UNIVERSITY OF SOUTHAMPTON

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Income Mobility Among Older People in England and South Korea

by

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Abstract

This thesis adopts a longitudinal approach towards examining the income mobility of older people aged 50 and over in England and aged 45 and over in South Korea over the period between 2006 and 2012, using panel data from the English Longitudinal Study of Ageing (ELSA) and the Korean Longitudinal Study of Ageing (KLoSA). This study of income mobility among older people points to pension income insecurity issues, which carry utmost significance when life expectancy and retirement duration are increasing. The comparative analysis brought insights into the ways in which different institutional settings may be responsible, and what policy reforms can be introduced to offset the adverse impact of income mobility on the wellbeing of older people. This research analysed the income mobility of older people using the unit of household equivalised disposable income and aggregate summary measures. The research also investigated the factors that significantly influence income mobility in old age at the microscopic level using multivariate analysis.

The findings from the analysis of absolute income mobility suggest that older people in England show much more income stability than their Korean counterparts. From the relative income mobility analysis, older people in both countries experienced a low rate of change in their position in the income distribution over the measured period. In both countries, there was income rigidity among the high-income and low-income classes. The examination on what lies behind income mobility and the comparison of the determinants of income mobility in the two countries revealed that income growth has very little impact on aggregate mobility in England, while it is crucial for the mobility levels in Korea.

Finally, the findings on the factors affecting income mobility of older people revealed that demographic characteristics, employment status, health status, educational level, and income attributes (welfare) are significantly associated with income mobility. A notable difference is that changes in living arrangements and a higher share of state benefits are associated with positive (upward) income mobility in Korea, whereas these factors are associated with downward income mobility in England. The transition into widowhood is associated with downward income mobility in England but has no significant effect in Korea. The empirical results highlight the benefits of cross-national comparative study on the income dynamics of older people, and how different contexts, welfare systems, and labour market affect the income mobility in later life. In Korea, the focus should be on finding the ways to expand social welfare services and income security policies so that the welfare state can be more responsive to income risk in old age. In contrast, means-tested income support policy in England should be investigated further in order to help middle-income class vulnerability in economic risks.

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DECLARATION OF AUTHORSHIP

I, Jin Pil Um

declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

'Income Mobility Among Older People in England and South Korea'

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;

2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;

3. Where I have consulted the published work of others, this is always clearly attributed;

4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;

5. I have acknowledged all main sources of help;

6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;

7. None of this work has been published before submission

Signed: ....

Date: ....

Acknowledgements

Definitions and Abbreviations

AA	Attendance Allowance
BHPS	British Household Panel Survey
BLSP	Basic Livelihood Security Programme
BOAP	Basic Old-Age Pension
BSP	Basic State Pension
CASMIN	Comparative Analysis of Social Mobility in Industrial Nations
CNEF	Cross-National Equivalent Files
CPI	Consumer Price Index
CTB	Council Tax Benefit
DB	Defined-Benefit
DC	Defined-Contribution
DLA	Disability Living Allowances
DSEP	Dutch Socio-Economic Panel
DWP	Department for Work and Pensions
ELSA	English Longitudinal Study of Ageing
GC	Guarantee Credit
GEPS	Government Employee Pension Scheme
GDP	Gross Domestic Product
GRB	Graduated Retirement Benefit
HB	Housing Benefit
HSE	Health Survey for England
IMF	International Monetary Fund
ISCED	The International Standard Classification of Education
KERIS	Korea Education and Research Information Service
KLIPS	Korean Labour and Income Panel Study

KLoSA	Korean Longitudinal Study of Ageing
KReIS	Korean Retirement and Income Study
MCL	Minimum Cost of Living
MLR	Multinomial Logistic Regression
MPPS	Military Personnel Pension Scheme
NEST	National Employment Savings Trust
NAE	National Average Earnings
NI	National Insurance
NPS	National Pension Scheme
OECD	The Organisation for Economic Co-operation and Development
PC	Pension Credit
PPP	Purchasing Power Parity
PSID	Panel Study of Income Dynamics
PSTPS	Private School Teachers Pensions Scheme
RISS	Research Information Sharing Service
SC	Savings Credit
SERPS	State Earnings-Related Pension Scheme
ONS	Office of National Statistics
G-SOEP	German Socio-Economic Panel
SPA	State Pension Age
S2P	State Second Pension
UN	United Nations
UNESCO	The United Nations Educational, Scientific and Cultural Organization
US	United States
USA	United State of America
UK	United Kingdom
WHO	World Health Organization

Chapter 1:   Introduction

1.1   Introduction and problem statement

The purpose of this study is to measure the income mobility of older people aged 50 or over in England and aged 45 or over in South Korea (hereafter Korea), using aggregated summary measures and household equivalised disposable income as the standard, and also to investigate the factors that have a significant influence on the income mobility of the elderly population at the individual level. Much literature and many statistical reports on this issue focus on how many older people are at a given annual income level, but these studies often do not tell us about the income movements from one year to the next. Therefore, the author's primary interest in this thesis is in describing the extent of change in income mobility of older people in Korea and in contrasting this with the experience of older people in England. The motivation behind the cross-national comparison is that each of the two countries concerned can draw useful lessons from the comparative insights. Although the two countries face similar demographic pressure with its ageing population, the comparative perspective can produce insight about the different income experience of older people in the two markedly different welfare and pension systems that are at different stages of maturity.

Income mobility allows the investigation of the movement of agents – individuals or households – along the income ladder, and the identification of demographic, structural and socio-economic factors driving these changes provides useful public policy insights. The longitudinal analysis, therefore, allows the identification of the possible factors of such issues as the risk of income and poverty, and of possible solutions to escape from positions of disadvantage.

The motivations underlying the study of income mobility in this thesis are manifold. Firstly, this thesis aims to consider what meaning our society has given to income mobility in the context of the social polarisation that has come after the 2008 financial crisis. Secondly, it is important to focus on the income mobility of older people because they face a higher risk of poverty, particularly in Korea (Barnes et al., 2013, Ogg, 2005, Sefton et al., 2007, Zaidi, 2010). Thirdly, not only are older people particularly sensitive to international and domestic economic changes, but they are also caught in the dilemma of being unable to escape continuous poverty due to coverage gaps in the state pension and social benefit

system particularly countries like Korea (details about the pension and benefit systems will be discussed in Chapter 4) with relatively weak social security systems (Engelhardt and Gruber, 2004). Finally, the comparative research will highlight the role of personal attributes and life-course events in determining the income mobility of older people who live in different welfare regimes. This study will be the first study providing such an extensive comparative approach between West and East, since available analyses have so far been limited to a few Western countries (e.g. Zaidi et al., 2004, Zaidi and De Vos, 2002) or focused on working-age groups with wage/earning mobility (e.g. Buchinsky and Hunt, 1999; Kopczuk et al., 2010; Fields, 2011).

The diffusion of free-market economies – between nations as well as domestically – has generated significant inequality, and this has led to the systematic exclusion of older people from mainstream economic and community life (Barnes et al., 2013, Ogg, 2005, Sefton et al., 2007). England and Korea have not been exceptions where this phenomenon is concerned. The 2008 financial crisis, which affected some countries more seriously because of the global economy, brought about polarisation not only between industry and corporations but also between high and low levels of income.

Korea is an important case study for analysing how income distribution evolves over time, as it shows a relatively weak trickle down of economic growth in reducing poverty and inequality, particularly among older people (old age poverty rate is the highest among the OECD countries) (Jones and Urasawa, 2014). Korea has become one of the world's major economies (the world's 11th largest) and has been one of the most rapidly growing economies in the world, with an increase in per capita income from 10% of the US level in 1970 to 63% in 2010 (Jones, 2012). The country is facing many social policy challenges. One of the fastest growing concerns is the problem of a rapidly ageing population and a high rate of income inequality and poverty in old age (Lee, 2012b).

In response to this, Korea has introduced an income support policy for older people. In order to guarantee a subsistence-level standard of living for older people in the lower income bracket, basic livelihood support is being provided through the national Basic Livelihood Security Programme (BLSP). Korea introduced the Basic Old-Age Pension (BOAP) in 2008. BLSP benefits were provided to 1.4 million people (2.8% of the population) in 2011 (Jones and Urasawa, 2014) while BOAP beneficiaries reached around 4.04 million older people, which was 64.7% of the population of persons aged 65 and over (National Pension Service, 2013). Additionally, beginning in 2011, through the Pension Act for the Disabled, enacted in July 2010, severely disabled people over the age of 18

could receive help for their daily lives from the Pension for the Disabled and the Law to Support the Activities of the Disabled.

However, according to a variety of statistics (e.g. Jaones and Urasawa, 2014; OECD 2011c; OECD 2013b), questions remain about whether or not these income security policies for the elderly population have been effective. This is because the gap in the household income and rate of poverty between elderly people and non-elderly people is gradually widening (Seok, 2010 and Statistics Korea, 2014). In 2011, nearly half (49%) of the population of persons aged 65 and over in Korea live in relative poverty. This is the highest proportion among OECD countries and nearly four times higher than the OECD average (Jones and Urasawa, 2014). In addition, the gap between the poverty rate of older people and that of the total population is the largest among OECD countries, at more than three times greater than the 15% rate for the population as a whole (ibid). Furthermore, the average monthly income of older people in Korea was only two-thirds of the national average, which is well below the OECD average of 86% (ibid).

Another concern is the high number of older people in absolute poverty, defined as having an income below the minimum cost of living. In 2012 a quarter of the elderly population faced absolute poverty, with their monthly income below only 450 thousand KRW (approx. US$450), which is below the minimum cost of living, set by the government at 553 thousand KRW (approx. US$553) (Ministry of Health and Welfare, 2013). In this way, the reason that Korea's elderly households' poverty problem is serious is that, while the national pension system is still underdeveloped, the elderly care system of the past that focused on families is being quickly dismantled (Seok, 2009). Because of this kind of situation, older people are often forced to work beyond the standard state pension age; this can be easily understood by looking at how older people in Korea receive their income. Table 1 below shows that public transfers only amount to 19% of income, while family support amounts to 15.7% and labour income makes up 35.8%. This stands in sheer contrast to the role that state pensions play as the most important source of income for older people in other developed countries. This kind of statistic is a clear illustration of how severe the problem of income poverty and inequality is for older people in Korea. Therefore, a study of income poverty shed further light on this phenomenon and reduce or enhance concerns that based on a static picture of income deprivation.

Table 1 Composition of income and amount, older people in Korea, 2011 (unit: thousands KRW, %)

	Total	Labour Income	Business Income	Asset Income	Private transfers	Public transfers	Other Income
Amount	2,161.4	774.3	390.2	215.9	339.6	409.6	31.8
Percentage	100	35.8	18.1	10.0	15.7	19.0	1.5

Source Jung et al. (2012), survey on the actual conditions of the elderly

Compared to Korea, England`s pension system is mature, and income support through means-tested benefits serves as an important component of older people`s incomes. In 2008, while public transfers (including pensions) accounted for only 16% of elderly persons' income in Korea (Jones and Urasawa, 2014), older people in England received 50% of their annual income from public transfers (including state pension and means-tested benefits), as shown in Figure 1. This is less than the OECD average of 59% but about three times higher than Korea. In England, benefits income was a very important income source for older people in the past, as Figure 1 shows, however, it has steadily fallen in terms of the total gross income, from 61% in 1979 to 43% in 2013/14, while both occupational and earnings income has increased during the same period. With a well-organised pension system and a relatively generous social benefits system compared to Korea, the level of poverty among elderly persons aged 65 and over in England has continuously fallen during the last two decades, from 30% in 1997/98 to 14% in 2011/12.

Figure 1 Composition of gross weekly pensioners' income (mean) by source, 1979 to 1996/97 and 1994/95 to 2013/14 in England
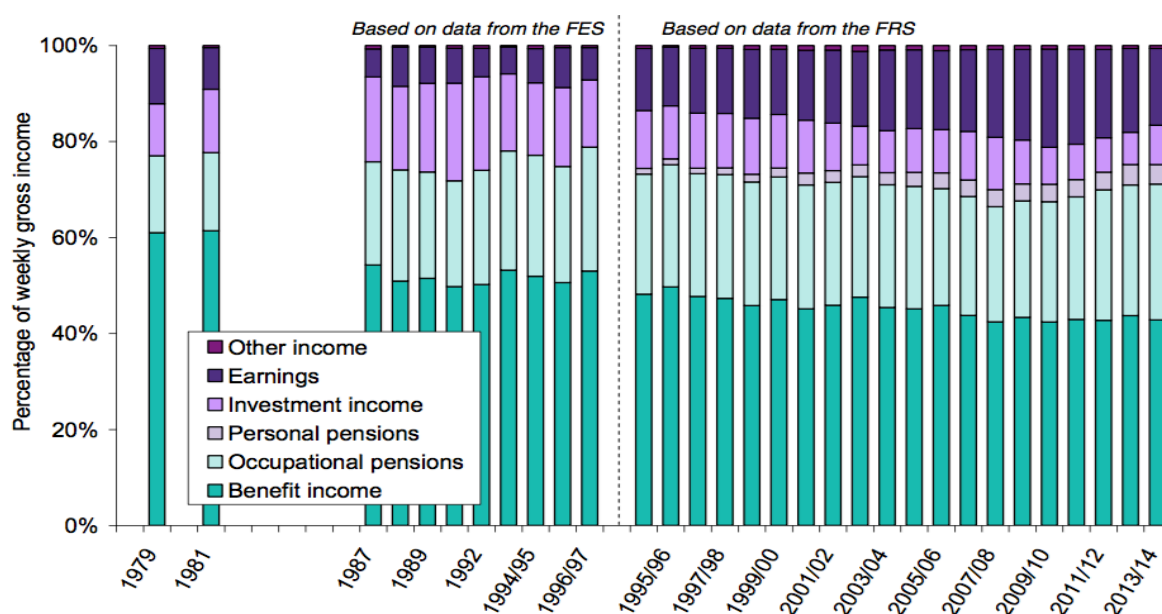
Note: FES is Family Expenditure Survey and FRS is Family Resources Survey
Source: DWP (2015) The Pensioners' Incomes Series

In addition, elderly persons in England are more likely to be active in the labour market until they retire from the job: 73% of people aged between 50 and State Pension Age (SPA) are in employment (Office for National Statistics, 2015). However, this proportion dramatically decreases once elderly people pass the SPA: only 12.1% of older people participate in labour market beyond SPA.

Besides the income support policy, Korea has promoted equal employment opportunities in order to expand the opportunities for labour market activity for the elderly population. In particular, the Act on Prohibition of Age Discrimination in Employment and Aged Employment Promotion was amended in 2008, so that older people are now encouraged to work beyond the age for pension eligibility, currently set at 61. In 2013, as shown in Table 2, 47.2% of the total population of people aged 55 or above were employed and, for people aged 65 or above, this proportion was 30.9% (Statistics Korea, 2014). Interestingly, compared to England (see Figure 2), there is a considerably lower proportion of older people (aged 55 to 65) in employment but the proportion of older people who are active in the labour market beyond SPA (30.9% in Korea) is 3 times higher than in England (10%). The enactment of the 2008 laws and the government`s promotion of older workers' employability became an opportunity to effectively aid the rights and interests of those being discriminated against due to age, prohibiting discrimination based on age at the time of employment or hiring (Lee and Lee, 2011).

Table 2 Korea`s Employment-population Ratio

(Unit: %)

	55 or more		Males		Females		65 or more	
	Labor force participation rate	Employment-population ratio	Labor force participation rate	Employment-population ratio	Labor force participation rate	Employment-population ratio	Labor force participation rate	Employment-population ratio
2000	45.5	44.5	58.5	56.8	35.5	35.0	29.6	29.4
2005	44.7	43.8	59.0	57.5	33.1	32.8	30.0	29.8
2006	45.0	44.2	59.3	57.9	33.4	33.1	30.5	30.3
2007	46.0	45.2	60.7	59.5	34.0	33.7	31.3	31.1
2008	45.5	44.8	59.9	58.6	33.8	33.6	30.6	30.3
2009	45.3	44.4	60.0	58.5	33.3	32.9	30.1	29.7
2010	45.5	44.3	60.3	58.4	33.4	32.7	29.4	28.7
2011	46.2	45.1	61.0	59.3	34.0	33.4	29.5	28.9
2012	47.3	46.1	61.8	60.1	35.2	34.6	30.7	30.1
2013	48.1	47.2	62.7	61.2	36.1	35.6	31.4	30.9

Source: Statistics Korea, 「Annual Reports on the Economically Active Population Survey」

Figure 2 Employment rates for people aged 50-64 and 65 or over (men, women, and all)
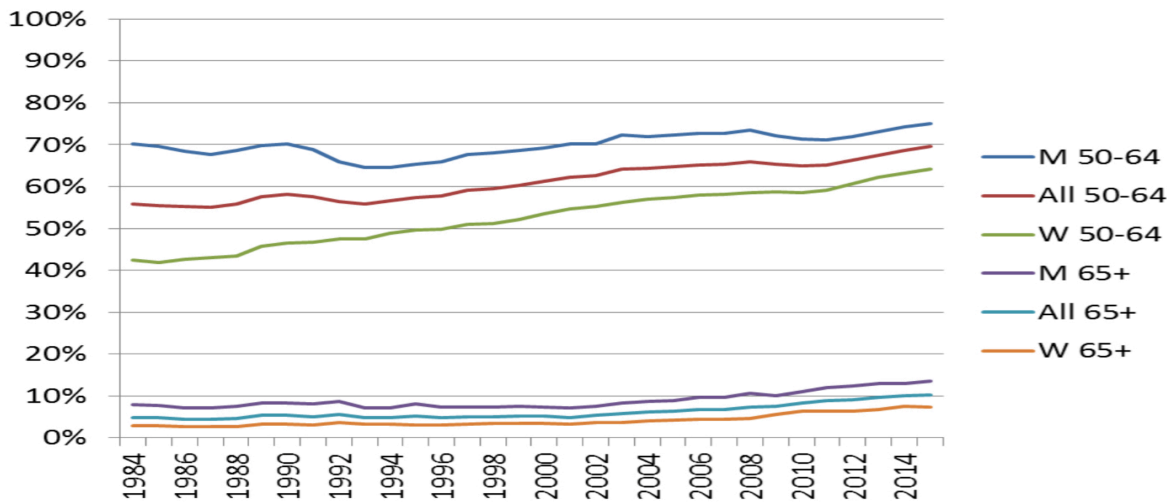
Source: Department for Work and Pensions (2015), Employment statistics for workers aged 50 and over, by 5-year age bands and gender

However, the biggest hindrance to the employment of elderly individuals is the relatively young age at which they leave companies. The average mandatory retirement age set by firms is 57, however, many workers leave even earlier as firms try to save the increasingly high cost of older employees. This mandatory retirement age will be increased to 60 for large (that is, with more than 300 employees) companies in 2016. While there has been an increase in the number of jobs and employment, most of the jobs for older people have been low-quality employment rather than decent jobs (OECD, 2011c).

In other words, labour market policies for older people in Korea are designed without an understanding of the social and cultural barriers that surround these individuals; thus, the opportunities that can be received through work are reduced (OECD, 2011b). Specifically, this situation has created a structure in which older people cannot avoid working in a secondary labour market represented by low wages and unstable jobs, thus having a negative effect on social integration by increasing the earned income gap between the elderly and non-elderly populations.

This kind of social background income support and labour market environment surrounding the elderly population forces them to remain continuously in the lowest income bracket, and is the leading cause of the intensification of income inequality. As a result, starting in 2000, a great deal of effort was made to improve income support and the labour market policies, based on a variety of research (Seok, 2009, Hong and Kim, 2011, Lee et al., 2013, Kang, 2009) to reduce income inequality. Nonetheless, the problems of income inequality for the elderly population and the income gap between them and the

non-elderly are not easily resolved (Jones and Urasawa, 2014). This is because the majority of research has focused on the "poverty" of the entire population and, since the research concentrating on the most vulnerable group, the elderly, has been very scarce (except in a few Western countries), it has had limited impact on policies to relieve income inequality for the elderly population.

Additionally, this kind of research has created a policy approach that attempts to solve the problem of "entering into poverty" and "escaping from poverty" through the measurement of the income inequality level and poverty rate in order to reduce income inequality (Koo, 2005, Lee et al., 2013, Kim and Noh, 2009). This type of approach may be useful in measuring the static level of income distribution, but within income distribution it has been shown that it has limitations in respect of measuring the dynamic changes of individual older people, or other similar dynamic changes, as it can only provide static snapshots of poverty and inequality (Jenkins, 2011).

The existing research on income inequality (Hagenaars et al., 1994, Disney and Johnson, 2001, Disney and Whitehouse, 2001, Heshmati and Rudolf, 2013, Kim and Noh, 2009, Koo, 2005) has overlooked the dynamic aspect within the income distribution of objects of poverty; thus, a broader perspective has emerged, raising the concept of "income mobility" (the body of literature will be critically discussed in Chapter 2). This concept is very useful when taking into consideration the changes in the individual income mobility of older people, including the dynamic movement of poorer groups and the upper-middle classes that appear over time within income distribution.

Thus, it appears that the limitations on the measurement of income inequality can be overcome by grasping the overall changes in the movement of the income distribution between individuals and households, similarly as for the approach to the concept of "income mobility" regarding the income inequality phenomenon of older people. Moreover, as the existing research on income mobility in Korea (Kang, 2009, Sung, 2011, Sung, 2010, Nam, 2015) does not provide an explanation of the phenomenon of income mobility or discuss its relationship to income inequality, a risk has been revealed of the relationships between income inequality and the income mobility of vulnerable groups in modern society being distorted. Therefore, by examining longitudinal data and applying recent measurement methods (methods used in this thesis will be discussed in Chapter 3), this thesis attempts to expand our understanding of the income mobility of older people through cross-national comparisons, and its aim is to contribute to a more evidence-based policy-making process.

1.2   Why is it important to study income mobility during old age?

The importance of providing an income mobility analysis from a longitudinal perspective can be explained by following a simple example. Consider two scenarios for a society of two individuals (A and B), where A has a low income and B has a high income. In the first scenario, the income of A and B stays the same between the base and final year. However, in the second scenario, A won a lottery and his/her income increases and A becomes rich, but B lost all his fortune on gambling and became homeless, and as a result B's income drops and B becomes poor. In this scenario there is a complete reversal of the two individuals' income ranks, however with cross-sectional income inequality analysis, it would not be possible to measure the dynamics of an individual's income changes but only show the stagnant poverty distribution in both scenarios; this approach cannot catch an individual's persistent and temporary income status. From a policy perspective, different approaches require tackling the problems in the two scenarios. In the first scenario, policy has to address the persistent poverty while, in the second scenario, policy must seek to minimise socio-economic vulnerabilities. Through income mobility analysis, the change of an individual's living standards across space and over time can be analysed.

Why do we need to study income mobility in old age? Many developed countries are experiencing an increase in the longevity of their populations (see Figure 3), which, coupled with a decrease in birth rates (Korea has one of the lowest birth rates, with 1.2 children per woman in 2013; England's birth rate is 1.9 children per woman), results in an ageing population (United Nations, 2014). Increasing numbers of older people, both in absolute numbers (globally 841 million people were aged 60 years or above in 2013) and relative terms (the global share of the elderly population is 11.7% in 2013), make up the population and older people are living longer (at the world level, life expectancy at age 60 is a further 20 years in 2010–15) (United Nations, 2013), which means they are more prone to experiencing some income mobility in the retirement phase of their lives.

