing characteristics, only the marital status effects on move, but after considering them, only the health status and housing ownership do. As presented in column (6) in table 6, the elderly who are healthier or don't have a house move more than the others. And health status of the elderly householders is the most significant factor - the healthy elderly move almost two times more than the unhealthy elderly do.

Table 8. The Middle age Move Logit model

	The effects on move (2001)			The effects on move (2012)		
	(1)	(2)	(3)	(4)	(5)	(6)
Age	0.954***	0.954***	0.979	0.953***	0.950***	0.968**
	(0.012)	(0.012)	(0.013)	(0.009)	(0.009)	(0.010)
Employment	0.745	0.705	0.745	0.901	1.001	0.905
	(0.138)	(0.133)	(0.145)	(0.185)	(0.211)	(0.194)
Marital status	0.585**	0.513***	0.603**	0.549***	0.682*	0.777
	(0.099)	(0.095)	(0.116)	(0.077)	(0.116)	(0.134)
Health status	1.226	1.175	1.264	1.670	1.803*	1.993*
	(0.226)	(0.219)	(0.245)	(0.437)	(0.478)	(0.536)
Monthly expenditure		1.257	1.472**		0.729*	0.966
		(0.169)	(0.211)		(0.100)	(0.141)
Housing ownership			0.230***			0.300***
			(0.035)			(0.044)
Housing_type			1.566**			0.858
			(0.235)			(0.120)
N	1879	1879	1879	3190	3190	3190
Log Likelihood	-749.993	-748.542	-698.224	-903.783	-901.142	-862.358

Exponentiated coefficients; Standard errors in parentheses ; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As the result of the middle age analysis, age and marital status affect significantly whether the middle age's move in 2001 as presented column (1) in table 7. But as presented column (3) in table 7, when consumption level, housing ownership and housing types are considered in the analysis, age of householders doesn't affect significantly whether to move or not. But marital status of householders, monthly expenditure, house ownership and housing type that affect significantly middle age's move in analysis take into account all variables. The results say that the middle aged who don't have a spouse or don't have a house or have high level of consumption or live in an apartment move more than the counterparts.

But the results in 2012 are different from in 2001. As presented in column (5), most variables besides employment status affect significantly move. But when house ownership was considered in analysis, only age and health status of householders and house ownership do. The middle aged who are younger, healthy and don't have a house move more than counterparts in 2012.

The effects of health status and house ownership are significant in both the elderly and the middle aged. But the age effect significant only for the middle aged.

4. 3. The effects of the elderly life cycle events on the elderly residential area

The elderly life course events affect the choice of their residential districts? Which the elderly live in urban areas or in rural areas? Regression model was used to examine the effects of the elderly life course events on their residential area. The independent variable is city density to measure urbanized degree of the regions. And other variables and analysis outline are the same as the analysis above about whether to move.

As analysis results of year 2001, employment status, consumption level, housing ownership and housing type significantly affects the residential districts density. The elderly who don't have a job or have high consumption or don't have a house or live in an apartment live in higher density regions.

In 2012 analysis, as presented column (6) in table 8, all variables besides marital status relate significantly to urbanization degree of the elderly residential districts. The elderly who are younger or don't have a job or healthier or have higher consumption level or don't have a house, live in an apartment

live in higher density regions. The results are similar to basic statistics of the city density of residence region (table 4 and table 5).

Table 9. The elderly residential district's density Regressions

	Residential district density (2001)			Residential district density (2012)		
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.020*	0.002	0.006	-0.042***	-0.030***	-0.026***
	(0.009)	(0.098)	(0.009)	(0.007)	(0.008)	(0.008)
Employment	-0.686***	-0.702***	-0.639***	-1.025***	-1.013***	-0.864***
	(0.127)	(0.122)	(0.062)	(0.099)	(0.098)	(0.097)
Marital status	-0.009	-0.365**	-0.206	0.129	-0.145	0.005
	(0.126)	(0.129)	(0.104)	(0.094)	(0.1001)	(0.099)
Health status	0.205	0.065	0.045	0.313**	0.217*	0.235*
	(0.120)	(0.119)	(0.120)	(0.977)	(0.098)	(0.096)
Monthly		0.675***	0.721***		0.479***	0.456***
Expenditure		(0.085)	(0.171)		(0.074)	(0.075)
Housing			-0.879***			-0.787***
ownership			(0.052)			(0.102)
Housing_type			0.480***			0.644***
			(0.208)			(0.095)
N	876	876	876	1700	1700	1700
R^2	0.035	0.098	0.155	0.065	0.086	0.139