Figure 3 Life expectancy at birth by development group and major area, 1950-55 to 2010-15
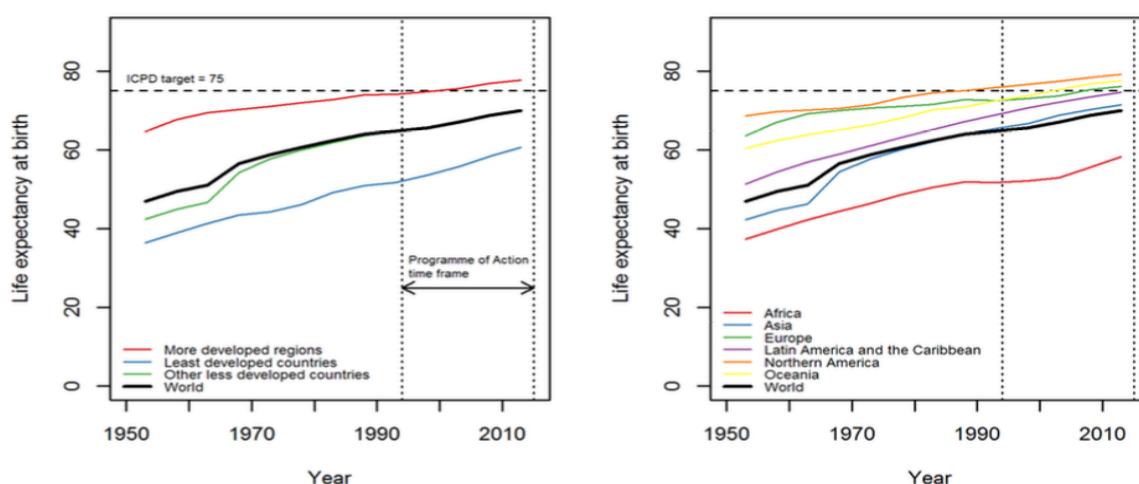
Source: Population Division of the Department of Economic and Social Affairs of the United
    Nations Secretariat (2013). World population prospects: The 2012 Revision. New
    York: United Nations

Studies on income mobility in old age cannot escape the fact that they are rooted in societal and ethical concepts or, according to Fields and Ok (1999b) and Atkinson et al. (1992), income mobility aspects always carry some degree of "normative significance". However, ethical principles behind income mobility in old age are somehow different from the ones that apply to other income mobility studies. This is clear when one compares income mobility in old age to inter-generational mobility, for example. Inter-generational income mobility is often seen as a goal in its own right, especially with origin independence (whereby one person's income is not dependent on his or her parents' income), for this is a sign of an open and mobile society (Atkinson et al., 1992). Most academics tend to agree that income mobility that results in lower income inequality is also good for societies (Jarvis and Jenkins, 1998).

Friedman (1962) says that "consider two societies that have the same distribution of annual income. In one there is great mobility and change so that the position of particular families in the income hierarchy varies widely from year to year. In the other, there is great rigidity so that each family stays in the same position year after year. The one kind of inequality is a sign of dynamic change, social mobility, equality of opportunity; the other, of a status society. The confusion of these two kinds of inequality is particularly important precisely because competitive free-enterprise capitalism tends to substitute the one for the other…capitalism undermines status and induces social mobility" (Friedman (1962), p. 171). If income inequality is high in a country which, at the same time, has low income mobility, then there is a high chance of that country's income inequality becoming persistent. By contrast, if income mobility is high, it is because the inequality is being

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reduced or the feeling of inequality is minimal. In countries where income inequality is high and income mobility is low, there is no effort or even hope within society to raise income. Moreover, because of a drop in income, mobility makes each individual or household's income permanent and lowers the chance of an upward movement in terms of social status. Thus, even if the income distribution situation generally appears to be the same every year, societies with more mobility can be considered more equal societies (Fields, 2008).

In addition, according to Sawhill (2000), when we assume that there is a "Meritocracy", a "Fortune cookie society", and a "Class-stratified society", even if the fortune cookie society or the class-stratified society has a greater equality distribution, people will say that they prefer to live in a meritocracy. This is because, compared to a class-stratified society – wherein one's family background or class is important and there is hardly any social mobility – or a fortune-driven society, it is better to live in a society where mobility is free, based on individual behaviour, achievements or ability.

However, the positive viewpoint of income mobility overlooks the importance of a nation's social and structural context in answering the question of what kinds of causes produce income mobility. Atkinson et al. (1992) and Jenkins (2011) point out that the biggest problem of income mobility is that there is no consensus about whether income mobility is "good" or "bad". In the case of poverty or inequality, there is agreement about the meaning of reduction or increase, but there is little consensus about the meaning of lots or little income mobility (Jenkins, 2011). This is because the relationship between income mobility and income inequality can be shown differently due to fundamental or structural parts (Hojman, 2000). Because the phenomenon of income mobility as it appears in a society can be different depending on the social and structural contexts that cause the mobility, its relationship with income inequality may not be static (Hojman, 2000). For instance, since income position is unstable, income mobility can appear widely, or there can be more opportunities related to rent-seeking; this also means boosting the income mobility of the upper and middle classes. This kind of income mobility also works as a factor to increase income inequality.

Older people are often assumed to have more stable incomes (although this is not clear, as it is shown later in Chapter 5 and 6), based on the assumption that most of their income derives from fixed-income state pensions (Suoniemi, 2012). As such, they are deemed a less interesting subject of observation compared to working-age group (e.g. wage/earnings

mobility) and are often overlooked in income mobility literature (an exception to this can be seen in the recent works such as Zaidi, 2008 and Suoniemi, 2012). However, based on judgements stemming from the emergence of new retirement and pension models, this assumption is less evident. Additionally, increased longevity in older people also means that their fixed income, whether from public or private pension systems, will most likely be affected in the long-term by inflation and economic growth. Even where pensions follow price increases, older people may find themselves poorer compared to the rest of the population, which experiences real income growth (Zaidi, 2008).

The individual risk element has increased with the privatisation of the welfare system, as the private personal pension system has a greater element of financial market risk than social security systems. The study of different sources of pension income and the determination of the longitudinal variation in its components provide assistance in understanding the magnitude of variations in pension systems.

This sub-section has discussed the positive aspects of the relation between income mobility and income inequality and demonstrated that their relationship is not static and has a double nature. It can be said that the interpretation of income mobility and its relationship to income inequality should take into consideration a society's structure and its economic environmental context. Specifically, in the case of older people, opportunity is more difficult to access than it is for younger people, and older people can be very sensitive to changes in the economy, so this could have a negative impact on income inequality. Thus, there is a need to shed new light on the meaning of the income mobility of older people occurring in England and Korea. The next section considers the significance of this research in the field of income dynamics of older people.

1.3 The significance of the research

This thesis which is focused on the income mobility of older people in England and Korea, has the following significance:

- Firstly, the evidence of "income mobility" can reduce concerns about income inequality by reflecting the dynamic changes in the income distribution of individuals and households that cannot be measured by income inequality from a long-term perspective. Much of the existing research has consisted primarily of suggestions as to the alternative policy to diagnose the level of income inequality or reduce the risk of entering into poverty. However, a few research projects have

emphasised the concept of "income mobility" as a step towards solving the problem of the limitations and polarisation of measuring income inequality. While there is a sense that, in comparison with research conducted in the West since the 1970s, income mobility research in Korea has come only recently, it is significant that there has been a consensus that income inequality measurement is limited in its usefulness in analysing changes in income distribution. In addition, the level of concern about income inequality levels and income mobility after the 2008 financial crisis has been minimal. In particular, there has been little research focusing on the elderly population, who are especially vulnerable to social dangers. Accordingly, through the measurement of income inequality and income mobility among older people from 2006 to 2012, the income inequality level of older people following the financial crisis can be grasped from a variety of directions.

- Secondly, the methods of measuring income mobility are different according to the conception and standpoint of income mobility (Fields, 2000, Raycroft, 2009). Thus, an understanding of the notion of income mobility must come first, in order for a measuring method appropriate to the research goals to be chosen, so, even while emphasising income mobility, it cannot be to excess. Generally, income mobility is divided into categories such as relative mobility and absolute mobility (Birdsall and Graham, 2000, Fields and Ok, 1996, Fields, 2000, Fields, 2008, Fields, 2009, Jenkins, 2011, Rycroft, 2009, Woolard and Klasen, 2005, Zaidi, 2008). Relative mobility is defined as the change of relative income status in relation to other people, and as the movement in relative individual income in comparison to others (Birdsall and Graham, 2000). Absolute mobility is an increase in one's absolute income, so, if one's absolute income has increased, one is considered to have experienced mobility even if one has not moved income categories in comparison to others (Fields, 2000, 2006; Rycroft, 2009[1]).

- Thirdly, although recent years have seen a growing number of studies on income mobility, little research has focused on analysing together the causes of income mobility and the dissimilarities in the structure of income mobility across countries (Ayala and Mercedes, 2007). It is evident that there is a cross-national difference in welfare systems and labour markets. The cross-national perspective of these

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[1] One problem with relative mobility is that even if one's income does not change, depending on the changes in other people's income, one's position can change (Fields 2000, Zaidi 2008). Absolute mobility was suggested in order to solve this problem.

analyses will allow us to examine the differential income experience of older people, where the two selected countries differ considerably in terms of old age social security systems, social care settings, living arrangements, and environmental context (West and East). Such analysis can contribute to policy lessons between the two countries.

- Fourthly, from a microscopic standpoint, it will investigate the factors that influence the absolute mobility of older people in England and Korea, discovering the areas where actual anti-poverty policy could have an impact. This is because, in an inadequate labour market and social welfare system, an increase in the absolute income of older people – caused by a rise in earned income, an increase in public support funds, etc. – is just as important as relative mobility. According to the results of existing studies, demographic factors such as:

  o gender (Kemp et al., 2004; Kang, 2011, Nam, 2015);

  o age (Johnson and Stears, 1998, Jenkins, 2011, Zaidi et al., 2008);

  o the number of those employed within a household (Jenkins, 2011, Kim et al., 2012, Nam, 2015);

  o changes in marital status (Bardasi et al., 2002, Zaidi et al., 2001, Sefton et al., 2011, Dornan, 2004, Zaidi et al., 2005); and

  o living arrangement (Seok, 2009, Nam, 2015, Jenkins, 2011, Sawhill, 2000, Woolard and Klasen, 2005, Zaidi and De Vos, 2002, Zaidi et al., 2005)

These were central factors in upward or downward mobility. Besides this, there is also research that emphasises on the role of social welfare systems (Aristei and Perugini, 2012, Ayala and Sastre, 2008, Seok, 2009, Zaidi, 2008), disability/health (Kemp et al., 2004, Kronstadt, 2008; Herts (2006), employment (Jarvis and Jenkins 1997 and 1998; Jenkins, 2011), and education (Birdsall and Graham, 2000; Seok, 2009; Rycroft, 2009).

Thus, in this thesis, the author will examine factors – demographic, health/disability, human capital (education), employment or welfare – which have the greatest impact on the absolute mobility of older people (empirical results will be discussed in Chapter 6). If the existing research has examined the influential factors using logit or probit models, using relative mobility as the standard, this thesis will use absolute mobility as a standard, adapting Zaidi and De Vos's (2002) multinomial logistic regression analysis with five categories of income trajectories as dependent

variables, it examines the factors associated with income mobility of older people in both countries and summarise the characteristics and directional income movement. These results can be beneficial in creating long-term policies to intervene and prevent poverty among older people from a perspective of guaranteed income.

1.4 Research objective and questions

The principal objective of this research is to examine the extent of income mobility experienced by older people in England and Korea using household equivalised disposable income as the standard, and to compare and contrast the factors that may affect income mobility among older people in the two countries. Ageing is accompanied by life events, and the transitions have direct and indirect effects on one's lifestyle, income and capabilities. Most older people experience decreasing physical abilities and diminishing financial resources (Zaidi, 2008). One of the main life events in old age is retirement, accompanied by declining income resources. This event has important effects on the economic situation, health and social lives of older people. Recent longevity trends and short working lives, due to a late exit from education and an early exit from the workforce (Zaidi et al., 2001), make it important for this study to examine the income mobility of older people close to and after retirement. Using longitudinal data from the English Longitudinal Study of Ageing (4 waves, 2006–2012) and the Korean Longitudinal Study of Ageing (4 waves, 2006–12), this thesis will provide new evidence about the income dynamics of older people in retirement and main factors affecting income mobility in old age.

This study will analyse macroscopically the patterns of the income mobility of older people in England and Korea from 2006 to 2012, and will investigate microscopically the factors influencing the income mobility of older people. A closer look will allow an analysis of the relative and absolute mobility of older people between 2006 and 2012.

Through analysing the determinants of mobility by means of different decomposition exercises, this thesis will also assess dissimilarities in the structure of income mobility in England and Korea. There are different national characteristics that may condition the process of income mobility in old age. One important element is, undoubtedly, the institutional diversity of the social security system. Thus, the extent to which the social security system for older age in the two countries differs (and whether it is associated with

income mobility differences) is important.

Finally, the comparative research will highlight personal attributes and life-course events to determine the income mobility of older people who live in different welfare regimes. This study will be the first study providing such an extensive comparative approach between West and East, since available analyses have been limited so far to a few Western countries or focused on working-age groups with wage/earning mobility. In order to achieve the research aims, the following specific research questions (RQs) have been set out:

RQ1: How much absolute income mobility is observed for older people in Korea between 2006 and 2012 and how did this compare with income mobility in England?

RQ2: How much relative income mobility is observed for older people in Korea between 2006 and 2012 and how did this compare with mobility in England?

RQ3: What determines aggregate income mobility differences between England and Korea?

RQ4: What are the factors affecting income mobility trajectories in old age in England and Korea? How are various personal attributes – for example, sex, age, education, employment, life-course transitions, such as becoming a widow, and changes in living arrangements – associated with the income mobility during old age?

1.5   The structure of this thesis

This thesis is organised into seven chapters. Chapter 1 introduces the problem statement and background to research undertaken in this thesis. Following this, it discusses why income mobility in later life is worthy of interest and why its relationship with income inequality is not static and has two sides. The objective of this study and its policy relevance and unique contributions are also discussed. The context of poverty rate and income support system for older people in England and Korea are introduced briefly. The significance of this research, along with the research questions of the thesis, has also been presented. Finally, the structure of the thesis is illustrated.

Chapter 2 presents a literature review of income mobility in old age from the existing research. It first reviews the literature on the theoretical background on the study of income mobility, with a particular concentration on the definition and concept of income mobility, e.g. by addressing the question "what is income mobility?" It also compares and contrasts

information relevant to different measures and multiple aspects of income mobility. In addition, it discusses the conceptual and methodological challenges of studying income mobility in old age. After providing theoretical and methodological backgrounds on this topic, the final part of the chapter, it reviews the empirical evidence from existing research on income mobility in both England and Korea and discusses the determinants of income mobility in old age. The chapter concludes by providing the gaps in the current literature and what this study can contribute to this particular field of study.

Chapter 3 provides the methodology used in this thesis. The chapter starts by revisiting the research questions and this is followed by an analysis of their contents. It also presents the details of datasets and discussing issues relating to attrition in both datasets. Following this, it outlines the study subjects, income variables (similarities and differences) and the definition and measurement of the variables. In addition, it discusses issues related to empirical choices for this thesis, the income data and equivalence scales, and how the choices can be justified and used in the analyses.

Chapter 4 discusses the differences in the pension and social welfare system in England and Korea. Firstly, it presents the importance and characteristics of the social security system for older people in the two countries, and then it compares and contrasts the two countries' pension systems. Following this, it discusses the social benefits system and how this affects the income mobility of older people across the two countries.

Chapter 5 presents the results of the descriptive analysis, using a number of different income mobility measures. The first part of the chapter provides the detailed demographic characteristics, educational level, and health status of the study sample. Following this, it discusses the personal economic attributes and relative socio-economic status of older people in the two countries. The second part of this chapter, adapting the number of income mobility measures, presents a descriptive result of income mobility for older people in England and Korea. It uses both "absolute mobility" and "relative mobility" concepts for RQ1 and RQ2, from the macroscopic level, to describe income movements considering its income origins and destinations. After analysing the absolute and relative income mobility of older people in England and Korea, this chapter attempts to undertake descriptive analyses to identify factors that are associated with income mobility in later life. It will present an examination of the experience of income trajectories by different age groups, marital status, educational level, labour and health status, and components of income. This will serve as a foundation for the subsequent econometric multivariate analysis (multinomial logistic regression analysis), addressing RQ4 in Chapter 6

Chapter 6, building on the descriptive analysis, presents the examination of what determines aggregate income mobility differences between the two countries (RQ3) and multivariate findings of this thesis. From the micro perspective, it focuses on analysing the different factors that have a significant influence on the income mobility of older people in England and Korea using multinomial logistic regress analysis (RQ4). This analysis will help to identify the key determinants associated with income mobility in later life.

Chapter 7 presents a discussion and conclusion of this thesis, integrating the results of the analysis presented in Chapters 5 and 6, and will comment on what these results imply for policy on the economic wellbeing of older people in both countries. This chapter also draws upon the research presented in the literature review to help highlight ways that this thesis supports or contradicts the findings of previous literature (which was discussed in Chapter 2). Finally, it summarises the key findings and implications of the research in this thesis. Limitations of the thesis are outlined and recommendations for future research are also discussed.

Chapter 2:   Literature Review

2.1   Introduction and outline

The aim of this chapter is to examine the current body of income mobility literature and to review the empirical studies that emerged over the past two decades and gives the greatest attention to England's and Korea's general and elderly populations, with an examination of the patterns and factors of income mobility in the different countries. To achieve this, it examines conceptual and methodological issues that arise when measuring income mobility and the literature relating to the factors which affect income mobility in old age.

Income mobility is one of the major issues in the current structure of growth-orientated industrial societies. It is differentiated form the concept of inequality in a sense that it concerns one's changing economic status from one generation to another or within a single generation in different time periods. The mobility studies take place in either intra-generational contexts while focusing the same individual (see (Atkinson et al., 1992, Jenkins, 2011, Jarvis and Jenkins, 1998, Fields and Ok, 1999b, Jenkins and Van Kerm, 2009, Massoumi, 1998, Zaidi and De Vos, 2002, Zaidi et al., 2008) or inter-generational contexts where the focus is on the association between the incomes of parents and their children (see works of (Björklund et al., 2009, Black and Devereux, 2011, Crawford et al., 2011, Piketty, 2000, Solon, 1999). The availability of longitudinal data makes it possible to analyse the concept of mobility in detail but still there is lack of a unified approach in the area of mobility measurement (Fields and Ok, 1996, Fields, 2008, Zaidi et al., 2008, Jenkins and Van Kerm, 2009, Jäntti and Jenkins, 2014). Therefore, to help understand broader concepts and measurements related to income mobility, both empirical and methodological studies at the national and international level will be examined.

A selection of studies of income mobility was carried out using online academic databases such as Econlit, Web of Knowledge, Ageinfo, Science Direct, KERIS, RISS, and ESTOR. Additional searches were carried out on academic journals and the websites of international organisations (for example, the OECD and the IMF) for literature that could not be identified using the above online search engines. Thus, this review draws upon literature from academic journals, books and international and domestic government reports from both England and Korea. This chapter will be organised in the following way:

- The chapter first discusses the theoretical background of income mobility, with a particular concentration on the definition and concept of income mobility (section 2.2). What do we mean by income mobility? Throughout this chapter, the author comments on the measures and concepts of income mobility that are relevant to the research topic are explored.

- It also provides an overview of the different mobility measures used in the literature. The literature is far from unified, as its application to the old age population is a relatively recent phenomenon (section 2.3).

- The task of this section is not to argue in favour of one specific measure or another; rather it is to compare and contrast information relevant to different measures and multiple aspects of income mobility. Thus, it also discusses conceptual and methodological challenges of studying income mobility in old age (section 2.4).

- After providing theoretical and methodological backgrounds on the topic, it discusses the determinants of income mobility in old age (section 2.5) and reviews the recent empirical studies on income mobility in both England and Korea (section 2.6).

- The chapter concludes by highlighting the gaps in the current literature and what this study can contribute to this particular field of study (section 2.7).

2.2 The concept of income mobility

The study of income mobility compares an individual or a household's income at two or more points in time to see whether the income has risen, stayed the same or fallen (Atkinson and Morrisson, 1992, Fields and Ok, 1999a, Fields and Ok, 1999b, Fields, 2008, Massoumi, 1998, Jenkins, 2011, Jäntti and Jenkins, 2014). In other words, it refers to the dynamic change of income over time. Here, income is referring not only to the earnings from the labour market, but also includes other components of income, such as financial and property income (Fields, 2008; Jenkins, 2011).

Generally speaking, a person's economic position can change for a variety of reasons, including the growth or shrinking of macroeconomics (see Jenkins et al. (2013), a change in environment due to one's employer, the growth or shrinking of a business, how strong or weak a local society's economy is, etc. As a result of changes in all of the economies in which a person participates, that person's position can be improved or worsened. Further, it can be changed by the important events in one's life that have economic effects on an individual: graduating from school (Crawford and Vignoles, 2014), getting a job or being

promoted (Jarvis and Jenkins, 1997), divorcing, becoming ill, the death of a partner (Jarvis and Jenkins, 1997; Zaidi, 2008), and retiring (Bardasi and Jenkins, 2002, Meadows, 2002, Zaidi and De Vos, 2002). This kind of income mobility research quantifies the movements of individuals' incomes that occur with the passing of time. Further, it confirms what kind of relationship the current economic position has to the past position, and investigates what influences are related to the movement of an individual's income (Fields, 2000).

Research on income mobility corresponds with research on inequality of income and poverty. In the 1970s, many third-world countries began to dedicate themselves fervently to economic growth, establishing economic development plans, etc. The results of these efforts did contribute to economic growth and the alleviation of absolute poverty to some degree, but, in the case of the destitute who were contained in the lower income levels, there was almost no improvement, and income inequality began to get gradually worse as the increase in wealth was only returned to a select few individuals (OECD, 2011a). Thus, each country created a variety of policies to relieve income inequality and poverty, but they were unable to find a clear solution. Therefore, while diagnosing poverty and income inequality of each country, the OECD and other international organisations began to focus on income mobility (OECD, 2009, Fields, 2009).

In particular, in analysing the static nature of income inequality and income distribution, neither the movement within income distribution nor the changes and dynamic aspects could be measured. Since there were limitations in terms of reflecting the differences in an individual's or a household's capability to accesses opportunities – access to education, employment, access to information, other areas – the income mobility perspective came into demand (Sen, 1999).

Put simply, the phenomenon of social inequality cannot be understood in depth using income inequality as a measurement (Birdsall and Graham, 2000; Fields, 2000; Jenkins, 2011). Generally, the inequality of a society is shown through the Gini coefficient, which is an index of income inequality, quintile ratios, decile ratios, etc. (Jenkins, 2011). However, while this kind of index for income inequality is useful for understanding static income inequality, it has limitations in that it cannot show the individual dynamic changes within income distribution over time (Jenkins, 2011). For example, consider a country in which there lived three individuals A (whose income in 2015 was £100), B (whose income was £500) and C (whose income was £1000). Imagine if in 2016 their incomes changed to £1000 (A), £500 (B) and £100 (C). In that scenario, that country's income inequality standards would be measured as being the same value, since the total level of inequality

remained the same. In addition, Jarvis and Jenkins (1997)[2], for example, in their study of income mobility in Britain between 1991 and 1994, found that income improvement happened for the low-income group and few of the people who had low incomes in the first year of interview stayed in the same low-income group in the next interview. This type of insight cannot be provided by a cross-sectional income inequality analysis. However, it can be examined through income mobility studies with a longitudinal perspective.

Therefore, the concept of "income mobility" can be considered edifying in examining the changes of individuals within this kind of income distribution. Moreover, even when the income distribution is the same, since an individual's welfare can have different results where an individual either changes their place in the table of income distribution over a period of time or does not (Yun and Hong, 2012), the concept of income mobility is extremely meaningful in interpreting income inequality.

In addition, the income mobility perspective is based on a long-term point of view.[3] For example, the individuals who are living in poverty can be the same or different from the year before, and there are those who are poor for the short term and those who are poor for the long-term. Even if a society has the same poverty rate, there are instances where the majority of the poorer class experiences poverty only temporarily and the majority moves up to a higher group, as well as where the movement is downward and the majority experiences long-term poverty (Seok, 2010, Jenkins, 2011). Accordingly, it may seem as though the poverty of the latter is more extreme, and since – in the case of households experiencing short-term poverty – from the long-term perspective, these people are no longer long-term poverty households, between groups efficient policy can be achieved (Jenkins, 2011).

As a result, the income mobility perspective can be concluded to be a concept that emphasises the dynamics of individual and household income changes that appear within a

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[2] For example, they found that there is more mobility among the elderly group (defined as those over 60 years of age at the first wave of the panel survey taken into account), both male and female, than among the non-elderly. However, they also note that, during the period studied, the income of older people grew at a stronger rate than the income of the rest of the population, and they conclude that the higher mobility for the older group is actually the effect of this higher rate of growth in the income of older people than in the rest of the population, rather than the effect of actual volatility in their income (Jarvis and Jenkins, 1997).

[3] For example, as compared to measuring long-term income mobility, measuring short-term income mobility can lead to an exaggeration in poverty and long-term inequality. In other words, if a person is investing in education or other human resources at the time that income inequality is measured, he or she might be relatively poor, while others might be at their peak in terms of their wages. Thus, measurement of the short-term can create distorted results (Behrman, 1999).

society's income inequality from a long-term viewpoint. This kind of income mobility perspective started to be recognised in researchers' discussions about the extent to which income mobility could be seen. According to Fields (2006), income mobility can be divided into six kinds of concepts: time dependence, positional movement, share movement, symmetric movement, directional income movement, and mobility as an equaliser of longer-term incomes.[4] While these concepts are may differ in terms of how they are defined and measured, the choice as to which income mobility concept is used should be based on the specific research questions that need to be answered (Ferreira et al., 2013). Each of these concepts and measures (except the sixth concept 'mobility as an equaliser of long-term incomes is not included as this concept is not used in this thesis) are summarised in Table 3.

Table 3 Summary of the five types of income mobility (Fields 2006)

Concept	Relative Mobility			Absolute mobility	
	Time dependence	Positional movement	Share movement	Symmetric income movement	Directional income movement
Definition	The degree an individual's economic past affects their present	The degree of change in an individual's economic position	The change in an individual's share in total income	No consideration to direction	The measurement of a person's income's increase or decrease with consideration of direction
Measure used in the two-period case	$1 - r(y_1, y_2)$ where r is the Pearson Correlation Coefficient	Transition Matrix $1 - p(y_1, y_2)$, where p is the rank correlation coefficient	Standard Deviation of the change in income occupied, the absolute value of the change in income share $\left(\frac{1}{n}\right)\Sigma|s(y_{2i}) - s(y_{1i})|$ where $s(.)$ denotes i's share of total income	Income Mobility Decomposition (Field and Ok 1999a) $\left(\frac{1}{n}\right)\Sigma|y_{2i} - y_{1i}|$	- Income change graph, X Axis: the value of difference in income change Y Axis: Household Total - Income trajectories

Source: Author's own work from Fields studies (2006, 2008)

Table 3 above shows the differences between the concepts of income mobility commonly found in the literature. The concepts explained in detail below will be used intensively throughout this thesis to answer the research questions, particularly when describing the income mobility patterns for RQ1 absolute mobility (symmetric and directional income mobility) and RQ2 relative mobility (transition matrix and rank mobility). There, this thesis will also use the both relative and absolute mobility concepts to answer RQ3 (time

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[4] Fields (2006) presented five of these concepts: time-independence, positional movement, share movement, symmetric movement and directional income movement, and added the sixth, mobility as an equaliser of longer-term incomes, in 2008.

dependence, share movement, and symmetric income movement) and absolute mobility concept for RQ4 (directional income movement).

Firstly, ***time dependence*** means whether or not current income is dependent on past income. Time dependence occurs in two kinds of context. The first is an inter-generational context, which is interested in how much a son's income can be predicted by his father's income. The other is the intra-generational context, that is, how much later individual income can be predicted by earlier individual income. In order to measure both contexts, they are generally divided into base income and final income, and the observed data is determined to be either categorical data or quantitative data. This is because, depending on the properties of the data, the measuring method is different.[5] Additionally, time dependence occurs when, as a particular form of immobility, the present economic position is determined by the past position. Therefore, perfect positive time dependence means "immobility", and refers to the times when the diagonal line is equal to one and the correlation coefficient is close to one as an identity matrix. These measurement methods are easy to employ, but due to the differences in expected frequency depending on the number of parts (quintiles, deciles, etc.) the mobility results can be different, and so can the correlated value: the greater the difference in time between the base year and the final year, the greater the chances that an error would occur of the correlation being low.[6] In general, time dependence can be measured by measures of Cramer's V or Pearson's correlation coefficient. Its formula is as below:

- $\dfrac{Cov\,(Y_j^f, Y_j^i)}{\sqrt{Var\,(Y_j^f)}\,\sqrt{Var\,(Y_j^i)}}$ - Pearson's correlation coefficient index

- $\sum_c \sum_r \dfrac{(n_{c,r} - m_{c,r})^2}{m_{c,r}}$ - Pearson's chi-squared index

    $Y_j^{f,i}$ refers to the income of individual j in period f (final income) or period i (initial income), and $n_{c,r}$ refers to number of observations in c (column) and r (row), of a quantile mobility matrix. $m_{c,r}$ refers to the number of expected observations in any cell of a quantile mobility matrix under the hypothesis on

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[5] Namely, when the unit of measure is categorical – for income categories, generally quintiles or deciles – it is shown using the chi-square value of a transition matrix of the base year and the final year, depending on the income position. By contrast, when the unit of measure is quantitative, based on the total amount of income, generally, the base income and the final income's coefficient of correlation or beta coefficient are used.

[6] When the measurements are in deciles or quintiles, this means that the degree of mobility can change. Moffitt and Gottschalk (1995) analysed that in the space of one year the correlation value was 0.7–0.8, but in five years it was 0.5–0.6.

time independence.

Secondly, the ***positional movement*** measures the proportion of individuals or households who move from one part of the income distribution to another. The income brackets can be percentiles, deciles, quintiles or any other group. Positional movement is also widely used in the study of poverty dynamics, measuring the proportion of people who move into and out of poverty between two periods. This measurement method is similar to the aforementioned time dependence measurement. Specifically, this refers to a unit matrix using the essential standard of position immobility. Compared to this kind of unit matrix, that which measures how far the actual mobility matrix drops is called an "immobility ratio". Simply put, this refers to the ratio of income earners that are left in the same category, comparing the base year with the measured years.

The income mobility literature contains many examples[7] of transition matrices, generally showing a strong diagonal but no diagonal dominance (i.e. the diagonal entry is often the line's largest, but is rarely greater than 0.5 in the entire matrix), indicating significant mobility. Another general finding that applies to most studies is that there is more mobility in the middle quantiles than at the tails of the income distribution. Transition matrices also allow for the observation of the extent of mobility, by quantifying how far the income of "mobile" people stretches. Generally, most mobility is actually of a short range, in that people who move out of the income distribution quantile between the two observed periods are in neighbouring quantiles. However, with this measurement, the small income mobility that arises within categories is ignored, and the movement between the categories is deemed more important. Furthermore, it is difficult to explain movement between the income classes and, since the moving of positions is relative, an individual's income position appears relative to those of others. Accordingly, one problem that can occur is that, even if an individual's income does not change, that person's income position can change as a result of a change in others' income. This mobility can be measured by measures of Mean absolute quantile change and Mobility ratio and its formula is as below:

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[7] For example, the transition matrix of US taxpayers between income quintiles, from 1996 to 2005, shows that 42.4% of taxpayers from the lowest quintile and 69.4% of those from the highest remained immobile, compared to 33.3% of the second and middle quintiles and 40% of the fourth quintile (first being the lowest) (US Department of the Treasury, 2007). In another example, the transition matrix for older people in the UK, from 1991–92 and 1999–2000, shows a 66.8% and 53.8% immobility for the first (lowest) and fifth (highest) quintile (respectively), compared to 41.1% for the second quintile, 39.2% for the middle and 34.8% for the fourth quintile (Zaidi, Rake and Falkingham, 2001).

- $\frac{1}{n} \sum_{j=1}^{n} |P_j^f - P_j^i|$, Mean Absolute quantile change index
- $1 - \text{trace}(M)$, Mobility ratio

  $P_j^{f,i}$ refers to the income position (e.g. quantile) of individual j in period f (final income) or period i (initial income). M refers to the transition matrix.

Thirdly, **share movement** occurs when there is a change in the ratio of individual income to the income of the total population. For instance, if my income is raised by 50%, even if the income of someone else is raised by 100%, if our categories remain the same as before it appears as though there has been no positional mobility. But, by considering share movement, it can be said that my income experiences downward income mobility. This is because, within the income of the total population, the share represented by my income has decreased. Therefore, while both the aforementioned position mobility and share movement are relative concepts, they choose to focus on different parts of mobility.[8]

The three relative mobility concepts described above focus on changes in each agent's share, or position, in the total income. Absolute mobility, comprising the remaining two concepts, on the other hand, focuses on the variation of individuals' incomes, regardless of the changes in their share of total income or their position in society ranked by income. This mobility can be measured by the mean absolute value of the change in income share. Its formula is as below:

- $\left(\frac{1}{n}\right) \Sigma |s(y_{2i}) - s(y_{1i})|$ where s(.) denotes i's share of total income.

The fourth concept is **symmetric income movement**, which is interested in the scale of the fluctuation, not the direction, when an individual's income changes. If we suppose that two people exist, and that one person loses £100 and another gains £100, from a symmetrical perspective there has been a total movement of £200, and a movement of £100 per person. In other words, the former, using a total mobility measure, would have a total loss and gain unrelated to the direction, and the latter, using the mobility of each person, would suggest that each has £100 as a loss and a gain (Fields and Ok, 1996). Total mobility can also be deconstructed into exchange mobility (the amount of income that is redistributed across agents, i.e. taken from one and given to another) and structural mobility, which results from the growth of total income.

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[8] As for the measurement of income mobility, when the absolute value of the change that people's income occupies is compared to the mean value, the larger it is, the larger we say the mobility ratio is. Generally, it is measured directly through the income correlation (Fields, 2000).

Ruiz-Castillo (2004) proposes a theoretical framework for deconstructing the exchange from the structural element of mobility. Ruiz-Castillo's (2004: 219) definition of structural mobility captures "the welfare effect of differences in the inequality of the cross-section income distributions" and exchange mobility captures "the welfare impact of rank reversals between the first and the second-period income distributions". Structural mobility is calculated by eliminating all re-rankings between the two periods, reorganising the second-period income distribution into increasing order (rather than using the first-period order). Fields and Ok (1996) provide indexes for measuring symmetric income movement and its formula is as below:

- $\frac{1}{n} \sum_{j=1}^{n} \left| Y_j^f - Y_j^i \right|$, Average absolute income change.

  $Y_j^{f,i}$ refers to the income of individual j in period f (final income) or period i (initial income). n refers to the number of individuals in the population.

Fifthly, ***directional income movement***, as something that divides and deals with the gaining and decreasing income, is used to see how many people increase or decrease their income. This index can be measured by following formula:

- $\frac{1}{n} \sum_{j=1}^{n} \left(Y_j^f - Y_j^i \right)$, average income change, and $\frac{1}{n} \sum_{j=1}^{n} \left[\ln\left(y_i^f\right) - \ln(y_j^i) \right]$, average logarithmic income change.

  $Y_j^{f,i}$ refers to the income of individual j in period f (final income) or period i (initial income). n refers to the number of individuals in the population.

The assumption about the use of this stochastic dominance technique is that individual or household income changes will be displayed and judged by graphs. In particular, the change in each family's base year and comparison years' actual income (logged income) on the horizontal axis of the graph is arranged in order from a negative value (-) to a positive value (+). On the vertical line, the sum composition ratio of the household is expressed. If the particular income mobility is more to the right or the bottom than on the income mobility graph of another time period, it can be said that the distribution regarding income change was improved (Fields and Ok, 1999a). An example can be seen in Figure 4, where Chen (2009) compares changes in directional income movements across nations over a common five-year period (1996–2000).

Figure 4 Directional Income movement 1996-2000
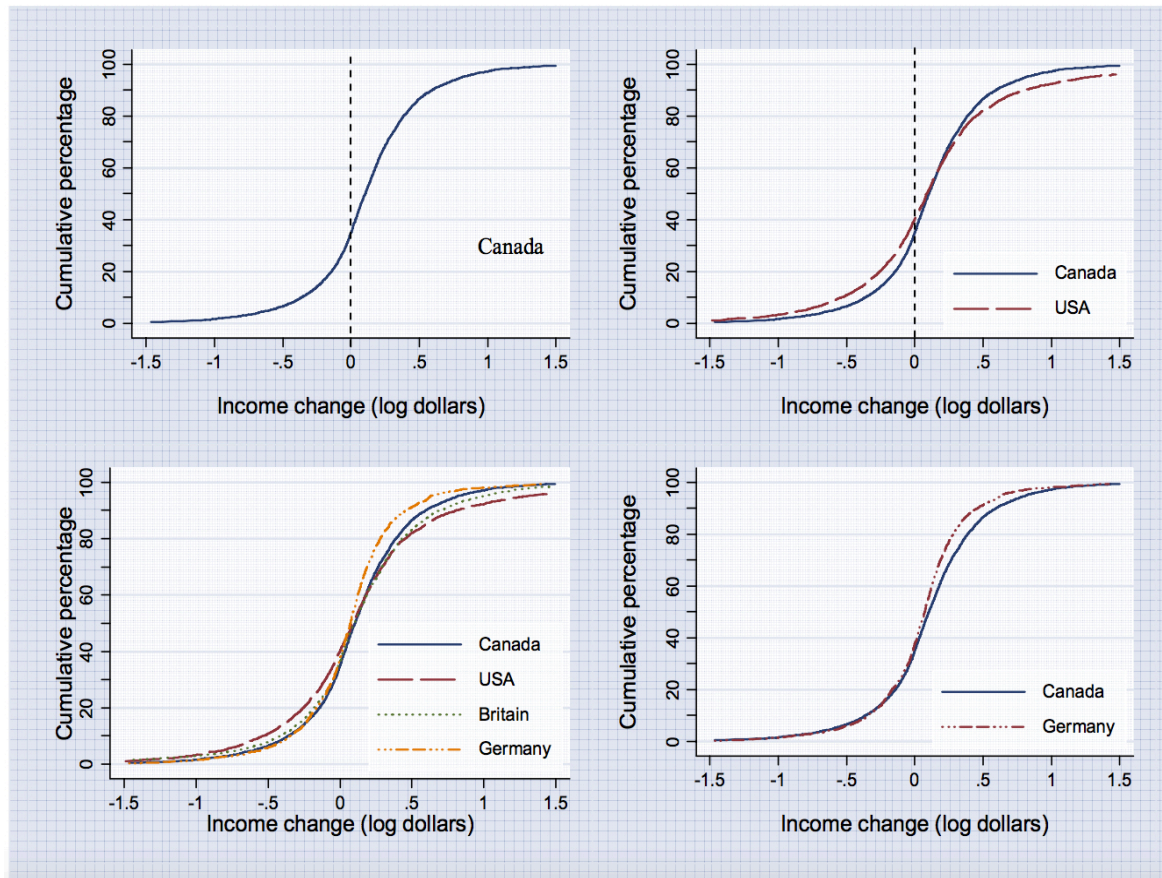
Source: Chen (2006)

Fields's (2000, 2006 and 2008) six kinds of income mobility, with the exception of mobility as an equaliser of longer-term incomes, explain the same aspects of income mobility. For example, time dependence and positional movement only have slightly different measurement methods, but their understanding of the movement between individual categories (deciles, quintiles) is the same. Furthermore, symmetric movement and directional income movement could both be said to measure the changes in the difference between the absolute value of income.

Subsequently, following from the research of a variety of scholars (Bradbury and Katz, 2002; Jenkins, 2011; Rycroft, 2009; and Yitzhaki and Wodon, 2002), two kinds of concepts emerged, as shown in Table 3 above: absolute and relative mobility. In other words, absolute mobility means the change in the scale of total income. Directional income movement and symmetric movement, which measure income gained and lost, are included within these concepts. On the other hand, relative mobility refers to the positional movement of the space between the base year and the final year, and explains the change in the quantile or rank of an individual's movement.

Therefore, in this study, income mobility, taking a macro perspective, means the absolute and relative mobility of individual income between the base year and the final year, bringing together intra-generational income mobility. In other words, it will refer to both how much an individual's final-year income has moved relative to the base year and to other people, and it will also refer to whether the value of absolute income has changed as "income mobility". Specifically, by measuring absolute mobility as a supplement, even if an individual's income does not change enough to move between categories within income distribution, if the absolute value of one's income has changed in comparison to the base year, it is considered to be income mobility, so the probability of income mobility is increased. In the case of comparing the structure of income mobility in the two selected countries, what lies behind income mobility and the differences in the determinants of income mobility in the two countries will be analysed using the techniques to deconstruct income mobility (exchange, structural and growth). Finally, from the microscopic aspect, more than relative mobility, the upward and downward mobility of the actual income of individuals is focused on, so the factors that influence absolute income mobility can be identified. Having considered what income mobility is, this chapter now turns to considering how it can be measured.

2.3   The measurement of Income Mobility

There have been nearly 20 measures of income mobility developed in the literature. Some empirical studies make a division between base- and final-year incomes into quantiles for the calculation of immobility ratios (Fields, 2001). Some studies measure correlation coefficients among base- and final-year incomes (Atkinson et al., 1992). Inter-generational mobility studies use these methods to calculate inter-generational elasticities that are being obtained after regressing the logarithm of child's income on the parent's income (Solon, 1999).

Given the variety of tools available to describe income mobility, most empirical studies include various approaches rather than relying on only one income mobility indicator. Each mobility approach answers some questions about different aspects of mobility and misses others. As one author put it, "different indices measure different underlying entities. Whenever one of these underlying entities is measured, other information contained in the joint distribution of initial and final incomes is lost" (Fields 2008: 2). Therefore, unless one has a good reason to focus on only one aspect of mobility, it appears more judicious to include various mobility indicators in empirical studies. Table 4 shows a summary of the

most commonly used approaches in the study of income mobility. The remaining section will discuss various measures of income mobility found in the body of literature.

Table 4 Summary of most commonly used measures of income mobility

Approaches	References
Aggregate index of income mobility	Shorrocks (1978) Akinson et al (1992) Fields and Ok (1996)
Income Trajectories as a mobility measure	Gardiner and Hills (1999) Zaidi, Rake, and Falkingham (2001) Rigg and Sefton (2004) Zaidi and Gustafsson (2006)
Income Transition Matrix as a mobility measure	Prais (1955) Bartholomew (1973) Bibby (1975)
Welfarist Approaches to income mobility measure	King (1983) Chakravarty-Dutta-Weymark (1985) Atkinson (1981) Ruiz-Castillo (2004)

Source: Author`s own work from literature

In order to measure income mobility, the concern about exactly what it is that has to be measured must be an essential prerequisite (Birdsall and Graham, 2000). In particular, since how income mobility is measured can cause it can be over or underestimated (Jenkins, 2011), it is necessary to be careful. An example of this is Gottschalk and Danziger (1998)'s research. The results of the measurement of the relative and absolute mobility in the US between 1968–70 and 1989–91[9] reveal that, in the case of *relative mobility*, the proportion of the population that was continuously in the lowest income category between those years was 53.8%, and that of those who were in the lowest category in 1968–70 but moved to the highest category in 1989–91 was 0.9%. By contrast, when measuring *absolute mobility*, the proportion of people who were continuously in the lowest category between 1968–70 and 1989–91 was 31.0%, 22.8 percentage points lower than the measurement for relative mobility, at 53.8%. These results reveal two different meanings. When looking at the results for relative mobility, it appears as though, over the last 10 years in American society, mobility has slowed down and the opportunities for an individual to improve his or her income have worsened, but, according to absolute mobility,

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[9] Gottschalk and Danziger (1998) measured relative income in quantiles by relative position ranking and, as for absolute income, if absolute income rose they considered it to be mobility, even if the category of other people had no mobility.

there are still opportunities and the income mobility situation is less negative than initially thought. Thus, by finding different results depending on the measurement method, readers are driven to arrive at a different conclusion. Therefore, from a certain perspective, there is a need to understand whether or not measurement methods vary.

Fields and Ok (1999b) provide a set of simple examples for understanding the dilemma of income mobility studies. First, consider a society made of two people, A and B, who are always ranked in that order. If A's income is 1 and B's is 2, adopt the notation x = (1,2) to describe the income distribution of that society at the initial year. One or more years later, distribution x is transformed to y (distributional transformation). Fields and Ok consider the following examples (p.560):

Example 1

Is there more mobility if x = (1,3) is transformed into y = (3,1) or z = (2,2)? (Fields and Ok 1999b: p.560). If the focus is on absolute mobility (how much money has changed hands), then there is more mobility in the x→y transformation, because 4 units have changed hands (+2 for the first agent and -2 for the second). However, if the focus is on origin independence, then there is more mobility in x→z, because the income that any agent earns in the final period is independent of his initial income.

Example 2

Is there more mobility if x = (1,3) is transformed into y = (2,6) or if it remains unchanged? (Fields and Ok 1999b: p.563). In the transformation from x to y, the earnings of all agents are doubled, so, from a relativist point of view, one might conclude that the situation is virtually unchanged and that there has been no mobility, except for the fact that economic growth has benefitted all of the agents in a proportional way. They still earn the same share of the total income after the transformation. However, from an absolutist point of view, one might conclude that B earns three more units of income and A only one more, so B has experienced more mobility than A. From an absolutist point of view, there is also more mobility in the transformation from x to y than in the case where the income distribution remains unchanged, as total income has gone from 4 to 8.

Besides these measurement methods, there are other things that should take precedence in measuring income mobility. The first is whether or not that mobility is inter-generational or intra-generational (Fields, 2006). The analysed categories of inter-generational mobility can be family and parents or children. Intra-generational could be an individual or a family

at two different points in time. Secondly, there needs to be an agreement regarding the categories of analysis and the situations to be measured – that is to say, whether or not the analysis categories to be measured are individuals or families, and whether the situations are social or economic (ibid.). Thirdly, there can be a distinction between macro-mobility and micro-mobility. For example, macro-mobility is interested in, for example, how much economic mobility there is each year, whether the national economic mobility was higher than that of other nations, and how different it was. In response to these questions, one could get answers like "This many people stayed in the same category in a certain country; among people a certain percentage went down at least £1,000 and, over time, income is increasing". By contrast, micro-mobility is related to questions like what the decisive factor is that influences individual income or positional change, and points to the results that the higher an individual's educational level is, the greater is that individual's income (Fields, 2008).

This thesis`s interest is how the economic situation of individuals – older people – and their intra-generational mobility are appearing macroscopically and microscopically. In other words, how is the mobility of older people's household net income moving in Korea, how does this compare with mobility in England, and what are the factors that are influencing this movement? What are the differences in the structure of income mobility between the two countries?

In the next sub-section, this thesis attempts to examine the commonly used measurement methods in the income mobility literature for absolute mobility, the decomposition of axiomatic and welfare measurements of mobility (exchange, structural and growth components), and relative mobility.

2.3.1   Absolute Mobility

Absolute mobility was derived as a way to remedy the limitations of relative mobility. Because categories (quintiles, deciles) for measuring an individual's relative rank within the total income distribution are fixed, even if an individual's income does not change, depending on the changes in the income of others, his or her income category changes. The results of this kind of relative mobility measurement have a chance of under or overestimating the current situation of income mobility (Fields, 2006), and also, since the focus is on the movement between categories, movement within categories is overlooked. Accordingly, absolute mobility, which includes movement within categories and real income upward mobility, emerged.

Therefore, as for absolute mobility, if absolute income increases by measurement methods that include the total of income change, even if there is no movement by income category (quintile, decile, etc.), it is considered mobility (Fields, 2000; Rycroft, 2009). Further, when the income of those who have lost income is directly transferred to those who have gained income, in spite of the occurrence of relative mobility, when income mobility is measured by the Gini coefficient the analysis incorrectly considers that there has been no income mobility (Fields, 2000). In other words, when the income of those who have lost income is transferred directly to those who have gained income, even the change that occurs is included by an absolute mobility measurement (ibid.).

The absolute mobility measurement generally is divided into two specific types of methods. The first, using Fields and Ok's (1996) method for breaking down income mobility, measures the sum of change in an individual's income scale (growth factor) over the measurement period and the change within the distribution (transfer factor). The second method, using the income trajectories approach which was first developed by Gardiner and Hills (1999) and, subsequently, Zaidi et al. (2001), Rigg and Shefton (2004), and Zaidi and Gustafsson (2007), individuals' income movements during the measured periods can be categorised. The income trajectories that are defined on the basis of absolute concepts of income mobility (e.g. flat, flat with blips, rising, falling, other and fluctuating or zigzag), using the income information for the whole measured period, individuals' differential experience of income changes can be analysed. A detailed description of this method is as follows.