Exponentiated coefficients; Standard errors in parentheses ; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As presented column (3) in 2001 analysis in table 9, Employment status, marital status, health status, consumption level and housing ownership significantly affect urbanization degree of middle ages' residential districts. The middle aged - who don't have a job or don't have a spouse or are healthier, or have higher consumption level, or don't have a house live in higher density regions. But in 2012 analysis, marital status and health status don't significantly affect, but age and employment status and monthly expenditure and housing ownership are significant variables. The middle aged who are older, don't have a job, have high consumption, don't have a house live in higher density regions in 2012. The age effect is opposite to the

elderly's cases.

Table 10. The middle ages' residential district's density Regressions

	Residential district density (2001)			Residential district density (2012)		
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.004	-0.003	0.006	0.001	0.005	0.016***
	(0.007)	(0.006)	(0.007)	(0.004)	(0.004)	(0.004)
Employment	-0.231*	-0.342***	-0.308**	-0.179	-0.284**	-0.296**
	(0.095)	(0.096)	(0.095)	(0.096)	(0.074)	(0.097)
Marital status	-0.034	-0.324**	-0.253*	0.037	-0.205*	-0.124
	(0.097)	(0.104)	(0.103)	(0.074)	(0.071)	(0.086)
Health status	0.344***	0.253**	0.267**	0.151	0.068	0.107
	(0.097)	(0.098)	(0.097)	(0.112)	(0.120)	(0.109)
Monthly		0.494***	0.547***		0.353***	0.435***
Expenditure		(0.072)	(0.072)		(0.096)	(0.068)
Housing			-0.499***			-0.587***
ownership			(0.076)			(0.067)
Housing_type			0.101			0.118
			(0.074)			(0.064)
N	1879	1879	1879	3190	3190	3190
R^2	0.009	0.035	0.056	0.002	0.011	0.035

Exponentiated coefficients; Standard errors in parentheses ; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. Conclusion

This study compares and analyzes the change of residential mobility based on the life course events of the elderly households. So this study does not treat the elderly households as one group but subdivides them in accordance with their life course events – aging, retirement, change of health and marital status.

And in conclusion, marital and health status among the events and housing ownership significantly affect whether the elderly move. And age, employment and health status and monthly expenditure and housing characteristics significantly affect the elderly residential regions. But the marital status among the four events don't affect significantly the elderly residential mobility.

The healthy elderly move more than the others. It can be said that health problems hinder the elderly from moving. And the younger, unemployed, healthy elderly live in more urbanized regions than the counterparts. In other words, the older, unhealthy and working elderly live in rural regions. So we can say that more vulnerable elderly tend to live in rural regions than in the urban regions. Therefore more welfare policies and programs for the vulnerable elderly must be provided in rural areas. These results say that aging, retirement, change of health and marital status have different effects on the elderly residential mobility. So we confirm that the elderly decide differently whether to move or where to move, depending on their age, retirement and health status, economic level and housing characteristics.

But there are some limits in this study. In the analysis whether the elderly move, some variables are not significant. The first reason is that the number of samples is much less than those for ones that don't move. In 2012, the number of the total elderly sample is 1,700, but the moving households in the total elderly samples are just 60. So the sample size is maybe so small to examine the effects between moving and household characteristics. And the second reason is that changes of housing market such as changes of housing price, rent, housing loan rates are not considered in the model. But Lim (2013) said that the change of housing market had effect on move more significantly than the household characteristics. Therefore housing market variables also have to be considered to examine the effects on the elderly resident mobility more accurately in the future studies.