2.3.1.1   Income Mobility Breakdown

As for Fields and Ok's (1999a) income mobility breakdown, Fields (2000) points to the symmetric movement concept as a way to focus on the movement and change of income mobility. Fields and Ok (1996) show that, in measuring the scale of income mobility, per capita mobility can be found by the following method:

$$m_n\,(x,y) = \frac{1}{n}\sum_{j=1}^{n}\left|y_j - x_j\right|$$

(y_j: $t+1$ Class income`s sum, $x_j$: $t$ class`s income`s sum, n: number of households)

However, the above method simply shows the income sum difference of each year as income mobility, so a limitation is that it cannot be clear about the difference from the base year. Hence, in selecting the log value in income, the base year's sensitivity was

maximised.[10] A more weighty and desirable mobility measure was applied to the income mobility of the classes with low income.[11]

$$m_n\,(x,y) = \frac{1}{n}\sum_{j=1}^{n}\left|log\,y_j - logx_j\right|$$

(y_j: $t + 1$ Class income`s sum, $x_j$: $t$ class`s income`s sum, n: number of households)

Next, the elements that compose absolute mobility were broken down into growth components and transfer components.[12] In other words, Fields and Ok (1996) say that income mobility develops as the result of two causes – one refers to the change in the total income amount as growth components, and the second refers to the income transfer between individuals as transfer components.

$$m_n\,(x,y) = \frac{1}{n}\sum_{j=1}^{n}\left|logy_j - logx_j\right| = G_n(x,y) + T_n\,(x,y)$$

$$K\,(x,y) = \frac{1}{n}\sum_{j=1}^{n}(\log y_j - \log x_j)$$

$$T_n\,(x,y) = \frac{2}{n}\left(\sum_{j\in L_n(x,y)}(\log x_j - \log y_j)\right)$$

(L: the set of households for which income decreased over time)

The growth component (K) refers to income change due to economic growth, and the transfer component (T) refers to income change that generates exchange mobility due to the income transfer between those households with decreasing income and those

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[10] Suppose two societies exist. ① is x = (10,000) -> (2,000) = y, and if ② changes to x = (1,000,000) -> (1,020,000) = z, the two countries' total amount of change would be 2,000. However, the change from 10,000 to 2,000 is very large, and the change from 1,000,000 to 2,000 would be very small. According to a method that does not apply the existing log value, the two countries could be said to have the same growth of a total of 2,000. But when the log value is selected, country ① shows as having larger mobility.

[11] Fields and Ok (1999a) say that using the social usefulness function that selects a → log a, through this process, the change in the level of social usefulness can be known.

[12] This is also called structural mobility and exchange mobility.

households with increasing income.[13] The transfer component is rounded to two times the sum of the difference between each individual's base-year log income and the measured years' log income for those whose income decreased. This is because the individuals whose income grew gained the diminished income of those individuals whose income decreased, so it is counted as twice as much. Thus, an income mobility breakdown is meaningful in that it focuses on income fluctuation, however it has the limitation of being unable to account for the directional nature of mobility (Jäntti and Jenkins, 2014). To overcome this limitation, many researchers use the income trajectories method, described below, that was developed by Gardiner and Hills (1999). This method will be explained in section 2.3.1.2.

Another way of decomposing the total mobility is using an approach developed by Chakravarty et al. (1985). This index is a welfarist measure and known as the CDW index in short. These authors suggest that mobility can be defined as the comparison between the welfare which can be derived by individuals under their current income structure and a fixed income structure, in which the individuals' positions are held constant. Having considered the welfare of the individuals under those two structures at different points in time, the measurement should consider the difference between the welfare derived from a situation of mobility and that from a situation without mobility.

The CDW index can be defined as follows:

$$M_{CDW}(x,y) = \left\{\frac{I(x) - I(z)}{1 - I(x)}\right\} \times 100$$

In this definition, $z = \{(x_1 + y_1), (x_2 + y_2), \dots, (x_n + y_n)\}$ is a distribution of aggregate income for the whole population and $I(x)$ and $I(z)$ are measures of relative inequality which have certain properties and are associated with the distributions (Ayala and Mercedes, 2007). A social welfare function is also associated. This is defined as $W(x) = \mu(x)[1 - I(x)]$. The welfarist connotation of the CDW index emerges from the possibility of taking both positive and negative values, corresponding to changes in social welfare associated with income mobility. Using the CDW index, Ruiz-Castillo (2004) formulate as below, mobility can also be broken down into three components: structural

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[13] An example of exchange movement would be a distribution of (1, 2, 3) → (3, 2, 1). In income mobility, the people who lose income and the people who gain income can be divided, and the income of those who have lost income is transferred directly to the people who have gained a total of two incomes. Thus, the total transferred income is twice as much as the income lost by those who lost income.

mobility (SM), exchange mobility (EM) and growth mobility (GRM) (Ayala and Mercedes, 2007).

$$M_{CDW}(x, y) = SM(x, u) + EM(x, u) + GRM(x, y, u) =$$

$$\left\{\frac{I(x)-I(z_c)}{1-I(x)}\right\} \times 100 + \left\{\frac{I(z_c)-I(z)}{1-I(x)}\right\} \times 100 + \left\{\left\{\frac{I(x)-I(z)}{1-I(x)}\right\} \times 100 - \left\{\frac{I(x)-I(v_a)}{1-I(x)}\right\} \times 100\right\}$$

The $SM(x, u)$ refers to the structural mobility caused by the differences between the initial and final distribution, once the re-rankings between those distributions have been eliminated, and when mean income constant is maintained at the initial level. The term $EM(x, u)$ describes re-rankings associated with the transition between the initial and final distribution. Finally, $GRM(x, y, u)$ reflects the mobility caused by income growth.

Having considered how income mobility can be described and broken down, it remains to be seen how it can be quantified.

2.3.1.2   Income trajectories

The directional income movement both up and down can be analysed through the characterisation of ***income trajectories***, using the framework first developed by Gardiner and Hills (1999), and subsequently by Zaidi et al. (2001), Zaidi and De Vos (2002) and Rigg and Sefton (2004). These authors identified five or six main groups of income trajectories: (1) flat, (2) flat with blips, (3) rising, (4) falling (5) other and (6) fluctuating or zigzag. Examples can be seen in Figure 5 where individuals are grouped into one of six broad types of income trajectory (Rigg and Sefton, 2004). Individuals are classified based on how wide a band of movement is allowed for a trajectory still to be classed as "flat". If only a narrow band across the distribution is allowed, fewer cases can be recorded as "flat" as even a small movement would be enough to rule this out. By contrast, if a very wide band of movement is applied, it would lead to many trajectories being recorded as "flat" (Gardiner and Hills, 1999). Much of the existing literature that uses this approach applies 15 quasi-percentiles criteria for movement (Gardiner and Hills, 1999, Zaidi et al., 2001, Rigg and Sefton, 2004).

This section has looked at a number of the most commonly used measurements of absolute mobility. In this thesis, Fields and Ok's (1996) absolute mobility method is used to estimate how much absolute income mobility is observed for older people in Korea and England between the base year and the final year from a macroscopic perspective (RQ1).

In addition, due to the limitations of Fields and Ok's mobility index in measuring the microscopic aspects of income mobility, this thesis will adapt Zaidi and De Vos's (2002) absolute mobility coefficient and income trajectories to understand the factors that influence the individual actual upward or downward mobility of older people's income (RQ4). Having considered the measures of absolute mobility, it is necessary to discuss below the measures of relative mobility.

Figure 5 Types of Income Trajectory

Flat trajectory

Blipping trajectory

Rising trajectory

Falling trajectory

Fluctuating trajectory

Other trajectory
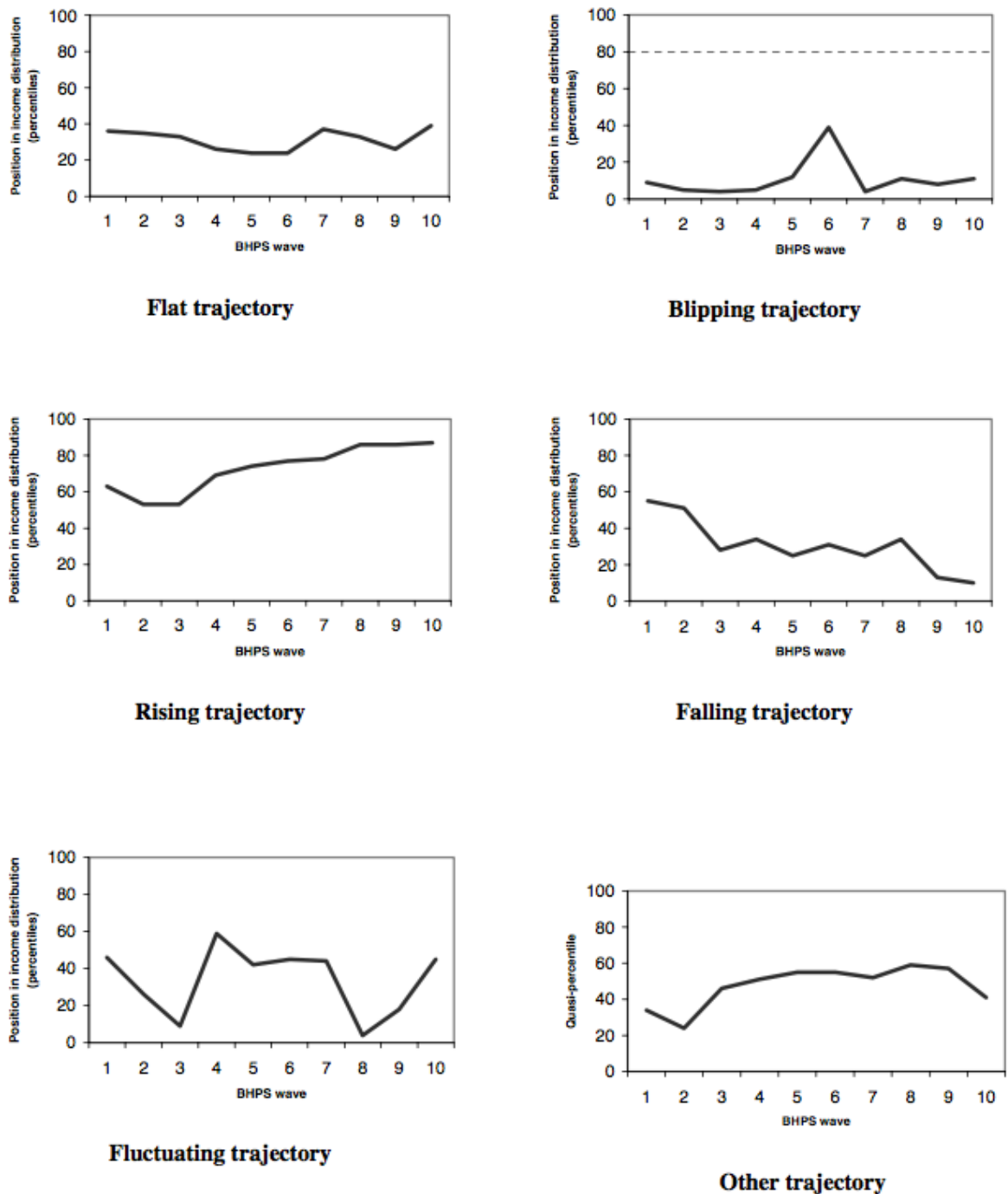
Source: Rigg and Sefton (2004)

2.3.2 Relative mobility

Relative mobility is defined as the relative mobility of an individual in comparison to others (Birdsall and Graham, 2000). Specifically, relative mobility compares an individual's income in income distribution with that of others and measures the relative positional change (Rycroft, 2009; Zaidi, 2008).

Accordingly, the measurement of relative mobility divides the quantity of an individual's income from a base time period and measured time periods into uniform categories (for example, quintiles, deciles and percentiles) as the standard. Furthermore, since that which determines which category an individual is put into is that individual's relative ranking within the entire income distribution, this presents the advantage that an individual's relative position can be measured. Because of this, the relative mobility measurement of income mobility is the most popular method of measurement within income mobility research, and, comparing the base year and the final year, it is outstanding at showing the mobility direction of income (Beenstock, 2004; Birdsall and Graham, 2000; Bradbury and Katz, 2002; Fields and Ok, 1996; Fields, 2000, 2006; Jenkins, 2011; Rycroft, 2009; Shi et al., 2010; and Shorrocks, 1978b). Much of the existing literature on income mobility that uses the concept of relative mobility found the following common measurements: the transition matrix, and the Gini Mobility index–rank mobility. An explanation of each measure is discussed below, along with comments on which measure will be used for analysing the relative mobility of older people in the two countries (RQ2).

2.3.2.1 Transition Matrix

Transition matrices are a similar concept of quantile studies. This method was presented by Shorrocks (1978b). Such matrices provide an easily understandable and intuitive visualisation of income mobility by showing the proportion of individuals from one quantile who move to another quantile between the base year and the final year. The identity matrix represents the extreme case of no positional mobility at all. By dividing the sample population into quantiles, based on the total income at both the base and the final year, transition matrices allow ignorance of the effect of the overall change in the total income (economic growth). This includes the inconvenience that they do not allow conclusions drawn on whether economic growth benefits some agents more than others (e.g., pro-poor growth as opposed to growth only benefitting the rich).

The measurement method uses M [income category number] x M's [income category number] transition matrix, presenting the base year's income categories (quintiles, deciles, etc.) in the rows and the final year's income categories (quintiles, deciles, etc.) in the columns. For example, measuring a transition matrix with income distribution divided into five parts – five categories of the same size with five pieces of data between the base year and the final year –if the unit matrix is $P1 = \begin{bmatrix} 10000 \\ 01000 \\ 00100 \\ 00010 \\ 00001 \end{bmatrix}$, [14] this means that the base year's income situation is completely determinative of the final year's income. In other words, it shows complete immobility. Thus, as for the possibility of comparison between unit matrices, through the function made by the information in a diagonal matrix, [15] size comparison is possible, and, generally, it is possible to say that when the sum is smaller in a diagonal matrix the mobility is large (Fields, 2006).

This measurement method has the advantage of showing detailed information about the positional change of income distribution for a certain individual or household. In other words, the way someone's movement is changing can be seen at a glance. However, as an individual's position is relative, it has the limitation of not being able to include the dynamics of mobility within categories of absolute increase. For instance, there are limitations in clearly understanding movements such as when an individual's income increases, and even though others' incomes have also increased, that individual remains in the same category, or, by contrast, where an individual's income stays the same but other people's incomes decrease, so the individual moves up into a new category.

Having considered the first measurement of relative income mobility, the transition matrix, next sub-section considers the second, Rank Mobility.

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[14] Fields (2000) says that, as for the unit matrix, in the nth square matrix, all of the components above the diagonal that goes from left to right and downward are 1, and as for all the other components, all of the 0 matrixes are called n^{th} unit matrices. For example, in a 5x5 (category) transition matrix, with the income categories (quantiles) of the base year on the rows and the final year's income categories on the columns, when the trace is 1, it means that the income parts (quintiles, deciles, etc.) of the base year and the measured years are the same. This refers to the unit matrix by immobility.

[15] In the matrix this means the diagonal's information.

2.3.2.2   The Gini Mobility Index - Rank Mobility

According to the **_Gini mobility index-rank mobility_**[16], unlike the previously introduced relative mobility measurement methods, the income rank and the relationship between incomes $(\Gamma^{12}, \Gamma^{21})$ for each of the final periods and base periods are computed. Additionally, the income inequality level of the measurement period is reflected in the movement of the income ranks of the two time periods.

$$S = \frac{(1 - \Gamma^{12})\, G^1 + (1 - \Gamma^{21})G^2}{G^1 + G^2}$$

G^t is the t time period of the Gini coefficient, whereas Γ refers to the Gini correlation coefficient. Γ^{12} uses the forward Gini correlation coefficient to measure whether or not the base year ranking is fixed based on the measured years.

$$\Gamma^{12} = \frac{cov\,(Y^1, R^2)}{cov(Y^1, R^1)}$$

Furthermore, Γ^{21} is the backward Gini correlation coefficient and refers to whether or not the measured years' ranking is fixed based on the base year.

$$\Gamma^{21} = \frac{cov\,(Y^2, R^1)}{cov(Y^2, R^2)}$$

Γ^{12}, Γ^{21} is used to measure the final year income rank and the base year's relationship between incomes, having a value between $-\,1 < \Gamma < 1$.

In other words, when there is no mobility between the base year and the final year, using $R^1 = R^2$, it means that, "the correlation between the two periods' ranks is very high". Therefore, the Gini correlation coefficient is $\Gamma = 1$ and thus $S = 0$. In contrast, if there is perfect mobility, $R^1 = R^2$ means that, "the rank is independent," and the correlation between the rank of the base year and the rank of the final year is very low. In other words,

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[16] Y_i^t displays a household's income. i =1, 2, ...N, t= 1, 2 according to time, the income distribution

$Y_i^t = \begin{bmatrix} Y_i^t \\ \cdot \\ \cdot \\ \cdot \\ Y_n^t \end{bmatrix}$. $\overline{Y^t}$ is the mean income of t time period. Similarly, r_i^t is the ranking within N from within each

income distribution. $R^t = \begin{bmatrix} r_i^t \\ \cdot \\ \cdot \\ \cdot \\ r_n^t \end{bmatrix}$

(Wodon and Yitzhaki 2001)

it is close to $\Gamma = 0$, and thus $S = 1$. However, if there is inverse mobility, wherein the people who are above the mean rank switch ranks with the people below the mean, this is close to the negative correlation $\Gamma = -1$, and is shown as $S > 1$. If the people with the very highest rank have perfect mobility by changing places with the people with the very lowest rank, then the ranks of the two periods are the perfect negative correlation, $\Gamma = -1, S = 2$.

Because the rank mobility coefficient (S) reflects the change in income rank between two years (the measured years and the base year) and the income inequality level of each year, it has the advantage of measuring intrinsic income mobility (Beenstock, 2004). It can be said that, in measuring relative mobility, this is a discriminating approach, along with the most commonly used transition matrix and *Mp* coefficient.

Until now, the transition matrix and Gini Mobility index-rank mobility have been examined as measurements of income mobility. This thesis uses Wodon and Yitzhaki's (2001) Gini mobility index-rank mobility, measuring the macroscopic aspects of the relative income mobility of older people in England and Korea. In particular, in an attempt to resolve the limitations of Wodon and Yitzhaki (2001)'s Gini mobility index-rank mobility coefficient to illustrate the directional nature of an individual's income mobility, it will supplement its explanation using a transition matrix as a supplement for relative mobility.

2.4   Measurement Issues

This section discusses some of the measurement issues that arise when one analyses income mobility from a longitudinal perspective. Issues relating to analysing income mobility longitudinally are no different to many of the issues that are found in the analysis of income distribution at a single point in time (Jenkins, 2011). These issues arise precisely because of data, measures, measurement errors and some of the concepts applied when analysing the income mobility of older people.

Existing literature highlights that income might not be the most adequate indicator to measure people's actual wellbeing. Consumption may well be a better alternative, as saving and borrowing can smooth short-term income volatility and ensure a more constant consumption, which is a better indicator of welfare than income (Fisher et al., 2013) (although there are other issues arising from its use, such as unsustainable borrowing and

over-consumption). Overall, given the unavailability of data on consumption expenditure, and the much greater availability of income data, it makes sense methodologically to use income as a proxy of wellbeing (e.g. Jarvis and Jenkins, 1998 and Jenkins, 2011).

There are different types of methodological challenges with the mobility measurement, especially relative and absolute mobility measures. As far as the relative mobility measure is concerned, the choice of which reference segment within society is chosen is a major challenge. For example, income mobility for older people can be measured by taking the relative measure of the overall population or just the population of older people. The choice about the reference segment within society provides different outcomes (Zaidi, 2008).

Income mobility studies require longitudinal income data, which follow the income of individuals for several years (as year-on-year comparisons do not usually allow for useful conclusions in this field). As income surveys are applied several times, the impact of the inevitable measurement errors also increases. As Fields puts it, in income mobility studies, "measurement error is a serious issue" (2008: 9). Sources of error include, for example, the misreporting of weekly earnings as monthly (or the other way around) and a decimal point transcription error, such as a 10.5 reported as 105 (Cowell and Schluter, 1998). Measurement errors when measuring income are widely documented in the literature (Bound et al., 2001, Jäntti and Jenkins, 2014).

Some income mobility indicators may be more easily affected by measurement errors than others. Cowel and Schluter (1998: 10) build upon previous work on the robustness of inequality indices (such as Cowell and Victoria-Fraser (1996) to prove that doubts can be raised about income mobility studies based on an analysis of changes in such indices between two periods. This shows that "this non-robustness is not a phenomenon which somehow cancels out in the top and the bottom of the fraction in [the formula used to calculate income mobility]". The authors build an influence function that can test the robustness of mobility functions and calculate whether the estimate of mobility will still be close to the real underlying mobility in the presence of a limited number of measurement errors.

Jarvis and Jenkins (1998) have expressed the hypothesis that measurement errors can be more important and frequent when measuring the income of older people compared to other groups of the population. One of the reasons for this is data imputation, which is closely related to the income data. Older people who participated in the survey may give

incorrect answers or, simply, may not know their exact income. Another source of error in income mobility studies can be introduced by the common practice of imputing missing data in income surveys (Jarvis and Jenkins, 1998). However, empirical data are inconclusive on this particular point. Jarvis and Jenkins (1998), for example, found that measurement error due to imputed data was likely to be lower for older males than for other population groups. In the British Household Panel Survey, by way of an example of imputed data, whenever there is missing data in fieldwork results, statisticians guess what value is missing, based on the average of that value in similar people. While this practice can be justified on many grounds, it is certainly not free of errors, and the imputation practice can be a reason behind some of the unexplained transitory volatility observed in income mobility studies.

Few studies have looked at the effects of measurement error on measures of the mobility of earnings. Fields et al. (2003) used a non-classical measurement error model similar to that of Gottschalk and Huynh (2010)[17] and argue that the effects of measurement error are "relatively minor" (Fields et al., 2003: 90).

Overall, that there is little research on this point might be taken to imply that measurement error has relatively unimportant effects on measures of mobility in practice. However, it should not be ignored. For example, measurement error arises in the case of outlier observations that are very high or very low observations. These may be genuine but may instead represent errors. Cowell and Schluter (1999) found this problem in the context of income mobility analysis. Thus, many researchers response to this issue by dropping the top 1% and bottom 1% income values in each year. This is known as "trimming" which removes outliers. Moreover, in order to address the transitory fluctuations of income, many researchers use annual income instead of current income and smooth annual income over a two-year period (an example can be seen in Zaidi et al., 2001). This thesis will use annual income and apply a trimming method in order to increase the coherence of the comparison of two countries.

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[17] Gottschalk and Huynh (2010) found that estimates of men's earnings mobility, defined in terms of the Pearson correlation between log earnings in one year and the next, are much the same in the survey data and their administrative dataset.

2.4.1   Issues conceptualising income mobility in old age

Studies of income mobility are, overall, concerned with people's welfare. That is why income mobility studies usually, if not always, focus on total income rather than just earnings (income earned on the labour market). This is even more evident in the case of older people, who are mostly out of the labour market (that is, they are retired). However, the welfare perspective of income mobility studies poses other challenges. One of these links to the question of *the unit of observation* on which to base empirical studies.

At first sight, one might think it is sufficient to look at individual elderly people's incomes as a proxy to their welfare. However, while this is probably the easiest solution to implement (although it depends on data sources and countries; for example, some studies are based on households' tax returns, see United States (US) Department of the Treasury (2007), individual income may not be the most suitable proxy to illustrate individual standard of living. Consider the example of a housewife living on her husband's pension. Her welfare will probably not be linked to her personal income, but rather to her husband's income. Thus, this signifies the importance of dedicating some thought to the choice of observation unit, and clarifying the assumptions behind that choice (Atkinson, 1998).

Assumptions behind the choice of observation unit include family transfers. One might assume that individual incomes are not shared, or on the other hand that they are shared, equally or not, between all members of the household, or that they are shared by a couple (a "benefit unit"), but not with the rest of the household (Zaidi, Rake and Falkingham, 2001). Zaidi, Rake and Falkingham (2001) for example, made the choice to study income mobility among elderly people at the household level, thus studying the income of older people's households, rather than just older people's income. In terms of the data used, this means that they only included in their sample older people from households where all the members of the household had answered all seven waves of the survey.

One of the most important questions about income mobility that researchers must answer is which type of mobility they want to analyse. This applies to income mobility in old age or other income mobility studies, but the answer may be different for particular types of studies. Ultimately it depends on the assumptions one makes about what is more important for older people. For example, choosing between a relative (how one's income changes compared to the rest of the population) and an absolute definition of mobility (how one's income changes without considering the rest of the population) requires making assumptions about what matters most to older people.

According to Zaidi, Rake and Falkingham (2001), an answer to the question of absolute or relative income mobility is that it is probably a mix of both elements (older people wish to both maintain or increase their income and avoid the situation where everybody else's incomes are growing faster than theirs). However, absolute mobility may be more important in the short term. Relative decline would be difficult to notice year-on-year. In addition, relative mobility is probably what really matters in the longer term, because nobody would like to see his or her income grow every year just to move from having an average income to being one of the poorest in the society. Therefore, using both approaches, depending on the timeframe, (absolute mobility for year-on-year comparisons, relative mobility for longer periods) is desirable.

Zaidi (2008) outlined a number of issues regarding the conceptualisation of income mobility in old age as follows:

- The statistical result of income mobility in old age is being affected by the selection of measurement techniques. The careful selection of relative or absolute measure of mobility is required to avoid misrepresentation of results.

- The choice of reference group or society is also a matter of concern for the measurement of relative income mobility because the figure for older people shows more mobility among their peers as compared to the overall society.

- The use of transition matrices as an income mobility measure shows that the older people at the bottom of the income distribution have a greater income rigidity and that there is a very little probability of change in their low-income status.

- Changes in family composition and switching from work to retired life are important factors for income variation in old age.

This thesis uses both absolute and relative mobility concepts to analyse the income mobility of older people in England and Korea. Most people like to know both their relative positions compared to others in their cohort (intra-generational mobility) and absolute changes in their own income. Older people are no different; they are interested in both. Therefore, this thesis will focus on analysing the income mobility of older people from a macroscopic perspective, which means that the relative and absolute mobility of individual incomes between the base year and final year will be analysed.

2.5   The determinants of income mobility in old age

Generally, the upward mobility of income, from an individual or household point of view, happens when an individual is employed or promoted (or where become more workers in the household to add to total household income), or with cohort effects or the better utilisation of social resources. On the other hand, losing one's job, ill health or disability, a higher number of dependants in the household, losing a spouse, and a low income from social security causes a downward mobility of income (Jenkins and Rigg, 2004, Jenkins, 2011, Jarvis and Jenkins, 1999). In this section, the determinants associated with income mobility will be examined.

2.5.1   Demographic Factors

According to the realisation capability approach by Sen (1999), an individual's "capability" is affected by factors on an individual level (age, health condition or gender) as well as on a social level (approach to education or gender roles and expectations). Individual factors within the realisation capability approach include demographic events such as divorce, the loss of a partner, the birth of a child, an increase in dependants and so on; these are more closely related to downward movement than upward movement (Jenkins, 2011; Woolard and Klasen, 2004).

Individual factors, such as gender, age, the number of employed workers in the household, the number of dependants in the household and so on, are the major factors that increase the income of older people and, especially if there are many dependants in the household, these negatively affect income mobility. If there are many workers in the household, this enlarges the source of income and therefore affects mobility positively.

Accordingly, the demographic factors that affect the income mobility of older people can be summarised as gender, age, the number of children in the household and the number of workers in the household.

2.5.1.1   Gender

Gender affects income mobility differently in different income classes (low, middle or high) per measuring period, and disabled female older people showed a higher risk of downward mobility and change in income (Zaidi, 2008).

Firstly, according to a study by Lim (2011), the significance of gender, affecting income mobility by different measuring terms and by income class, was measured and the results were that, for a short-term (1 year) male householder in a lower income class, gender was significant for a higher income mobility, but not in the middle and higher income classes.

On the other hand, another study suggested that gender did not affect income mobility. This considered the 1999−02, 2002−05, 2005−09 and 1999–09 periods, looking for any income mobility consequence affected by gender; in both the short term and long term there were no significant results (Kim et al., 2012).

Meanwhile, a higher risk of income decline and income change for older women was found. Zaidi (2008) found that there was an increased likelihood of income mobility associated with the death of a spouse. Women were significantly more likely to face a downward income mobility than were men. However, the cohort effects do vary: younger cohorts of women are less likely to be financially dependent on their spouses because their labour market participation rates are higher than those of older cohorts.

After all, exclusion from the labour market can result in a lower income, which eventually makes an upward income movement for female elderly more difficult than for their male counterparts (Kemp et al., 2004; Zaidi, 2008). On the other hand, female householders have more unstable socio-economic positions than males, and their incomes are more vulnerable to economic changes (Nam, 2015).

Therefore, the influence of the householder's gender is varied by the study conductors and the income class of the household, so the additional analysis is necessary.

2.5.1.2   Age

The influence of age on income mobility shows a different result by subjects and income class.

Firstly, following the study conducted on the whole population, as a determinant of moving towards the upper class, age shows a positive inclination, up to a certain point, and then would start to decline. This proves the difficulty of raising income after a certain age, which is because of income stagnation due to the wage peak system, retirement or other variables (Jenkins, 2011).

Mobility in income quantiles weakens as individuals grow old. This means that, as people get older, they have less opportunity to work and change their income status. Johnson and

Stears (1998) found that age related to reductions in labour income and also a slight reduction in social security payments. They also found that, generally, younger male pensioners have higher private pensions and investment income than older pensioners, but they suggest that this may simply down to greater private pension coverage and asset accrual in later cohorts rather than, necessarily, capital dis-saving or the under-indexation of pensions.

Therefore, as a summary, considering the population as a whole, an increase in age affects income positively until the age that people stop economic activities, and, after that age, it affects income negatively. In the case of older people, age does not significantly affect the income quantile; more research on this point is necessary.

2.5.1.3   Changes in marital status

Changes in an individual's marital status may influence income dynamics within all age groups, but is one of the most important factors affecting income mobility in old age, because becoming a widow or widower is one of the most important demographic transitions to affect older people (Zaidi, 2008). A study by Burkhauser et al. (2001) also confirms that the death of a partner is associated with significant changes in the financial situation of older people. Many other studies have also found that both widowhood and marital status (separation or divorce) are strongly associated with negative movement, low income and poverty in later life (Sefton et al., 2011, Glaser et al., 2009, Zaidi, 2008, Price, 2008, Albuquerque et al., 2006, Ginn, 2003, Bardasi et al., 2002, Maclaughlin and Jensen, 1993).

2.5.1.4   Living arrangement

The more dependants in the household, the harder it is to effect upward income mobility (Lim, 2011). In Korea, a higher percentage of seniors in the household lowers the possibility of raising that household's income class, and raises the possibility of lowering its income class (Lim, 2011). In particular, the result from the lower class is significant, and suggests the need for support to senior households to improve their class mobility. The same result was obtained from studies in third-world countries. A study of adults in South Africa in 1993 and 1998, considering differentiating factors affecting the difference in average income in cities and countryside, found that more children lowered average income and raised the possibility of entering poverty (Woolard and Klasen, 2004).

In various study results, the number of employed workers in the household showed different results, according to social class, however it was commonly held to be a factor increasing household income (Jenkins, 2011; Kim et al., 2012; Suk, 2010; Lim, 2011; Sawhill, 2000; Woolard and Klasen, 2004; Nam, 2015).

More employed members in a household lead to a higher total income, therefore it is not surprising that members of the household have a higher chance of moving towards the upper classes. This is also revealed to be a significant variable in both the city and countryside, as the additional employed member of the household positively affected income mobility and, as was especially the case in the countryside, an additional *unemployed* member of the household negatively affected income mobility (Woolard and Klasen, 2004). Zaidi et al. (2002) found that, for both men and women, changes in living arrangements were associated with a greater income mobility. Older people who experienced changes in their living arrangements had a substantially lower probability of observing no change in their income mobility. They argue that changes in income may be a consequence, as well as a cause, of changes in living arrangements but it is difficult to infer a cause-and-effect relationship from the results they found.

Accordingly, the number of employed members of the household, and changes to living arrangements are very important, and significant factors to income mobility.

2.5.2   Human capital (education) factor

According to the human capital theory, wages are determined by an individual's productivity, and eventually the individual attribute is determinative (Rycroft, 2009). This theory is important to understanding certain social phenomena in early 1960s such as wage determination, poverty and social inequality. Even though this theory has the limitation of having to take into account very personal factors, it is still one of the most reputable theories in the labour market. Education is a key element of this theory because the level of education is a way of measuring the quality of work (Crocker, 2006).

This theory was developed by the economists Schultz (1963), Becker (1964) and Mincer (1974) in around 1960. Education must begin in early childhood, and needs to be maintained for the period of public education; when converting from learning to working, enough incentive should be provided for both employers and employees to invest in skills and techniques throughout overall employment (OECD, 2011).

According to this theory, two arguments can be made. Firstly, people's income mobility is dependent on the individual's possession of human capital. This means that, all other conditions being equal, people with a larger human capital are paid higher wages. Accordingly, poverty is the outcome of a lack of human capital, and income growth represents the accumulation of human capital over the span of a career. Secondly, the amount of human capital depends on the activity of the individual or his or her parents. For example, a skill can be learned from school or training programs or from the experience of parents. This means that parents' education, skills and experience can be related to their children's success.

"Education" in the human capital theory is an especially important factor in mobility (Birdsall and Graham, 2000; Rycroft, 2009). The educational variable is the contributor, as well as the result itself, of the mobility pattern. Therefore, in the sociological and economics study on income mobility, education is considered a significant variable, which affects mobility or inequality.

On the other hand, according to the study by Birdsall and Londoño (1997), education (or the lack of education) in a certain group in the region rather reflects a lost opportunity in the past. Based on this, older people, schooled in the past education system, are in an unfair, difficult position to access education, which means that the lower education level of the current cohort of older people could come from the past education system. Further, these low education levels negatively influence income mobility, so as to aggravate income inequality; therefore low education levels are both cause and effect.

2.5.3   Economic activity

Employment income for the older population is important for a relatively small number of pensioners. These pensioners tend to be younger (closer to the state pension age) and often richer. In England, studies by both Smeaton and McKay (2003) and Banks and Casanova (2003) have found that a significant minority of people beyond retirement age continue in paid employment, though the rates tail off quite quickly after five years.

In population terms, this income source is insignificant and it falls in value as people age, especially for unmarried men (Johnson et al., 1998), but for those in employment (usually the younger age group before retirement) this source of income is very important and volatile. Zaidi (2001), using BHPS data for 1991–97, suggested that the chances of downward mobility were about three times greater for those retiring than for those who had

already retired. It is to be presumed that those who had already retired had already undergone this downward mobility. Leaving work (whether above or below the state pension age) is clearly associated with substantial, but possibly predictable, income reduction.

Another important factor that affects income mobility for older people in later life is the different income package that an individual has. Zaidi et al. (2001) analyse variations in different components of income; they found that benefit income (50%) and non-state pensions (30%) account for the major share of total income, and these shares increase with age while the share of income from labour falls dramatically as one gets older. Their study also reveals that investment income and labour income contribute more to the longitudinal variation of total income than that of occupational pensions and state benefits (ibid).

2.5.4   Health

In old age, health is an important factor in determining the personal wellbeing of older people. As people age, their physical conditions become weaker and their chances of becoming ill or disabled become higher, which can be very costly. Changes in an individual's health status can impact both downward and upward income mobility. Although it is considered less influential than employment or demographic factors, it can still be very important. Becoming ill or disabled could contribute to intra-generational mobility, either because of their effects on employability or because of the high cost of medical expenses (Kronstadt, 2008). A study by Hertz (2006) suggested that health status was a significant predictor of income mobility between 1997 and 1998, applying a self-report on health status (fair or poor) and having a disability associated with modest income declines. However, in his earlier research (1990–91) and later research (2003–04) no significant effects were shown on income mobility.

According to human capital theory, "health" is a major factor to the ability to perform work, to work for a long time, and to endure the stress of work, so healthy people can earn more income (Rycroft, 2009). It is evident that individuals with disabilities have a financial disadvantage as against those without disabilities (Kronstadt, 2008). For example, in the US, 23% of individuals with at least one form of disability were living in poverty, compared with 9% of those people without a disability (Stapleton et al., 2006). The financial status of older individuals with disabilities could improve if social transfers such as disability benefits and cash payments by governments are taken into account, especially

for those people in the lower-income class who are entitled to receive state benefits (Zaidi, 2008). However, with these social benefits and other forms of household income, the income gap between individuals with and without disabilities remains (Bound and Burkhauser, 1999). Ill-health and disability can affect an individual's capacity to participate in employment and may affect his or her eligibility or entitlement to benefits. There is an increasing number of studies on pathways into and out of incapacity benefits, but relatively little about how changes in an individual's health or disabilities over time influence changes in his or her income (Kemp et al., 2004). Thus, the impact of changes in one's health and disability on changes in the income of older people requires further research.

2.5.5   Welfare system factors

Income mobility can be promoted by removing social obstacles through social resources or welfare systems. So, social class mobility can be promoted by removing social disorder such as gender discrimination, unfair education opportunities and reliance on family backgrounds through redistribution policies and welfare systems, and by taking back privileges in order for them to utilise their own ability to the full (Markanya, 1984).

Accordingly, the welfare system becomes a significant factor in increasing income mobility (Kim et al., 2013), and social security maintains or pushes elderly individuals' minimum standards of living upwards (Graham et al., 2012, Zaidi, 2008). According to Sen's (1999) capability point of view, social protection not only keeps people surviving, but also is considered a mechanism for them to invest in their ability, so as to function better or more productively. In particular, many studies demonstrated that the expansion of social welfare system for re-distribution purposes has eased income inequality the poverty in the market standard (Atkinson et al., 2002). In general, the bigger the income difference, the less income mobility in the country, and the large gap between the rich and poor becomes a factor that disrupts the class-climbing mobility (Dorling, 2014). In these countries, easing income inequality will help to remove the barriers to income mobility. This is especially the case in those countries with social benefits (cash payments) systems in areas such as disability support, elderly care, new-born child and mother care, and in the case of investments in local social services. It would also bring a quantitative increase in service.

Therefore the expansion of welfare systems would function appropriately for income mobility within the elderly population. For example, of older persons' households, the

households in the 1st quantiles depend heavily on state support, such the Basic Old Age Pension and the National Basic Livelihood Security in Korea, and the state's means-tested benefits in England, so the expansion of public transfers to elderly individuals can be a major factor in income mobility. The expansion of public transfers and direct services would increase the upward mobility of income. There is a theory that income mobility can be boosted by increasing the efficiency of using social resources (Markany, 1984, Craig et al., 2003, Zaidi, 2008). It means, from a macroeconomic viewpoint, the redistribution policy could increase income mobility, and the utilisation of various welfare services could deliver positive effects from a microeconomic viewpoint (Graham et al., 2012). However, the significance of social welfare services has been interpreted in many different ways by the existing studies, so more discussion of how the countries' welfare systems affect income mobility on a microeconomic level needs to take place.

Having examined the determinants of income mobility in old age, this thesis will look at demographics, health or disability, educational level, employment status and the welfare systems as microeconomically the most significant factors on the income mobility of older people, and will study the relationship between the sub-factors of the above five factors and income mobility.

2.6   Income mobility in England and Korea: empirical evidence

This section assesses evidence about income mobility in both England and Korea. In general, it concentrates on findings emerging over the past two decades and gives the greatest attention to England's and Korea's general and elderly populations, with an examination of the patterns and factors of income mobility in the different countries. Further, it discusses the trends over time and the cross-national differences found in studies on income mobility and in the mobility concepts used in those studies. Firstly, it analyses patterns and factors affecting income mobility in England, and in a wider set of countries that were used for cross-national comparative studies (section 2.7.1). In the second part of this section, the Korean studies of income mobility to date are discussed (section 2.7.2).

2.6.1   England and other developed countries: evidence

The interest in income mobility in the developed world arose in the late 1970s and drove such studies as the "meaning of income mobility" (Fields and Ok, 1996), "research on the concept of income mobility and the way to measure" (Fields, 2000), and "the relationship between the level of income mobility and income inequality by the time periods of

different countries", which focused on macroeconomic factors (Khor and Pencavel, 2010). On the other side, the microeconomic approach was conducted with studies such as "factors to affect the income of individual and household" (Jarvis and Jenkins, 1998, Jenkins, 2011).

The development of the concept and the method of measuring income mobility started to be applied to the US and England, as well as to developing countries, and it played a major role in seeking the relationship between the level of income mobility and income inequality (Bradbury and Katz, 2002; Jenkins, 2011; Rycroft, 2009). While there are more studies on the income mobility of the working-age population emerging in many countries, little research exists that examines the dynamics of the income mobility of the older population. The major contribution to the literature of income mobility in old age is by Zaidi et al. (2001). In their paper, the focus of analysis was the elderly population who had reached the legal age of retirement. The paper used the first seven waves of the British Household Panel Study (BHPS), for the period 1991 to 1997. It also used the net income data for households as used by Jarvis and Jenkins (1996).

The results, as shown in Table 5, indicate a correlation coefficient of 0.616 for the older population and 0.503 for the younger population between 1991 and 1997: income mobility is higher in younger people compared to older people. They also identified the transition from work to retirement and changes in family structure as the most important factors of variation in income in old age. The transition matrix for older people in the UK, from 1991 to 1992 and 1999 to 2000, shows a 66.8% and 53.8% immobility for the first (lowest) and fifth (highest) quintile (respectively), compared to 41.1% for the second quintile, 39.2% for the middle and 34.8% for the fourth quintile (Zaidi et al., 2008).

Table 5 Aggregate measures of income mobility between 1991 and 1997

	Older population	Younger Population	Overall Population
1. Coefficient of Variation	0.237	0.266	0.262
2. Correlation coefficients for income in 1991 and 1997	0.616	0.503	0.527
3. Slope coefficient in log income 97 regression on log income 91	0.578	0.438	0.507
4. Shorrocs's R (m) measure (based on Gini-coefficient)	0.89	0.86	0.87
Number of observations	1010	5469	6479

Note: (1) Correlation Coefficient refers to Pearson product-moment correlation coefficient

(2) Slope coefficient is calculated by a regression of log income 1997 on log income 1991

(3) Shorrocks' R(m) measure is equal to inequality of m-period income expressed relative to the weighted sum of inequality in each of the seven waves, Source: Zaidi et al., 2001. 'Income mobility in later life'

Using the characterisation of income trajectories ((1) flat, (2) flat with blips, (3) rising, (4) falling and (5) other), which the framework first developed by Gardiner and Hills (1999), Rigg & Sefton (2004) analysed ten waves of the British Household Panel Survey and found that there was greater income stability for pensioners than for any other group, but still only 34.7% of single pensioners and 39.9% of pensioner couples experienced a flat income trajectory, which means that over 60% did not. Among the life events identified by Rigg & Sefton (2004), retiring, suffering from a disability and widowing can greatly affect the income of older people. Additionally, Zaidi et al. (2008) applied this concept to older people, finding that, "contrary to conventional wisdom, a large proportion of older people experience income mobility, since a flat income trajectory is the experience of a minority of older people, not that of the majority" (p.171). They also observed that the longer the time period, the larger the proportion of non-flat income trajectories.

A cross-national comparative study was carried out by Zaidi et al. (2003) that analysed the income mobility of older people in Britain and Germany during the 1990s. The study used data from the BHPS and the German Socio Economic Panel (G-SOEP). The analysis provided in their study indicated the presence of a strong relationship between old-age income and welfare systems in both countries and the income risks experienced by older people. The study uses the Shorrocks (1993) and Fields and Ok (1996) measures for the estimation of aggregate income mobility between older people. The estimates are presented below in Table 6.

Table 6 Aggregate indices of income mobility

	Britain	Germany
Shorrocks (1978) mobility index:		
Using Theil (GE (1))	0.139	0.091
Using MLD (GE (0))	0.148	0.102
Using Atkinson - 0.25	0.137	0.092
Using Atkinson - 1.50	0.177	0.105
Using Atkinson - 2.50	0.522	0.134
Fields and Ok (1996) measure:		
'Percentage' income mobility	23.6%	17.6%

Source: Zaidi et al., (2003) Income mobility in old age in Britain and Germany.
Note: The author notes the difference between England and Britain, the two terms denoting two different geographical (and demographic) areas. Britain comprises England, Scotland and Wales, plus a number of islands.

The major finding of the paper is that old-age income mobility is more prominent in Britain, as compared to Germany, as all the index outcomes show higher numbers in Britain compare with Germany.

Zaidi and De Vos (2002) also provide a cross-national comparative study on the income mobility of older people in the UK and the Netherlands. They used longitudinal data from the BHPS and the Dutch Socio-Economic Panel (DSEP) for 1991 to 1997. Household income was used for the measurement of income mobility. The results were consistent with other empirical studies and showed that older people in the UK had a greater probability of income mobility compared with older Dutch persons. The study made use of multivariate analysis that indicated that different demographic, labour market and income characteristics had a considerable correlation with income mobility. Predominantly, widowhood and a change in living provisions influenced the income of older people in both countries. The results showed that becoming a widow influenced both downward and upward income mobility in the Netherlands, whereas in Britain it just had a downward income mobility. Similarly, private pensions were linked to a lower level of downwards income mobility in Netherlands but they had a greater propensity towards upward income mobility in Britain.

The macroeconomic research suggests that the level of income mobility can vary depending on the country and the time period. On the other hand, studies of the factors that affect income mobility have been conducted with a microeconomic view (Beenstock, 2004; Jenkins, 2011; Woolanrd and Klasen, 2004; Aristei and Perugini, 2012). These studies commonly pointed towards human resources and the labour market as the most influential factors on the income mobility of the younger-age groups of individuals and households; while older people's income is less volatile than that of younger people, it does not mean that they are stable (Zaidi et al., 2001). One of the most influential factors on downward movement is the transition into retirement (leaving work) and states' pension and social benefits systems play an important role in stable income after retirement (Brown and Prus, 2004).

2.6.2   Korean evidence

Currently, there is a little research exist on income mobility of older people in Korea compared to Western countries. One of the reasons for this is related to the kind of database that enables study. In Western countries, the longitudinal data systems were built from the late 1960s to provide research data. The longitudinal data on ageing also started to

be collected in 1998 (ELSA). However, Korea only started collecting data from the late 1990s (and data on ageing from 2006), and as a result, it was hard to investigate mobility between or within generations.

Also, the little public interest in the study of income mobility was one of the reasons for the lack of further research. Instead of focusing on the cause of the unfair reality and the structure of the society that did not provide fair "opportunities" to individuals and households, the studies which focused only on the short-term solution to this phenomenon were popular.

Even so, after the foreign currency crisis in 1997, as Korean society became more polarised and unequal in income, scholars started to discuss the concept of income mobility in several studies as the solution of these issues (Kim and Chung, 2004, Kim, 2007, Sung, 2011). Research was conducted into the concept of income mobility (and its measurement methods) (Sung, 2007, Sung, 2011, Oh and Kim, 2011, Lee, 2009), with data from the Urban Household Budget Survey, the Korean Labour Panel and the studies that macroeconomically considered the unequal reality since 1997 as a "change in income mobility".

On the other hand, studies of "the equalising effect of income mobility on income inequality", and "the study of the significant factor on income mobility" (Kim et al., 2012, Kim and Chung, 2004, Nam, 2012, Sung, 2007, Lee, 2009, Ham, 2005) were minimal. In particular, this research focused on the change of income mobility and the level of inequality after the currency crisis, so interest in the social change after the 2008 financial crisis, the mobility of weaker group within the quantiles, and the pattern and meaning of the mobility was relatively low.

Taking a closer look at the Korean studies on income mobility, to analyse the unequal reality since 1997 the study of the concept of income mobility as an alternative solution to measuring income inequality (thus overcoming the limitation of the traditional method) was conducted as the first of the series of studies on the concept of income inequality and its measuring method. For example, one study developed the income mobility index (Sung, 2007, 2011) and another revealed the error of the panel that excessively estimated income

mobility and introduced a research method of applying pseudo panel data to solve the issue (Oh and Kim, 2011[18]).