And this study includes not the elderly household members but the elderly householders. Because this study wants to deal with the households with the elderly who have sole effect of their decision making on moving. So, if residential mobility of the total elderly population is needed, the samples have to include not only the elderly householders but also the elderly household members.

APPENDICES

APPENDIX A

A. The number of household member (1980~2010)

(unit : 1,000 households, %)

Year	1980	1985	1990	1995	2000	2005	2010
Total	7,969	9,571	11,355	12,958	14,312	15,887	17,339
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
One member	383	661	1,021	1,642	2,224	3,171	4,142
	(4.8)	(6.9)	(9.0)	(12.7)	(15.5)	(20.0)	(23.9)
Two member	840	1,176	1,566	2,185	2,731	3,521	4,205
	(10.5)	(12.3)	(13.8)	(16.9)	(19.1)	(22.2)	(24.3)
Three member	1,153	1,580	2,163	2,636	2,987	3,325	3,696
	(14.5)	(16.5)	(19.1)	(20.3)	(20.9)	(20.9)	(21.3)
Four member	1,620	2,422	3,351	4,110	4,447	4,289	3,898
	(20.3)	(25.3)	(29.5)	(31.7)	(31.1)	(27.0)	(22.5)
Above five member	3,974	3,734	3,253	2,385	1,922	1,582	1,398
	(49.9)	(39.0)	(28.7)	(18.4)	(13.4)	(10.0)	(8.1)

Source : Population and Housing Census (http://kosis.kr/)

APPENDIX B

B. Difference of the number of households between year 2005 and 2010

Year		2005		2010	
		The number of households (all ages)	The nubmer of households (above 65)	The number of households (all ages)	The nubmer of households (above 65)
Total		**15,887,128** 100.0%	**2,448,348** 100.0%	**17,339,422** 100.0%	**3,111,011** 100.0%
The number of household member	**One**	**3,170,675** 20.0%	**782,708** 32.0%	**4,142,165** 23.9%	**1,066,365** 34.3%
	Two	**3,520,545** 22.2%	**1,010,000** 41.3%	**4,205,052** 24.3%	**1,291,031** 41.5%
	Three	**3,325,162** 20.9%	**342,764** 14.0%	**3,695,765** 21.3%	**424,108** 13.6%
	Four	**4,289,035** 27.0%	**145,766** 6.0%	**3,898,039** 22.5%	**168,337** 5.4%
	Above five	**1,581,711** 10.0%	**167,110** 6.8%	**1,398,401** 8.1%	**161,170** 5.2%

Source : Population and Housing Census (http://kosis.kr/)

APPENDIX C

C. Data description and source

Variable	Description	Source
Age	Age of householder	KLIPS
Employment	Employment status of householder (0=not employed, 1= employed)r	KLIPS
Marital status	Marital status of householder (0=single, 1=couple)	KLIPS
Health status	Health status of householder (0=unhealthy, 1=healthy)	KLIPS
Monthly Expenditure	Log(Original Monthly Expenditure of Household)	KLIPS
Housing Ownership	0=tenant, 1=house owner	KLIPS
Housing Type	0=besides apartments, 1=apartments	KLIPS
Whether move	0=not move, 1=move	KLIPS
City density of residence	Log(Original city density of residence)	National Statistics

APPENDIX D

D. Move Reasons

Number	Reasons
1	Getting a job
2	Moving workplace
3	For easy commute
4	For children education
5	Expecting to rise house prices
6	Resizing house area
7	Cheap house prices or rent
8	To live near families for caring children or parents
9	For health problem or environment
10	Good convenience facilities
11	Marriage
12	To have one’s own home
13	Home town
14	Other reasons
15	Expiration of an agreement or redevelopment
16	Independence
17	Divorce or separation
18	Worsen economic condition