Other studies measured Korean income mobility using an index introduced by Western countries. Lee (2009) found differences between income mobility indices by evaluating various measuring methods of income mobility. She measured the effect of income mobility on income inequality with Fields's *E* factor over the 1999–2007 period. As a result, income mobility in Korea improved the income inequality, but it was found that the degree had been decreasing. This research is meaningful in that it comprehended the income-moving trend using the measuring methods of the relative concept and the absolute concept, and studied the effect of income mobility as an equalising factor in Korean society. In particular, the study measured the difference in income mobility by household characteristic, inclusion of public transfer income level, and whether the male householder in his 40s−50s had relatively higher mobility. Further, if income was taken as including public transfers, it showed a higher mobility than if it included only labour and property income. However, private transfers had a more significant effect on mobility than public transfers.

More studies were actively conducted to measure income mobility status after the currency crisis using a macroeconomic viewpoint. These studied:

- Short-term income mobility during 1997 and 2001 (Kim and Jeong, 2004; Ham, 2005);
- Income mobility and the difference of mobility by income type (ordinary or disposable income) (Kim et al., 2012; Lee, 2009);
- Income mobility and poverty dynamic study using two-period comparison (1999-2002 and 2003-2006) (Kim, 2007);
- The difference in social rank over the short-term and long-term (Lim, 2010);
- The change in income mobility after the 2008 financial crisis (Nam, 2012); and
- Whether there had been a difference in income mobility between the disabled and non-disabled, and between the generations (Kim et al., 2010).

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[18] Oh and Kim (2011) proved that the panel overestimated income mobility after they compared the mobility index by 1998–2008 panel research by the Korean Labor Panel, and the index by pseudo panel data research. IN particular, as they looked for the existence of a poverty trap using cubic non-linear income mapping, the existence of a poverty trap toward the lower-income class was revealed, and the Korean Labor Panel had under-reported the existence of a poverty trap.

The aforementioned result of the income mobility studies mostly agreed that income mobility was insignificant and the middle class had collapsed, however, each scholar suggested a different outcome in terms of income mobility after 2008. From 1990 to 2008 the income mobility had been declining, and the trend was particularly worse after 2000 (Sung, 2012). Same studies stated that there was a risk that poverty could be entrenched due to the ongoing decline of income mobility in Korea. Further, by comparing income mobility between regular income and disposable income, the policy of redistribution was found to be effective in increasing the degree of income mobility[19] and the study showed that there was a polarisation issue, as the proportion of the Korean population in the middle class had been declining at the same time as the lower and upper classes had been increasing in population share (Won, 2013). Further, the difference in income mobility by social class was analysed, and the result showed that there was a declining trend towards lower-income classes climbing up the quantile and higher-income classes falling down the quantile (Kim et al., 2012). In particular, in the analysis for the short term (1 year) or the medium term (5 years) on the difference per social class by the migration matrix, more households in the lower or upper classes than in the middle class maintained their social class (Lim, 2010[20]).

However, an opposite result was shown, in that the income mobility increased a little in 2008 compared to previous periods of time. According to the research on the income mobility of the total population during 2005–2009, the income correlation in 2005 and 2008 is 0.506, which declined from 0.615 in 2005 and 2006. This result suggested there was overall income mobility of all the groups in 2008 (Nam, 2012).

While the above studies considered the overall population, only a few studies were conducted on the income mobility of elderly households in Korea. According to Nam's (2015) study, using the Korean Retirement and Income Study (KReIS), 56.4% of respondents stayed in the lowest quintile in both 2005 and 2011, which illustrates that there

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[19] Kang (2011) monitored the changing trend of income mobility of Korea in both microeconomic and macroeconomic viewpoints through the Household Budget Survey data from 1990 to 2008, studied the effect of household characteristics on income quantiles and concluded that gender, age and social position had relatively different effects, however the number of workers in the household had a positive effect in all periods. In particular, female householders had great variance in income. Finally, the percentage of temporary or daily workers was a significant factor in entering into poverty, but not so much when exiting poverty. In order to monitor the effect of macroeconomic variance on income mobility, Kang (2011) applied income rank per quarter from 1990 to 2008, for 18 years, reorganised the dataset for each quarter and obtained 60 time series samples to be able to figure the status quo of income mobility.
[20] Lim (2010) measured income mobility on households, utilizing the data from the 2nd to the 10th year of the Korean Labor Panel (1998–2007).

is relative poverty among older people. Interestingly, only a few older people (1.8%) experienced an upward mobility, compared with 26.6%, who experienced a downward mobility, suggesting that income mobility among older people is low. Moreover, more than half of older households remained in the lowest quintile for all 6 years, which indicates, concurring with the findings of Seok (2012), the severity of economic difficulties in Korea. In his multinomial regression analysis, it reveals that age, gender, education and having one's own house were shown to be determining factors of income mobility (Table 7).

Table 7 Multinomial regression of income mobility

	Upward group		Downward group	
	B	Exp(B)	B	Exp(B)
constant	5.433***	—	1.646	
Male	0.807	0.446	−0.898***	2.454
Age	−0.129***	0.879	−0.060***	0.942
Education	0.059	1.061	0.378***	1.460
Married	1.100*	0.333	−0.193	1.213
Economic activity	0.273	0.761	0.181	0.284
Having one's own house	0.534	0.586	0.588**	0.555
Metropolitan	−0.520	1.682	0.080	0.923
Number of employed family member in 2011	−0.072	0.931	−0.098	0.907

***$P<0.001$, **$P<0.01$, *$P<0.05$

Source: Nam (2015) Income mobility of elderly households in Korea

These data show that younger persons and people who are married had an upward income mobility. By contrast, individuals in the downward group had a higher chance of having a female head of household, a younger age, more education, and their own house compared with the non-changed group. In addition, having one's own house in the downward group was statistically significant. This finding can be explained by recent changes in the property market in Korea. It is understood that many people bought a house with mortgages, however, because of the financial crisis in 2008, property prices decreased considerably, resulting in negative equity for numerous people. Thus, the debt generated by owning a house might affect a fall in income among the case of the downward group. However, this study has a few limitations including, as is found in many longitudinal surveys, that income data are respondents' reflections, and thus lack accuracy. It is remarkable because only a very small number of respondents (1.8%: 48 households out of 5000 households) reported income increases, which is very small compared to other studies.

Another study by Lee (2012a),[21] using data from Wave 2, 7 and 12 (1999, 2004 and 2009 respectively) of the Korean Labour and Income Panel Study (KLIPS), reveals patterns of income mobility among older people similar to the studies by Bardasi and Jenkins (2002), Zaidi et al (2001) and Jenkins (2011) in that, at the time period in which one moves from working age into retirement, there is a large change in income rank, and after the transition to retirement, the older an individual becomes, the greater the tendency that that individual's income rank will become fixed. He also found that when transitioning into old age the largest factor to bring about a change in income rank and to increase the level of income inequality is a decrease in earned income.

Exiting the labour force results in a decline in income for many older people but other income components, such as property income, social insurance income, and private transfer income compensate to some degree for the decrease in earned income, so that the increase of income inequality and income mobility brought about by earned income changes are eased (Lee, 2012). This result reflects that, because public aid is focused on payments for the lower-income class, the increased income inequality level caused by earned income is reduced at the same time that the income position of the lower-income class experiences a downward mobility, so there is an additional change in income rank.

Another study conducted by Seok (2009), using data from the first and second wave of the Senior Citizen Security Panel of the National Pension Research Institute, analysed the income distribution characteristics of the elderly generation (those over 50 years of age) in Korea, and, with this as the foundation, looked at the causes of income change through a decision tree model. His analysis results showed, firstly, that the income gap within the elderly generation became more extreme when the age group increased, but also that the income gap within the same age group was reduced during the analysis period. In addition, he also stated that the lower the age group, the greater the chance that they were able to maintain employment, so the income level was generally high; the higher the age group the lower the income level, due to the loss of earned income due to retirement, and, even if a work situation was maintained, that promised only low wages and high chances of working in a temporary position. Finally, the income change of the elderly generation operated, with the most influential matters being education level and other human capital factors; next were age and change in employment situation, which had a big influence, as was confirmed in many other studies. Seok (2009) also stated that public pension payments

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[21] He analyses the changes in income inequality and income mobility accompanying the transition to old age.

play a major role in maintaining the income level of an elderly generation. This is similar to the results found by Zaidi et al. (2001) in England.

2.6.3   Summary of empirical evidence

Firstly, empirical studies of income mobility show that there is a substantial degree of longitudinal flux in income, and the pattern of income mobility differed by country, mobility concepts and time period. In Korea, the result of income mobility before and after the late 2000s showed the opposite results. After the late 2000s, one study showed that income mobility declined, and the change in the 1st and 5th quantile became fixed; another study emphasised the downward movement of the income class in the 5th and middle-income quantiles. Further, the result of the income mobility analysis resulted in different outcomes, dependent on country and time period. This is because income mobility was affected by different macroeconomic events such as economic situations and the structures and systems of the individual countries.

Secondly, income mobility as an equalising factor had different influence by country and time period. England had a high income mobility between 1991 and 2006, though the equalising factor was not so effective, and in Korea, income mobility performed the equalising function after 2000, though it was continuously decreasing (Lee, 2009). These phenomena represented the double side of income mobility, not the traditional positive-only view. With particular relevance to the relationship of income mobility and income inequality, the country's structures and social context could be very important.

Finally, in both countries, the upward movement of income mobility in old age was determined significantly not only by demographical factors but also by human resources, labour market and social welfare. Demographic factors that affected household income were the number of workers and the number of dependants in the household, and age, marital status, widowhood and gender.

In general, both countries show that there is a greater income mobility in younger age group compared to older age group. However, in England, although it is evident that income mobility of retirement age people (60 or above for women and 65 or above for men), between 1991 and 1997, is significantly less than for working-age people, this is non-negligible and there is a variation in income among older people. Zaidi et al (2001: 9) state that "Taking the coefficient [of income variability] as a measure of uncertainty in income, we find that the older population experiences less uncertainty than the younger

population yet the degree of uncertainty experienced by the older population is non-negligible. This is a motivating factor in our investigation of income mobility in old age". In addition, income trajectories analysis by Rigg & Sefton (2004) and Zaidi et al. (2008) indicates a higher degree of income stability for older people (approximately one in third of older people) compared to any other age group, but majority (two in third) of older people experience their income change in old age. By contrast, in Korea, more than half of respondents stayed in the bottom quintile between 2005 and 2011 and only a few older people (1.8%) experienced an upward mobility compared with 26.6% of downward mobility, suggesting that income mobility among older people Korea is low. Studies also revealed that there is a persistent poverty in Korea with more than half of older households remaining in the bottom quintile for all 6 years (Nam, 2015).

2.7   Conclusion and limitations found on the topic of income mobility

This chapter has offered an overview of relevant literature on income mobility in later life. It highlighted the concept of income mobility and various measures used to date, including measures of absolute mobility (income mobility breakdown and income trajectories) and relative (transition matrices and rank mobility index). Diversity in income mobility measurements reflect the variety of the types of mobility that one wishes to observe, and this chapter highlighted both conceptual challenges of analysing income mobility in old age and the important choices necessary. For example, the difference between absolute and relative mobility has different real-life implications for older people (Zaidi, Rake and Falkingham 2001). While researchers are bound to choose one methodology over another, it is vital that they clarify the justifications and implications of such choices. The review also highlighted that empirical studies are bound to face methodological challenges, such as measurement error, which this chapter briefly presented, along with the solutions that can be found in the literature to date.

From analysing the literature and some empirical evidences, it is apparent that factors affecting income mobility in later life are varied and complex. In addition, the studies' findings also provide mixed evidence on whether older people experience "a lot" or "a little" income mobility. This in part depends on the methodologies, concept, and data limitation used in analysis (for example, in Nam (2015)'s study, only 1.8% of older people experienced an upward income mobility during 2005 and 2011 which is very low percentage compared to other studies which suggesting possible measurement errors or data contaminations). In general, older people in both countries experience less income

change compared to the younger working age group, however, one fact clearly does emerge from the literature: old age income mobility is significant and not negligible. The literature also shows that older people can be exposed to specific life events common to older life, such as retiring or widowing, which can trigger large income changes, and other factors such as education, health, employment and the country's welfare system are the main influences on income mobility in old age. From the examination of literature, a summarisation of the characteristics of the income mobility of the older people appears as follows:

Table 8 The Characteristics of the income mobility of the older people

Classification	Characteristics of mobility
Demographic factors	• Disabled female older people showed a higher risk of downward mobility and change in income, however, there is an increased likelihood of income mobility associated with the death of a spouse. • The income quantile mobility is weak as people grow old and there is an age-related reduction in labour income and slight reductions too in social security payments. • Age increase affects positively to raise income before retirement; after that, it affects income negatively. • Changes in an individual`s marital status affect income dynamics of all age groups but are one of the important factor affecting income mobility in old age. • The higher the number of employed people in the household, the greater the probability of upward income mobility. • The higher the number of dependents in the household, the greater the probability of downward income mobility.
Human capital factor	• Education levels negatively influence income mobility, and would decrease income mobility to aggravate income inequality. • The current older generation has fewer human resources than the younger generation, thus there is a negative effect on upward income mobility.
Employment factor	• Transition into retirement associates negatively with income mobility. • The chances of downward mobility were about three times greater for those who were retiring than for those who had already retired. • The majority of employed older people in Korea are employed in low-quality kinds of jobs, which negatively affects actual upward income mobility.
Health factor	• Becoming ill or disabled could contribute to intra-generational mobility either because of their effects on the ability to work or because of medical expenses. However, research results are somewhat mixed as some research revealed that health is not a significant factor (Hertz, 2006). • The occurrence of disability has a negative influence on the change in a household's total income and earned income.
Welfare factor	• The more there is activity aid support and all kinds of social welfare service benefit, the greater the probability of a positive influence on upward income mobility. • Social security maintains or pushes the elderly individuals' minimum standard of living upward

Source: Author's own from literature

Using the findings from the literature review, the author could identify the following limitations and gaps on existing literature surrounding the field of income mobility in old age.

Firstly, income inequality measurement methods like Gini's coefficient or 5-quantile distribution ratio to analyse the social inequality cannot explain the movement within the distribution. Therefore, in order to measure the movement of individual within the income distribution in a long term, the "income mobility" perspective is more useful. In particular, the inequality studies for older people, who are very vulnerable to economic and social changes, are even more useful.

Secondly, many scholars in this field, especially in Korea, tend to interpret the status quo of income mobility without diverse discussions and arguments about the "meaning and influence of income mobility on society". In fact, various research and studies only emphasise the positive side of income mobility (Kim et al., 2010; Sung, 2007; Yu, 2012; Lim, 2010), leaving the possibility of misinterpreting social income mobility. Actual income mobility can act as the inequality promoting factor as well as the inequality equalising factor, as was empirically proven. Therefore, when active income mobility is found in the Korean study, further detailed analysis, such as what kind of move was found within the income distribution, which group's income mobility was active and so on, is needed; the bottom line of this analysis/interpretation should include the cause and result of income mobility (Bradbury and Katz, 2002; Fields, 2009). Then the income mobility phenomenon will be re-highlighted by relating its cause and result to the country's structure and social contexts, and in particular, it will form the base to interpret the relationship with the income inequality.

Thirdly, the studies on income mobility can over- or under-measure actual income mobility because many studies tend to be conducted using relative concepts to measure income mobility. Studies about relative income mobility consider the quantile changes as income changes, so they tend to ignore the mobility within the quantiles. Various scholars emphasised that income mobility should be measured by consideration of both relative concepts and absolute concepts (Bradbury and Katz, 2002; Jenkins, 2011; Rycroft, 2009; Zaidi, 2008). Therefore, relative mobility and absolute mobility should be measured at the same time, to analyse income mobility more clearly (Beenstock, 2004; Bradbury and Katz, 2002; Yitzhaki and Wodon, 2002). A number of Korean studies found in literature only use one measure (method) of income mobility which resulted in over- or less-exaggerated outcome.

Fourthly, there needs to be more analysis on the factors affecting the income mobility of the older people in microscopic viewpoint. There are only two studies found in the Korean literature that focuses on the income mobility of older people. If the discussion of the income mobility of the older people is conducted from a macroscopic perspective, then it is necessary to examine microscopically to identify the factors that can actually increase the income of the older people. It is necessary to understand the factors that affect the absolute increase of income and to create the policy that decreases the gap in the unfair income structure between elderly and non-elderly people.

Fifthly, there are few studies that analysed the income mobility in old age after the financial crisis in 2008. Therefore, a comparison between income mobility of absolute and relative changes, and the analysis on how this income mobility changed the income distribution in England and Korea are needed.

Finally, there are few cross-national comparative studies on income mobility in old age which focus on Western countries but none exist comparing West and East. Therefore, this comparative studies on income dynamics in old age can help to uncover how different social and economic factors, such as the design of pension systems, the level of income inequalities during working life, health and benefits mechanisms, among others, can affect income mobility in later life. While conceptual issues may not be very different in the case of international comparative studies than in single country studies, methodological challenges may increase. Therefore, this research will contribute to an under-researched field of interest, and can help to understand both the methodological and conceptual issues a researcher may face when analysing the income mobility of older people. In addition, this thesis can attract the attention of policymakers in both countries (particularly in Korea) towards a more dynamic measure of individuals' standard of living than static measures so that it can affect the direction of welfare policies for older people.

Chapter 3:   Methodology

3.1   Introduction

In Chapter 2, Literature Review, theoretical and empirical literature surrounding the topic of income mobility was discussed and some common strengths and limitations were identified that affect the analysis in this study. The aim of this chapter is to discuss and justify the empirical methods used in the thesis, and to also provide information about the two datasets: the English Longitudinal Study on Ageing (ELSA) and the Korean Longitudinal Study of Ageing (KLoSA) that serve as a reference point for the research reported in this thesis. It will also justify the methods used to measure the income mobility of older people in England and Korea. The chapter is organised in the following order:

- The chapter will start by revisiting the research questions (section 3.2).
- This section is followed by providing the details of the datasets of ELSA and KLoSA (section 3.3). Then, it discusses the attrition in both datasets (section 3.4). Following this, details about the study population and analytical sample are discussed (section 3.5).
- It will then describe income variables of the two datasets (section 3.6, sub-section 3.6.1 for ELSA and 3.6.2 for KLoSA, and 3.6.3 for similarities and differences between the income variable of two datasets).
- It will also discuss other issues related to empirical choices for this thesis (section 3.7: the coverage of income sources (3.7.1), the choice of the unit of analysis (3.7.2), the choice of the equivalence scale and price indices (3.7.3), and the dependent variables for each RQs (3.7.4).
- Information surrounding influential factors of income mobility is also discussed (section 3.8: demographic factors (3.8.1), health factors (3.8.2), human capital factors (3.8.3), employment factors (3.8.4), and welfare system factors (3.8.5).
- The analysis contents and methods for this thesis will be discussed in section 3.9
- The limitations of the datasets and methodology used in this thesis will also be discussed (section 3.10)
- Finally, it will conclude with the chapter summary highlighting the key points discussed in this chapter (section 3.11).

3.2   Research questions

This thesis's goal from a macroscopic perspective is to analyse how income mobility is observed for the elderly population in England and Korea from 2006-2012 and what determines income mobility differences across England and Korea. Moreover, from a microscopic perspective, the author sets out to measure the factors that most influence the income mobility of older people and contribute to actual upward or downward income mobility for older people in the two selected countries. In order to accomplish this, the base year is set as 2006, and the research used the three waves of both ELSA and KLoSA between 2008 and 2012 as the measured years.[22] The research questions based on the goals of this research are as follows:

RQ 1) How much absolute income mobility is observed for older people in Korea between 2006 and 2012 and how did this compare with mobility in England?

RQ 2) How much relative income mobility is observed for older people in Korea between 2006 and 2012 and how did this compare with mobility in England?

RQ 3) What determines aggregate income mobility differences across England and Korea?

RQ 4) What are the factors affecting income mobility of older people in England and Korea? How are various personal attributes (for example, sex, age, education, employment) and life-course transitions (such as becoming a widow, and changes in living arrangements) associated with income mobility during old age?

3.3   The datasets for England and Korea

As population ageing is being experienced and is progressing in every region of the world, the longitudinal study on ageing in a number of countries has achieved remarkable scientific success in the last two decades as demonstrated by an impressive number of users, studies, and publications (Angrisani and Lee, 2011). A number of developed (mainly Western Europe, USA, Japan and Korea) and developing countries (China, India, and Indonesia) have started collecting similar data based on a comparable survey design. This section provides an overview of two of those datasets used: the ELSA and the KLoSA.

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[22] Using 2006 as a base year and 2008-2012 as measured years means comparing 2006 to 2008, 2010, and 2012.

The datasets used for the analysis of income mobility in this thesis are the four waves of the two selected countries' longitudinal studies on ageing. The KLoSA currently consists of four waves between 2006 and 2012. The surveys are conducted by Computer Aided Personal Interviews, and due to a large number of mid-career changes in the population, a decision was made to survey younger individuals than are typically surveyed. The lower limit for the age of panel respondents (i.e., people followed over time) is 45 years old excluding those individuals in long-term care institutions and residents of the Che-Ju Island (Korea Labour Institute 2009). The KLoSA is a biennial longitudinal study. The Korea Labour Institute has released the first two waves of the survey and the last two waves (Wave 3 & Wave 4) were released by the Korea Employment Information Service. The KLoSA consists of various ageing-related modules including on socio-demographic characteristics, income, assets, family composition, employment, health, and life satisfaction.

In contrast, the ELSA currently consists of six waves, each of which takes place over a period of two years. The focus of the ELSA is the status of people aged 50 and over, but nearly a quarter of the 37,949 people across the waves are under age 50 and are included as partners of the survey respondents who are themselves older than 50. The ELSA was all drawn from participants in the Health Survey for England (HSE) for the years 1998 – 2011 (NatCen Social Research, 2014). Unlike KLoSA, not all respondents have participated from the Wave 1 due to the sample having been refreshed at three waves (Wave 3, 4, and 6). Although some new topics were introduced at different waves, all waves include the following information: demographics, health, work and pensions, income and assets, housing, cognitive function, social participation and expectations.

Wave 1 interviews of ELSA were conducted in 2002 and 2003 and contained people selected from the HSE for 1998, 1999 and 2001 who were born on or before February 29, 1952. These original survey respondents are referred to as "Cohort 1." Three additional cohorts were added later. Cohort 3, consisting of people born between the first of March, 1952 and the 29th of February, 1956, was added starting in 2006 as field work for wave 3 commenced in order to add individuals in the 50-54 age range as Cohort 1 sample members aged out of that range. Cohort 4 was added during wave 4, for which field work started in 2008, and consists of individuals age 50-74 (born between March 1, 1933 and February 28, 1958). Cohort 6 was added during wave 6 and fieldwork was carried out in 2012-13, and consists of individuals born between 1 March 1956 and 28 February 1962. Table 9 provides the sampling dates for each wave of ELSA and KLoSA.

Table 9 Sampling dates for the ELSA and KLoSA waves

Wave	Date of sample	
	ELSA	KLoSA
0	1998, 1999, 2001 HSE survey	-
1	2002-2003	2006
2	2004-2005	2008
3	2006-2007	2010
4	2008-2009	2012
5	2010-2011	2014 (not available yet)
6	2012-2013	-

Source: Phelps and Wood (2013, p. 1), KLoSA user guide in Korea Employment Information Service

Because information was collected from partners of the survey target of people older than 50 as well as the survey targets, the concept of a *cohort core member* is important. Cohort core members are interviewees over the age of 50 as their cohort is introduced, are the focus of the ELSA survey and are tracked over time in each wave. However, research that uses income data often uses combined household income and some components of income are gathered separately for separate members of the household.

All empirical results for England have been produced by using data from the last four waves of ELSA, covering the period 2006 to 2012. Thus, the baseline of ELSA data used in this thesis is from the Wave 3 of the actual dataset in order to match the period of the KLoSA data. For Korea, it will use first 4 waves, covering the same period of ELSA. The characteristics of these two datasets are summarised in Table 10.

Table 10 Comparative characteristics of the KLoSA and ELSA

	KLoSA	ELSA
Type of survey	Longitudinal survey of households, interviewing adults aged 45 or above and interviews were conducted in every two year	Longitudinal survey of households, interviewing adults aged 50 or above and interviews were conducted in every two year
Years available	All four waves (2006-2012) are available for analysis	Data are available for 6 waves (2000-2012) but will be used only the last four waves (2006-12) in this paper
Sample size	10,254 persons and 6,171 households at baseline	In 2002/03 (1st Wave), the sample included 11,391 eligible participants (core members). In 2006/07 (3rd Wave), 1,276 core members aged 50 to 54 years and 457 partners were added in the sample. In 2008/09 (4th Wave), 2,291 core members aged 50 to 75 years and 299 partners were added in the sample. In 2012/13 (6th Wave), 2,244 core members aged 50 to 56 years were added in the study along with their partners.

Source: User guide of KLoSA, NatCen Social Research (2014) ELSA Wave 1 to Wave 6 user
guide

3.4   Attrition in ELSA and KLoSA

One of the undesirable but inevitable features of all panel surveys is participants' dropout over time. There are a number of causes in arising attrition in panel surveys: a) participants may no longer wish to be involved in the survey, b) it may be due to difficulty in tracing a respondent between one fieldwork period and the next, and c) it may be simply because of the death of respondents due to illness or old age. In addition, some respondents may indicate that they do not want to take part in one wave but they can re-join in the next wave.

Attrition has two main harmful effects on the data: it reduces the sample size and it may harm the representativeness of the survey. As a result, this leads to a bias in estimates (Jenkins, 2011, Baltes et al., 1971, Kennison and Zelinski, 2005). There are some important differences in the sample size and in the attrition incidence in each country. With regard to the first of these issues, the analysis of response rates and attrition from the ELSA is complicated due to variations in the responses to different elements of the study, deaths and differences between core and refreshment cohorts. Some respondents may fail to interview at one wave but participate in later waves.

Table 11 below shows the details of the number of core respondents in the first six waves of ELSA. The cross-sectional response rate for each wave can be calculated by the total respondents divided by the number of individuals eligible for the wave, where eligibility means membership of the core sample including those not known to have died or have moved outside the country. Rates were high in wave 2 with 82%, but were low in both wave 3 and 4 with 73% and 74% respectively, and were increased to 78% in wave 5 and 85% in wave 6 respectively. Although there were three refreshments that were added in wave 3, wave 4, and wave 6, losing more than 50% of the sample between the first and the last wave may cause data attrition.

In contrast, the KLoSA suffered less attrition than ELSA, losing less than 25% of the sample between the first and the last wave 4. Table 12 shows the yearly respondent retention rates of KLoSA data. There was no refreshment (this is expected to be added to wave 5) as it was found in ELSA and yearly retention rates were relatively high with 87% in wave 2, 80% in wave 3, and 76% in wave 4 respectively.

Table 11 ELSA achieved sample numbers* and response rates**

Wave	1	2	3	4	5	6
Wave 1 Sample, number interviewed	11,392	8,780	7,535	6,623	6,242	5,659
Wave 3 refreshment sample, number interviewed	n/a	n/a	1,275	972	936	888
Wave 4 refreshment sample, number interviewed	n/a	n/a	n/a	2,291	1,912	1,796
Wave 4 refreshment sample, number interviewed	n/a	n/a	n/a	n/a	n/a	826
Wave 1 sample members interviewed who participated in all preceding waves	11,392	8,780	7,198	6,019	5,316	4,766
Wave 1 sample members who have died (cumulative)	n/a	504	1,164	1,620	2,158	2,682
Wave 1 sample members field response rates (based on issued cases)	67%	82%	73%	74%	78%	85%

* Based on core members only. The totals for productive interviews include those in care homes/institutions.
** Those in care homes / institutions are excluded from the response rate calculations.
Source: Steptoe et al, 2012 Cohort Profile: The English Longitudinal Study of Ageing

Table 12 KLoSA's Yearly Retention Rates

Year	Survey Instrument	Original Panels	Survey Target Panels	Responded Panels		Total	Retention ratio-target	Retention ratio-original
				Death	Survival			
2006 Wave 1	CAPI	10,254	10,254	-	-	10,254	-	-
2008 Wave 2	CAPI	10,254	10,254	187	8,688	8,875	86.60%	86.60%
2010 Wave 3	CAPI	10,254	10,067	309	7,920	8,229	81.70%	80.30%
2012 Wave 4	CAPI	10,254	9,758	327	7,486	7,813	80.10%	76.20%

Source: Study Descriptions: Health and Retirement Studies Around the World, Lee (2013)

As in many studies that use longitudinal data, attrition in both datasets is affected by the participants' socio-economical background and is more severe in poorer classes of the participants. Table 13 shows the comparison between the sample who participated in wave 3 (ELSA) and wave 1 (KLoSA) and who did not participate in wave 6 (ELSA) and wave 4 (KLoSA). It can be seen that the sample who did not follow the survey tend to be economically poorer, less educated (more severe in ELSA case), and older than those who participated in wave 6 (ELSA) and wave 4 (KLoSA). In addition, they were more likely to be single or widowed, unemployed or retired, and to report a poor self-reported health status.

In order to minimise the potential effects of attrition, both ELSA and KLoSA provide weighting variables to use in the analysis. Longitudinal weights are intended to reduce bias in estimates derived from the longitudinal data. Further problems caused by attrition are not considered in detail in this thesis, due to much of the analysis being of short-run transitions requiring relatively short sequences of observations for each respondent. In

addition, the panel maintenance activities by both countries' survey administrators are well maintained, and weighting variables provided in each Wave are useful for reducing the potential bias in estimates.

Table 13 Participation by ELSA (wave 3) and KLoSA (wave 1) sample in wave 6 and wave 4.

	ELSA			KLoSA		
	Participants in wave 6 (n=6,114)	Lost to follow-up (n= 2,696)	P Difference	Participants in wave 4 (n = 7468)	Lost to follow-up (n= 2,768)	P Difference
Gender						
Men	68.05	31.95	0.014	72.03	27.97	0.051
Women	70.49	29.51		73.76	26.24	
Age						
45-49	-	-		71.10	28.90	<0.001
50-54	70.24	29.76	<0.001	78.45	21.55	
55-59	80.52	19.48		79.57	20.43	
60-64	79.17	20.83		80.36	19.64	
65-69	75.85	24.15		76.41	23.59	
70-74	70.97	29.03		71.99	28.01	
75-79	60.24	39.76		64.76	35.24	
80-84	47.83	52.17		46.10	53.90	
85 +	27.67	72.33		30.04	69.96	
Marital status						
Single	67.63	32.37	<0.001	56.52	43.48	< 0.001
Couple	72.42	27.58		76.08	23.92	
Divorced	70.73	29.27		66.08	33.92	
Widowed	57.99	42.01		61.96	38.04	
Income quintile						
1 (lowest)	60.87	39.13	<0.001	69.16	30.84	< 0.001
2	65.13	34.87		74.63	25.37	
3	69.85	30.15		78.31	21.69	
4	75.63	24.37		76.07	23.93	
5 (highest)	77.83	22.17		73.24	26.76	
Education						
Low	64.78	35.22	<0.001	72.70	27.30	0.03
Middle	75.66	24.34		74.60	25.40	
High	77.68	22.32		70.56	29.44	
Employment						
Unemployed	64.44	35.56	<0.001	71.10	28.90	<0.001
Employed	77.68	22.32		78.47	21.53	
Retired	65.31	34.69		66.90	33.10	
Health status						
Poor	51.47	48.53	<0.001	67.47	32.53	<0.001
Fair	63.25	36.75		76.67	23.33	
Good	74.80	25.20		74.27	25.73	

Source: author's own analysis using ELSA waves 3-6 and KLoSA waves 1-4

3.5   Study subjects

The object of analysis in this study from a macroscopic perspective is the income mobility of older people, and from a microscopic perspective, the factors that influence the income mobility of older people. In order to analyse these factors, it focuses on individuals, including not only those who are engaged in economic activities, but also those who are not. This is because in the case of older people, due to age, health conditions or a variety of kinds of social exclusion, those who are not engaged in economic activities are a large percentage (for example, in Korea, according to Statistics Korea (2014), 47.2% of the total population of people aged 55 or above are employed and, for people aged 65 or above, this proportion was 30.9% while the percentage is even less in England with only 10% of those aged 65 and over were economically active in 2011 (Office for National Statistics, 2013b), which could lead to the creation of income preservation policy that will lead to a change in their income. The following table 14 shows the sample number that participated in each wave for both datasets.

Table 14 Respondent frequencies of sample, ELSA (Waves 3-6), KLoSA (Waves 1-4)

ELSA	Original sample:	Original sample: (Partners)	Refreshment samples:	Refreshment sample: (Partners)	Analytical sample:
Wave 3 (2006)	Total: 7, 626 CM: 7,535 CP: 91	Total: 415 YP=312 NP=103	Total: 1,275	Total: 457 (OP:142, NP: 21, YP: 295)	8,810
Wave 4 (2008)	Total: 6,724 CM: 6,623 CP: 101	Total: 395 YP: 276 NP: 119	Total: 3,275 From W3: 984 New W4: 2,291	Total: 656 (OP: 271, YP: 345, NP: 40)	9,886
Wave 5 (2010)	Total: 6,367 CM: 6,242 CP: 125	Total: 407 YP: 281 NP: 126	Total: 2,892 From W3: 953 From W4: 1,939	Total: 609 (OP: 229, YP: 318, NP: 62)	9,090
Wave 6 (2012)	Total: 5,783 CM: 5,659 CP: 124	Total: 386 YP: 267 NP: 119	Total: 3,548 From W3: 900 From W4: 1,822 New W6: 826	Total: 851 (OP:346, YP: 430, NP: 75)	9,169

(CM) core members, (CP) core partners, (YP) young partner, (NP) new partner, (OP) old partner

KLoSA	Original Sample:	Original Sample: (partners)	Refreshment samples:	Refreshment sample: (partners)	Analytical sample:
Wave 1 (2006)	10,254	n/a	n/a	n/a	10,254
Wave 1 (2008)	8,875	n/a	n/a	n/a	8,688
Wave 1 (2010)	8,229	n/a	n/a	n/a	7,920
Wave 1 (2012)	7,813	n/a	n/a	n/a	7,486

Source: NatCen Social Research (2014), English Longitudinal Study of Ageing Wave 1 to Wave 6 (User guide to the core datasets), Korea Labor Institute (2007), User Guide for 2007 KLoSA, Korea Employment Information Service: http://survey.keis.or.kr

The subjects of this thesis differed somewhat depending on which RQ was being answered and which method of analysis was being applied. A choice needed to be made about which subjects should be chosen for the RQs, which measured the macroscopic changes in income mobility of older people in England and Korea – and which factors were influential on that mobility – between 2006 and 2012. For the analysis of demographic profile (section 5.2), health status (section 5.3), educational profile (section 5.4), personal economic attributes (section 5.5), and the relative economic status (section 5.6) of older people in the two countries, it used the analytical sample presented in Table 14.

In contrast, for research that grasps the longitudinal characteristics and influencing factors of the same panel's income mobility from 2006-2012, using the responses from the same respondents for four waves (2006-2012) as a standard is the obvious choice (e.g. see table 15 of sample number (iv) who participated in all four waves after trimming outliers of top 1% and bottom 1%). In this case, those who did not respond every year were excluded because these respondents were not appropriate for understanding the microscopic changes in England and Korea. Following table 15 summarise the sample number that used to answer the each research question. As explained above, unbalanced panel sample were used for the analysis of profile of sample in both countries. In relation to the balanced panel sample, *i* refer to the sample who participated in both wave 1 (wave 3 in ELSA) and wave 2 (wave 4 in ELSA), *ii* refer to the sample who participated in three successive waves, and *iii* refer to the sample who participated in all four waves. Finally, iv refer to the sample after dropping out the top 1% and bottom 1% income values in each wave. In this study, in order to reduce the errors related to the selection of sample as much as possible, depending on the RQs, appropriate respondents were selected. In particular, in the case of the two panel datasets, in order to solve the problem of error due to an exaggerated sampling of low income-class groups, it employs the cross-sectional and longitudinal weights suggested by the panel data. For example, if it uses the cross-sectional weight suggested by the both panel data in the case of mean income and the Gini index of older people in England and Korea, with quintiles for the mean income and ratio, it uses the longitudinal weight to calculate the Rank Mobility index, Fields & Ok index, and Shorrocks index of the base and measured years (see example Van Kerm (2002)).[23]

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[23] For instance, if the Gini index and mean income for a given year were the same, using the cross-sectional weight for each year, it would be possible to compare each year; otherwise, I calculated using the longitudinal weight for the measured years for the mean income and the correlation between income and rank between the two years.

Table 15 Sample used for each research question, ELSA and KLoSA

Research question	Measures	Sample used	
		ELSA	KLoSA
RQ1 Absolute income mobility	Fields and Ok (1996) mobility index	i, ii, iii	i, ii, iii
	Income Trajectories (Rigg & Sefton, 2004)	iv	iv
RQ2 Relative income mobility	Rank Mobility (Wodon & Yitzhaki, 2001)	i, ii, iii	i, ii, iii
	Transition Matrix	i, ii, iii	i, ii, iii
RQ3 What determines aggregate income mobility differences across in England and Korea?	Decomposition of mobility using Fields and Ok' (1996) and Ruiz-Castillo's formula using Chakravarty, Dutta and Weymark (CDW) (1985) mobility index	iv	iv
RQ4 the factors affecting the income mobility of older people	Zaidi and De Vos's (2002) Multinomial logistic regress analysis	iv	iv

	Unbalanced panel				Balanced panel*			Attrition ***	Trimming ****	Dropped Observations*****
	W1	W2	W3	W4	W 1-2 (i)	W 1-3 (ii)	W 1-4 (iii)		(iv)	
ELSA**	8,810	9,886	9,090	9,169	7,182	6,311	5,660	36%	5,408	4.5%
KLoSA	10,254	8,688	7,920	7,486	8,688	7,763	7,104	31%	6,951	2.2%

* Individuals present in each of the waves considered. (i) represent individuals who particiapted in both wave 1 and 2, (ii) represent individuals who particiapted in both wave 1 and 3, (iii) represent individuals who particiapted in both wave 1 and 3, (iv) represent individuals who particiapted in all 4 waves after trimming lower and upper 1% using the Square root equivalence scale

** For ELSA, starting wave is Wave 3 and people whose status is only core member in Wave 3, 4, 5, and 6 were extracted.

*** Attrition with respect to the first wave.

**** Trimming, for each wave, lower and upper 1% using the "modified OECD equivalence scale"

***** With respect to individuals present in each of the four waves.

Source: author's own analysis using ELSA waves 3-6 and KLoSA waves 1-4

However, in the panel analysis to understand the factors that influence income mobility, a weight was not applied. In addition, it will drop the top 1% and bottom 1% income values in each year. This is known as 'trimming' that removes outliers. In spite of these adjustments, the sample may suffer from non-random attrition, that is, participants who did not follow up the survey may differ from those who remain in the survey throughout the measured years (see table 13 the difference in sample characteristics of those who drop-out and remain). There are some important differences in the sample size and the incidence of attrition between the two countries, which should be taken into account when considering the results.

3.6 Income variable

3.6.1 The income variable in the KLoSA

The KLoSA asked its sample participants to report income values in 10,000 Korean won, corresponding to approximately 10 U.S. dollars. KLoSA is focused on the individual, which means that conditions of households are collected to understand the conditions of individuals. In the KLoSA data, household income is just a total household income

(respondents' answer on total household income), and not, for example, income sources such as business income and wage income within the household. In other words, although details on the income sources for individual respondents are provided in the data, it is impossible to obtain details for households because there is no data available for the income sources of all the people living in the households.

There are several features of the dataset to be aware of in constructing household incomes. Income can come from the sources listed in Table 16, which may be both or either of an annual, lump-sum amount and if monthly, may be received in only some months of the year (for example, a pension for which one becomes eligible halfway through a year). Because some income sources are only available as annual totals, the annual total income is used. This annual total can be used to construct a monthly average, but of course doing so obscures the detail of variation in incomes across months.

Table 16 Sources of income in KLoSA data

Source	Monthly	Annual	Notes:
Wage income	X		Take sum of monthly totals
Income from the respondent's business	X		Take sum of monthly totals
Income through agricultural and fisheries business		X	Given as an annual total, w01E020
Income from a side job		X	Given as an annual total, w01E027
Benefit from a National pension	X	X	Take sum of monthly totals plus lump sum benefit, if any
Income from Occupational pension	X	X	Calculated from monthly payment times number of months plus lump sum if any
Income from private pension	X	X	Take sum of monthly totals plus lump sum if any
Benefits from unemployment compensation	X	X	Calculated from monthly payment times number of months plus lump sum if any W01e072, w01e073, w01e074
Benefits from worker's compensation	X	X	Calculated from monthly payment times number of months plus lump sum if any, w01e082, w01e083, and w01e084
Benefits from National basic living scheme	X		Calculated as total across months received
Income from Veteran's benefits	X	X	Calculated from monthly payment times number of months plus lump sum if any E101, E102, E103
Income from other welfare benefits	X		Calculated from monthly payment times number of months received
Other income (alimony, child support, consulting fees, odd jobs)		X	Available as annual total w01E120

Source: Korea Labor Institute, 2006

Below table 17 shows the income variables derived from the source variables described above.

Table 17 Income variables in KLoSA

Variable name	Variable contents
WageIncome	Annual income from wages
SelfEmployIncome	Annual income from self-employment (i.e., owns a business
SidelineIncome	Annual income from a second job or business
AgricultureIncome	Annual income from agriculture or fisheries
AnnuityIncome	Pension income, sum of state pensions, private pensions and occupational pensions
AssetIncome	Sum of annual income from real estate and financial assets
SocialSecurity	Sum of annual income from National Basic Living Standard payments, Unemployment compensation, Worker's compensation, Veteran's benefits and Other welfare payments
PrivatePension	Annual income from private pensions
StatePension	Annual income from state pensions
OthWelfInc	Annual income from other welfare programs
AlimonyEtcIncome	Other income from alimony and other payments
RespIncomeNoTran	Respondent's income excluding family transfers in or out
HHInc	Income for the household the respondent lives in

Source: Korea Labor Institute, 2006

3.6.2   The income variable in the ELSA

Income is available in the ELSA from a large variety of sources for both the individual and the Benefit Unit level which is a couple or a single person with dependent children. Whenever a survey respondent could not give an exact answer to an income question, ELSA interviewers used a series of "unfolding brackets" to determine a range of possible incomes. The unfolding brackets are a series of intervals that the survey respondent is able to place the income in and these brackets become narrower until the survey respondent can no longer answer. When an income source ends up in a range in this manner, the exact value of the data that is recorded in the survey is imputed by a conditional hot-deck procedure that amounts to randomly selecting an income from a survey member with similar characteristics who provided their income as the imputed value (Natcen Social Research 2013a). As an example, the various sources of income included in the surveys for wave 1 are given in Table Appendix C along with information about how much of the data had to be imputed. For example, for wage and salary income, 0.9% of responses were missing completely, 1.8% of responses consisted of the respondent knowing the amount

was positive, but not being willing or able to say more, 0.5% were an open band estimate given by the respondent followed by the hot deck imputation (i.e., the respondent provided a lower limit income estimate but no upper limit) 2.9% were closed band followed by a hot-deck imputation (i.e., a closed interval that the respondent believed contained the income), 49.9% of the responses were zero (which is taken as a valid response) and 44.1% were exact responses (i.e., continuous). Thus the sum of the first two columns, 94.0% for wage and salary income by the benefit unit during wave 1, is the proportion of the sample that is considered to have responded accurately. Because these reporting rates were typically quite high, none of the imputed incomes was abstracted from the source files.

The very detailed data in Table Appendix C is summarised into types of income that are included in the abstracted data set as the variables in Table 18. The nomenclature for the variables in Table 18 is that the stem or first word in the name is a reference to the source of the income and whether it is equivalised (e.g., totinc is total income that has not been equivalised, and eqtotinc is equivalised total income). The second word, which is either bu, r, or p, refers to income for the benefit unit, respondent (i.e, the core survey member in our data) or partner, respectively. The last word, _s, indicates that these are summary variables, or equivalently, that they contain the income information that was accurately obtained from the survey and does not contain imputed values.

For some components of income in Table 18 (generally, the larger, more important categories), one can obtain a series of data that includes incomes that were imputed by the hot-deck procedure described above. The suffix "_f" implies the variable is a validation flag that indicates that the observation is valid (non-missing), or was not imputed, or was taken from a respondent living in an institution, which requires a more complicated imputation (Natcen Social Research, 2013b). The suffix "_t" indicates a variable that flags the type of imputation that was required, if any, using the categories given in the header to Table 18. Finally, the variables with the suffix "_ni2", "_ni3", and "_ni4" are counts of the number of components of the given income variable that were imputed for the associated value of the variable with the suffix "_t" or a higher value, t=2 is a closed band, t=3 is an open band, and t=4 is missing (Natcen Social Research, 2013b). The ELSA survey datasets contain these variables as guides for the quality of the data. For example, if a data user extracts an income series that contains imputed income, then a value of "0" in a variable whose last word is "f" indicates that no imputation had to be performed for that particular observation. The data extracted for the analysis contains no income data that was imputed,

so the variables whose last letters are either t, f, ni2, ni3, or ni4 can, in fact, be dropped without losing any useful information.

Table 18 Income variables in the ELSA data set

Income Source	Variable name	Description
Total income	totinc_bu_s	Total benefit unit income = sum of employment income self-employment income state benefit income state pension income private pension income asset income other income
	eqtotinc_bu_s	The equivalized version of totinc_bu, i,e,, adjusted for benefit unit size
Employment income	empinc_bu_s	Benefit unit income from employment
	eqempinc_bu_s	Equivalised version of empinc_bu_s
	empinc_r_s	Respondent's income from employment (individual)
	empinc_p_s	Partner's income from employment
Self-employment income	seinc_bu_s	Benefit unit income from self-employment
	eqseinc_bu_s	The equivalised version of seinc_bu_s
	seinc_r_s	Respondent's income from self-employment
	seinc_p_s	Partner's income from self-employment
Annuitized Income	ppinc_bu_s	Benefit unit annuitized income (private pensions and other annuity)
	eqppinc_bu_s	The equivalized version of ppinc_bu_s
	ppinc_r_s	Respondent's annuitised income
	ppinc_p_s	Partner's private pension income
State pension income	spinc_bu_s	Benefit unit state pension income
	eqspinc_bu_s	The equivalised version of spinc_bu_s
	spinc_r_s	Respondent's state pension income
	spinc_p_s	Partner's state pension income
State Benefit Income	beninc_bu_s	State benefit income for benefit unit
	eqbeninc_bu_s	The equivalised version of beninc_bu_s
	beninc_r_s	Respondent's state benefit income
	beninc_p_s	Partner's state benefit income
Asset income	assinc_bu_s	Benefit unit income from assets
	eqassinc_bu_s	The equivalised version of assinc_bu_s
Other income	othinc_bu_s	Benefit unit other income (mainly income from people outside the household such as child support payments)
	eqothinc_bu_s	The equivalised version of othinc_bu_s
	othinc_r_s	Respondent's other income
	othinc_p_s	Partner's other income

Source: Taylor, et al., 2007, p. Appendix F

3.6.3   Similarities and differences of income variables between the two datasets

In order to harmonise the income variables of the two datasets, it is necessary to aggregate income sources into broad categories: a) income from employment, b) income from self-employment, c) income from private pensions and annuities, d) income from a public pension, e) income from benefits and welfare transfers, f) income from assets, and g) income of other household members[24].

Comparing the level of detail on information on income from public pension, private pension, and benefits and welfare transfers, it is evident that the sets of information are very complicated and differ substantially between the two countries due to different institutional settings and welfare systems. KLoSA contains all income sources mentioned above and other income sources were also included such as income from agricultural and fisheries activities and other self-managed business. However, the ELSA does not provide such information about agricultural and fisheries but it contains a detailed sequence about the income payments of other household members. There are some differences and similarities in the unit of measurement across income-related questions between the two surveys (see Table 19). Income sources can be answered at the individual level, at the couple level, and at the household level. In the KLoSA case, such information is always provided at the individual level and may not be available for those spouses who are not age-eligible for the interview.