APPENDIX E

1. Correlation Matrix (the middle ages and the elderly data in 2001)

	Age	Employ -ment	Marital status	Health status	Monthly expenditure	Housing ownership	Housing type
Age	1.0000						
Employment	-0.4978	1.0000					
Marital status	-0.2235	0.2236	1.0000				
Health status	-0.3561	0.3424	0.2068	1.0000			
Monthly expenditure	-0.4868	0.3781	0.4474	0.3449	1.0000		
Housing ownership	0.1318	0.0195	0.1563	0.0264	0.1293	1.0000	
Housing type	-0.2061	0.1028	0.0668	0.1151	0.2165	0.1337	1.0000

2. Correlation Matrix (the middle ages and the elderly data in 2012)

	Age	**Employ -ment**	**Marital status**	**Health status**	**Monthly expenditure**	**Housing ownership**	**Housing type**
Age	1.0000						
Employment	-0.5552	1.0000					
Marital status	-0.2540	0.2666	1.0000				
Health status	-0.3923	0.4119	0.2677	1.0000			
Monthly expenditure	-0.5854	0.4672	0.5488	0.4168	1.0000		
Housing ownership	0.1704	-0.0211	0.1969	0.0494	0.1267	1.0000	
Housing type	-0.2398	0.0868	0.1536	0.1330	0.3240	0.0841	1.0000

REFERENCES

· Chaung, Eui-Chul and Lee, Kyung-Ae. 2013. Residential Mobility and Housing Tenure Choice Decisions of Older Homeowners. *Housing Studies Review*, vol21 No3 : 37~60.

· Don E. Bradley. 2011. Litwak and Longino's Developmental Model of Later-Life Migration : Evidence from the American Community Survey, 2005-2007. *Journal of Applied Geronology,* 30(2) :141-158.

· Geist, Claudia and McManus P.A. 2008. Geographical Mobility over the Life Course : Motivations and Implications. *Population, Space and Place* 14:283~303.

· Hong, Sung Jo et al. 2011. Residential Mobility Patterns and Pull-factors of Small Households in Seoul. *Journal of The Urban Design Insitute of Korea*. 2011-08 (46):51-62.

· John F. Ermisch, Stephen P. Jenkins. 1999. Retirement and housing adjustment in later life : evidence from the British Household Panel Survey. *Labour Economics* 6 (1999) : p311-333.

· Kim, Jun Hyung and Han, Jung Hoon. 2012. Residential Mobility on Retirement Evidence from the Aging Population in Seoul. *Journal of the Korea Planning Association* 2012-06 47:159-173.

· Ko, Jinsoo and Choi, Mack Joong. 2014. Patterns of Housing Choice of Korean Elderly Households – Focused on the Residential Mobility and Elderly Housing. *Journal of The Urban Design Insitute of Korea*. 2014-02 (61):19-32.

· Lee, Tai-Won. 2015. An Analysis on The Determinants of Moving Desire to other provinces - In Case of Residents in Kangwon Province. *Journal of Social Science* 54(1), 81-112.

· Lee, Hoon et al. 2013. Housing Consumption and Residential Location Change in Later Life-Focused on the Metropolitan Area. *Journal of The Urban Design Insitute of Korea*. 2013-10 (59):5-16.

· Lim, Mi Hwa. 2013. A study on the Residential Mobility Factors by Household's Age, *Real Estate Study* Vol: 23 No. 2 :79-95.

· Litwak, E. and C. F. Longino. 1987. Migration Patterns Among the Elderly : A Developmental Perspective. The Gerontologist 27 : 266-72.

· Meyer, JW and Speare. A. Jr 1985. Distintively elderly mobility: types and determinants. *Economic Geography* Vol. 61, No. 1 (Jan., 1985) : 79-88.

· Rogers. 1988. Age patterns of Elderly Migration : An International Comparison. *Demography* vol.25 No.3(Aug, 1988) : 355-370.

· Rossi, P. H. 1955. *Why Family Move*. Free Press.

· Walters, W. H. 2002. Place Characteristics and Later-Life Migration *RESEARCH ON AGING*, Vol. 24 No. 2 : 243-277

· Yoon, Soon-duck et al. 2005. Determinants of migration intention to rural area after retirement among urban residents in Korea. *The Korean Gerontological Society* Vol. 25 No. 3 (2005) : 139-154