Table 19 The unit of measurement

Income sources	ELSA	KLoSA
Income from employment	Individual Level	Individual Level
Income from self-employment		
Income from private pensions and annuities	Couple Level	
Income from public pension	Individual Level	
Income from benefits and welfare transfers		
Income from asset	Couple Level	
Income of other household members	Individual Level	Household Level

Source: (Angrisani and Lee, 2011)

In the ELSA, each respondent provides information about his or her earnings and self-employment income. The other income questions are answered either by respondent or

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[24] The ELSA extracts the total labour or non-labour income received by other household member beside the respondent and his/her spouse, while The KLoSA extracts the total amount of household income including payments received by family members other than the respondent and spouse.

spouse if the finances are kept together, or by each respondent, if couple keeps their finances separately (see Table 20 below). The KLoSA asks all income questions to each respondent. All income payments may be reported before or after taxes. In the KLoSA, incomes are all typically reported after taxes whereas, in the ELSA, some are reported before taxes and some are after taxes. Both the KLoSA and the ELSA used unfolding bracket questions to obtain at least partial information whenever respondents are unwilling to provide or do not know exact amounts.

Table 20 Summary of who answered on income questions between the two countries

Income sources	ELSA	KLoSA
Income from employment	Each Respondent	Each Respondent
Income from self-employment		
Income from private pensions and annuities	Respondent or spouse	
Income from public pension		
Income from benefits and welfare transfers		
Income from asset		
Income from other household members		
Income from family members (family transfers)		

Source: (Angrisani and Lee, 2011)

3.7 Empirical choices

There are a number of methodological issues that arise when exploring the concept of income mobility, and operationalising it using the longitudinal dataset for both countries. In this thesis, income mobility focuses on money-based measures in contrast with other measurement methods such as multidimensional measures (Mack and Lansley, 1985; Gordon and Pantazis, 1997; Maasoumi, 1998; Tsui, 2009) or consumption-based measures (Meyer and Sullivan, 2003; Krebs et al., 2013). Therefore, it is necessary to discuss what choices have been made for this paper before analysing the dataset:

- The coverage of income sources
- The choice of the unit of analysis
- The choice of the equivalence scale and price indices
- The dependent variables for each RQs

3.7.1   Coverage of income sources

In order to avoid a potentially biased picture of how older people's income changes over time, it is important to measure income as comprehensively as possible and take into

account all available sources of income. However, it is well documented that including comprehensive income sources for data analysis potentially creates measurement error, as it is difficult to measure non-cash types of income sources, for example, access to health care, social care, and home ownership (Jenkins, 2011). People who own their own home may have an income advantage compared to those people who rent their home. In practice, this is difficult to measure as there is no relevant information on the cost of ownership (ibid). In addition, not many longitudinal surveys collect this type of non-cash income source or capital gains information due to the difficulty of setting on robust practical methods. For these reasons and the fact that this research focuses on income mobility and is concerned with the dynamics of the wellbeing of older people, it will exclude non-cash income sources from the data analysis.

Income in all four RQ refers to disposable income. Disposable income refers to cash income from all sources including labour earning (both employment and self-employment), social transfer (pension and benefits) less outgoing income such as social security contribution and income tax. The reason for using disposable income as the standard is that income, after being affected by national taxes and social welfare policies (namely, the redistribution policy), is actually used to approximate one's material welfare (Office for National Statistics, 2014).

3.7.1.1 Households and Individuals

There are two distinct analytical issues when one wants to summarise the financial wellbeing of older people. The first is that older people are most likely to share their income with other household members. This issue concerns the pooling and sharing of incomes within households (Zaidi, 2008). If we analyse employment earnings only, this does not pose a challenge as it is a one-to-one relationship between the wage earner and the wage recipient (Jenkins, 2011). This is no longer true when we analyse income at the household level. This is because many older people may not receive any employment-related income in their own name, yet they may receive some income from their child or partner which ensures a certain degree of consumption through sharing income within the household (ibid). The problem is that the actual within-household distribution is unobserved, and the sharing rule is likely to vary across households (Falkingham and Baschieri, 2009). In addition to this unobserved within-household distribution, there is a second issue related to the differences in the household composition, time periods, and between countries, therefore, it brings out the question concerning equivalence scales and price indices. This issue will be dealt further in the subsection 3.7.3 discussing the choice

of the equivalence scale and price indices.

3.7.2   Choice of the unit of analysis

This thesis follows the most employed method in income mobility analysis according to which within each household, incomes are pooled and shared by household members. Therefore, the demographic unit of account for the income is the household, however, the focus of the analysis is the unit of the individual. This is because this thesis concerns the financial wellbeing of older people within the population. This is particularly important from a longitudinal perspective due to households being difficult to follow over time in a consistent manner compared with individuals as household members change over a period time. For instance, research (13th year of the US PSID) by Duncan (1983) shows that only 12 per cent of the originally assigned sample remain unchanged in their household members while more than half were headed by someone other than the originally assigned sample. This indicates that it is not desirable to focus on the 'longitudinal household' in economic mobility analysis (Jenkins, 2011).

Furthermore, focusing on households without any compositional change selects a group that is unrepresentative of the population as a whole, and therefore undesirable. This argument has been demonstrated in a developing country context by Rosenzweig (2003), who shows that focusing on households who do not experience any splits leads to 'substantial' biases in estimates of economic mobility. Therefore, this thesis tracks elderly individuals' income over time while assessing the family composition and income of the household which they belong to.

3.7.3   The choice of the equivalence scale and price indices

There are issues of how can we measure the within-household income allocation, and how to compare incomes across individual units with different household composition, and located in different countries. The adjustment with equivalence scales recognises that the same income does not imply that the same lifestyle is affordable for households of greatly different size (Ayala and Sastre, 2008). However, equivalence scales do recognise that households are subject to economies of scale (Jenkins, 2011). For example, a household that doubles in size from one person to two does not require twice as much square footage or twice as many dishes, refrigerators, vacuum cleaners and so on as before. The comparison of equivalised income with per capita income draws out the importance of two income earners in producing equivalised income – a single head of household who gains a

partner that earns the same income as he/she does not gain per capita income but will gain equivalised income because the weight of the second person is less than one.

With the help of equivalence scales each household type in the population is assigned a value in proportion to its needs. There are a number of factors are taken into account to assign these values such as 'size of the household' and 'the age of its members' (whether they are adults or children). There exist a wide range of equivalence scales (see review by (Atkinson et al., 1995) and the most commonly used scales in the income inequality and poverty literature are as below:

- **OECD equivalence scale:** this scale is commonly known as Oxford scale or old OECD scale which is a useful tool for the countries which have not established their own equivalence scale. This scale assigns a value of 1 to the first household member, of 0.7 to each additional adult and of 0.5 to each child.

- **OECD-modified scale:** this scale was proposed by Haagenars *et al.* (1994) in the early 1990s. Since then it has been widely used in many studies, including official statistics of HBAI from DWP. This scale assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.4 to each child. This scale is currently used in Eurostat statistics on income distribution, including at-risk-of-poverty statistics.

- **Square root scale:** this scale has been used in recent OECD publications (e.g. OECD 2011, OECD 2008) and it used particularly for the studies focus on comparing income inequality and poverty across countries. This scale divides household income by the square root of household size.

Table 21 Different equivalence scales

Household size	Equivalence scale				
	Per-capita income	OECD scale (Oxford scale)	OECD modified scale	Square root scale	Household income
1 adult	1	1	1	1	1
2 adults	2	1.7	1.5	1.4	1
2 adults, 1 child	3	2.2	1.8	1.7	1
2 adults, 2 children	4	2.7	2.1	2.0	1
2 adults, 3 children	5	3.2	2.4	2.2	1
*Elasticity**	1	0.73	0.53	0.50	0

* Using household size as the determinant, equivalence scales can be expressed through an "equivalence elasticity", i.2. the power by which economic needs changes with household size. The equivalence elasticity can range from 0 to 1. The smaller the value for this elasticity, the higher the economies of scale in consumption.
Source: OECD Project on Income Distribution and Poverty

Table 21 above illustrates how needs are assumed to change as the household size increases. In general, there is no agreed method for determining equivalence scales. The selection of a particular equivalence scale depends on technical assumptions about economies of scale in consumption as well as on value judgements about the priority assigned to the needs of different individuals such as children or older people. These judgements will affect results. For instance, if the researcher uses equivalence scales that give greater weight to each additional household member, the poverty rate of children will be higher compared to older people (Förster, 1994). Therefore, in choosing a particular equivalence scale, it is important to consider its potential effect on the level of outcomes (e.g poverty) and the size of the focused population and its composition.

In the ELSA data, household incomes are given by type and are generally the sum of spouse and respondent income. However, KLoSA is focused on individuals which mean that the conditions of households are collected to understand the conditions of individuals. In KLoSA data, the household income is just a total household income (respondents' answer on total household income) and does not include, for example, income sources such as business income and wage income by household. In other words, although details on income for individual respondents are provided in the data, it is not possible to obtain this detail for households because there is no data available for incomes of all the people living in the households. Therefore, in order to perform cross-national comparisons, the choice for the equivalence scales which will be used for this thesis is 'Square root scale'. This decision is influenced by the fact that KLoSA data is not possible to obtain income sources of other members of the household, that this thesis is principally a comparative study between Korea and England. In addition, 'Square root scale' is one of the most commonly used in international scale and is very similar to the OECD-modified scales in the above table, which many researchers prefer to use for cross-national comparisons studies. Examples can be found studies by Aaberge et al. (2002) on income inequality and income mobility in the Scandinavian countries compared to the US, and in Zaidi (2002) jointly with De Vos which provides comparative studies on income mobility of older people between Great Britain and the Netherlands.

Because the income of the both datasets is measured using its nominal form and included the inflation index as the standard, it is limited in measuring the changes in actual

income.[25] Accordingly, using the consumer price index provided by the OECD (stats), it will measure the actual income (see Table 22). In addition to this, after adjusting for inflation using Consumer Price Index (CPI) indices to each country's own currency, it will be converted to US dollars using the Purchasing Power Parity (PPP).

Table 22 Korea and England's Consumer Price Index

Country	Year				
	2006	2008	2010	2012	2014
Korea	88.1	94.5	100	106.3	109.1
UK	89.4	94.8	100	107.4	111.8
OECD	91.9	97.7	100	105.2	108.7

Note: Index, 2010 = 100
Actual income = (nominal income / (2010=100) consumer price index)*100
Source: http://stats.oecd.org

3.7.4 The dependent variables for each research questions

3.7.4.1 RQ 1 Fields and Ok (1996) mobility index and Income trajectories

RQ 1 analyses the absolute income mobility among older people in England and Korea from a macroscopic perspective. Absolute income mobility analyses using a Fields and Ok (1996) mobility index for older people between measured years 2008 and 2012, using 2006 as the base year. Fields and Ok's absolute mobility measures how much income mobility is observed from initial year to final year. The measure is defined as below:

$$m(x,y) = \frac{\sum_{i=1}^{N} |x_i - y_i|}{\sum_{i=1}^{N} x_i}$$

Where N is the number of individuals in the population, x_i is the income in the initial year of individual i and y_i is the final year income of same individual i.

Second is the measurement of income trajectories using a *six-categories* income mobility outcome variable that is developed by first Gardiner & Hills (1999), subsequently Zaidi,

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[25] If some individuals received a monthly pay of £1,000 in 2008, and again received £1,000 in 2011, it appears as though there has been no income mobility from the absolute value, but due to inflation, in actuality, the 2011 income would be below the 2008 income. Because of this, it is necessary to convert actual income by applying the price index.

Rake & Falkingham (2001), Zaidi & De Vos (2002), and Sefton & Rigg (2004). Six categorical variables are as follow:

Flat: no significant income change observed over the four waves. All observations within a band of plus or minus 15 quasi-percentiles from the mean.

Flat with blips: similar to the "Flat" category, but with one wave or two blips, defined as a deviation of more than 15% quasi-percentiles from the mean, in either direction.

Rising: income movement from wave to wave is either upwards or flat (with a change of more than 15% quasi-percentiles at least once).

Falling: income movement from wave to wave is either downwards or flat (with a change of more than 15% quasi-percentiles at least once).

Fluctuating: income movement from wave to wave starts with up → fall → up or fall → up → fall over the measured periods.

Other: all other possible income movements not included in the above five types (It should be noted that, if a blip occurs in the first or last wave, it cannot be classified for these purposes as blip or the start of a rising or falling trajectory).

This approach offers to summarise the characteristics of income mobility using the income information for the covering periods. It quantifies the income mobility outcomes basis on the different thresholds of income changes and whether income is moved up/down or fluctuated (Zaidi et al., 2004). The necessary variables are the above six categories and income from the base year to the measured years.

3.7.4.2   RQ 2: Rank-mobility index, transition matrix

Addressing RQ1 requires an analysis of the relative income mobility of older people in England and Korea from a macroscopic perspective. Relative income mobility is analysed using 2006 as the base year and 2008-2012 as measured years, using the rank-mobility index of older people and a transition matrix.

First is the measurement using the rank-mobility index. This is measured using the rank-mobility calculation suggested by Wodon and Yitzhaki (2001). The variable necessary to calculate the rank-mobility index is the covariance between incomes and income ranking. Therefore, as mentioned before, the actual household equivalised disposable income is

used as the standard, and the ranks for the disposable income of older people are measured based on where the disposable income of older people fell relative to the income of the younger adults population between 2006 and 2012. In other words, the analysis is conducted using the entire studied population as an object and ranking the incomes from 2006-2012 for each wave, starting with 1 and going up to the highest income (1 being the smallest value and the next smallest being 2), if the values are the same, then they are assigned the mean rank.[26] In this way, the relative income ranks for elderly and non-elderly people and the covariance between income and income rank for older people in England and Korea will be measured.

After this basic work is completed, the rank-mobility index was measured. The method for calculating the income-mobility index is $S = \frac{(1-\Gamma^{12})G^1+(1-\Gamma^{21})G^2}{G^1+G^2}$. The rank-mobility index (S) is composed of the Gini index G of the base year and the measured years and the covariance index Γ between the rank and income of the base and measured years. In other words, controlling the degree of income inequality for the relevant years, rank-mobility is calculated using Γ, which measures whether the measured years' rank is due to the base year's rank. Γ is $-1 < \Gamma < 1$, and when $\Gamma = 0$, the base year's rank and the measured years' ranks have no correlation. $\Gamma = 1$ means that there is an extremely high correlation, and $\Gamma = -1$ means that there is inverse mobility between the base year's rank and the measured years' ranks. Based on these results of Γ, the rank-mobility index (S) has a value of $0 \leqq S \leqq 2$. If $\Gamma = 0$, it becomes closer to $S = 1$, and this means that there is much income mobility. If $\Gamma = 1$, $S = 0$ and there is no income mobility or very little. If $\Gamma = -1$, then $S = 2$. Specifically, if $1 < S < 2$, there is inverse income mobility between the high groups and the low groups, and if $S = 2$, it can be said that there is perfect inverse mobility between the two groups.

Second is the measurement using a 5 x 5 transition matrix. This measures the direction in which income mobility has taken place. Rank mobility is limited in their ability to measure the direction of income mobility. Therefore, income was divided into five parts (quintiles) by year, and using a 5 x 5 matrix for between the base year and the measured years, it analyses the ratio of each part for the base year that stayed the same in the measured years, as well as in which direction movement took place. This has the advantage of expanding

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[26] For example, if there are two values with the third smallest value, the rank of the observed value of both of them becomes (3+4)/2 = 3.5.

the analysis of rank-mobility and making it possible to consider in depth the phenomenon of relative income mobility. In addition to this, a graphical tool developed by Van Kerm (2011) will be used to present transition probabilities. Movements between income groups over time can be shown by the extent to which the original groups (origin) end up in different income groups at their destination.

3.7.4.3   RQ3 Fields and Ok (1996) and Chakravarty, Dutta and Weymark (CDW) index

RQ 3 analyses what determines income mobility differences across in England and Korea using the decomposition of axiomatic and welfare measurements of mobility suggested by Fields and Ok (1996) and Chakravarty, Dutta and Weymark (CDW) (1985), subsequently developed further by Ruiz-Castillo (2000).

Fields and Ok (1996) say that income mobility develops as the result of two causes—one refers to the change in the total income amount as growth components, and the second refers to the income transfer between individuals as transfer components.

$$m_n\,(x,y) = \frac{1}{n}\sum_{j=1}^{n}\left|\log y_j - \log x_j\right| = G_n(x,y) + T_n\,(x,y)$$

$$K\,(x,y) = \frac{1}{n}\sum_{j=1}^{n}(\log y_j - \log x_j)$$

$$T_n\,(x,y) = \frac{2}{n}\left(\sum_{j\in L_n(x,y)}^{n}(\log x_j - \log y_j)\right)$$

(*L*: the set of households for which income decreased over time)

The growth component (*K*) refers to the income change due to economic growth, and the transfer component (*T*) refers to the income change that generates exchange mobility due to the income transfer between households with decreasing income and households with increasing income. The transfer component is rounded to two times the sum of the difference between each individual's base year log income and the measured years' log income for those whose income decreased. This is because the individuals whose income grew gained the diminished income of those individuals whose income decreased, so it is counted as twice as much.

In addition to this, using the CDW index, Ruiz-Castillo (2004) formulate as below which mobility can also be broken down into three components: structural mobility (SM), exchange mobility (EM) and growth mobility (GRM) (Ayala and Mercedes, 2007).

$$M_{CDW}(x,y) = SM(x,u) + EM(x,u) + GRM(x,y,u) =$$

$$\left\{ \frac{I(x)-I(z_c)}{1-I(x)} \right\} \times 100 + \left\{ \frac{I(z_c)-I(z)}{1-I(x)} \right\} \times 100 + \left\{ \left\{ \frac{I(x)-I(z)}{1-I(x)} \right\} \times 100 - \left\{ \frac{I(x)-I(v_a)}{1-I(x)} \right\} \times 100 \right\}$$

The $SM(x,u)$ refers to the structural mobility caused by the differences between the initial and final distribution, once the re-rankings between those distributions have been eliminated, and when mean income constant is maintained at the initial level. The term $EM(x,u)$ describes re-rankings associated with the transition between the initial and final distribution. Finally, $GRM(x,y,u)$ reflects the mobility caused by income growth.

3.7.4.4   RQ4 Income mobility of older people index

In RQ 1-3, if income mobility was analysed macroscopically, in RQ 4, in order to contribute to the upward and downward actual income mobility of older people, from a microscopic perspective, it analyses the factors that affect absolute income mobility. In order to do so, the author employs Zaidi and De Vos's (2002) multinomial logistic regression and use five categories of income mobility variable as a dependent variable. These five income mobility outcome variables are defined as follow:

1. Fall, more than 15%: Long-range downward income mobility

2. Fall, 6% to 14%: Short-range downward income mobility

3. Less than 5% change: No income mobility

4. Rise, 6% to 14%: Short-range upward income mobility

5. Rise, more than 15%: Long-range upward income mobility

The statistics program used for all analysis for RQs was STATA 13/MP.

3.8   Explanatory factors of income mobility

The factors that influence income mobility describe the independent variable of RQ 4. The choice of explanatory variables follows previous literature as discussed in Chapter 2

Literature Review: they mostly summarise the demographic factors (gender, age, marital status, and living arrangement), the health status factor, human capital factor (education), labour market factors (changes in employment status), and social welfare system factor.

3.8.1   Demographic Factors

3.8.1.1   Gender

The literature suggests that gender plays important role in influencing the economic status of older households (Choudhury and Leonesio, 1997, Willson and Hardy, 2002). Evidence shows that gender affects the income mobility differently by the income classes (low, middle, high) per measuring periods, and disabled female older people showed higher risk of downward mobility and change in income (Zaidi, 2008). In addition, according to the study by Nam (2015), the downward mobility group had a higher chance of having a female head of household than a male head of household. Similar results are shown in Zaidi et al's (2004) study that male individuals who became widowed had an upward income mobility. However, it was only statistically significant for the German case which shows the important role played by a country's pension system.

Zaidi (2008) also found that there is an increased likelihood of income mobility being associated with the death of a partner. Women are significantly more likely to face downward income mobility than men in this case. This highlights the importance of incorporating gender in the analysis of income mobility of older people (Nam 2015). In operationalising gender as an explanatory variable, the original variables DISEX was used from the ELSA and w01gender1 from the KLoSA to derive a new binary variable named Gender. The newly created Gender was coded as 1 male and 2 female for both datasets.

3.8.1.2   Age

Literature has identified that age is associated with income changes in later life. For example, Johnson and Stears, (1998) argue that younger pensioners and those people nearing retirement tend to have higher incomes than the previous generations they follow. Bardasi and Jenkins (2002) also found that people who were close to their retirement experienced both economic activity rates and work hours declined in the years leading up to retirement and that household income also declined. Zaidi's (2008) study on the covariates of income mobility in old age also confirmed similar result but, interestingly, the oldest age group is likely to experience upward mobility as age. This may due to the entitlement of additional benefits related to disability as one becomes frail.

In operationalising age as an explanatory variable, the original variables DIAGR was used from the ELSA and w01A001_age from the KLoSA in order to derive a new variable named Age.

3.8.1.3   Living arrangement

Zaidi et al. (2001) suggest that older people who live in multi-person households have significantly different income mobility compared to that of older people who live alone or with their partner only. Zaidi (2008) also identifies that both men and women who experience changes in living arrangements face greater income mobility.

In Korea, a higher number of elderly persons in the household lowers the possibility of raising that household's income class, while it also increases the possibility of lowering the household's income class (Lim, 2011). In particular, the data from the lower-income class is significant, suggesting the need to support older households to improve their income mobility. In the results of various studies, the number of employed persons in the household had different effects, depending on that household's income classes. However, this factor was commonly indicated to be a factor which increased household income (Jenkins, 2011; Kim et al., 2012; Seok, 2010; Lim, 2011; Sawhill, 2000; Woolard and Klasen, 2004).

To construct the new variable 'lvgarr' (living arrangement), the study used the original variables 'painhh' and 'mainhh' from the ELSA and w01B026 w01Ba60_01 w01Ba60_02 w01Ba60_03 w01Ba60_04 w01Ba60_05 w01Ba60_06 w01Ba60_07 w01Ba60_08 w01Ba60_09 w01Ba60_10 from the KLoSA.

3.8.1.4   Marital status

Changes in a person`s marital status affect income dynamics of all age groups but are one of the important factors affecting income mobility in old age, since the transition to widowhood is one of the most important demographic transitions that affect older people (Zaidi, 2008). A study by Burkhauser et al. (2001) also confirms that the death of a partner is associated with significant changes in the financial situation of older people. It is also found in many studies that both widowhood and single marital status (separation or divorce) is strongly associated with negative income movement, low income and poverty in later life (Sefton et al., 2011; Glaser et al., 2009; Zaidi, 2008; Price, 2008; Albuquerque et al., 2006; Ginn, 2003; Bardasi and Jenkins 2002; McLaughlin and Jensen, 1993).

To operationalize this explanatory variable, the original marital status variable called 'DIMAR' from the ELSA data and 'W01A006' from the KLoSA data was transformed. It was then renamed as 'marsta'. This newly created variable simplified the original variable by grouping the similar categories into one category. For example, those categories of 'legally separated' and 'divorced' were placed into one category of 'divorced'. Also, categories of 'married, first and only marriage', 'a civil partner in a legally-recognised union', and 'remarried, second or later marriage' were merged into the new category of 'married'. In order to examine the changes or no changes in marital status during the measured period, new categories were created such as 'remained a couple', 'remained widowed', 'remained divorced', 'remained single', and 'became widow'.

3.8.2   Health factor

There is a strong tradition in the economics literature for investigating whether health might influence income (Benzeval et al., 2014). The main hypothesis across both economic and social epidemiology literature is that poor health limits a person's ability to access employment. This may mean that people are not able to apply for paid employment or lose their job once they become ill or retire early (Martikainen et al., 2003), with a consequent reduction in their income. It may also mean that they need to take less strenuous or stressful roles or only work part time, which again may result in a reduction in income. In general, evidence suggests that health is more likely to affect whether people can take paid employment than to influence the sorts of occupations they may be able to take (Stronks et al., 1997).

Although health factors are less common than employment or demographic events, for the individual households concerned, it can be influential on one's income in later life. Becoming ill or disabled could contribute to intragenerational mobility either because of the effects of illness on one's ability to work or because of medical expenses (Kronstadt, 2008). In addition, elderly persons with disabilities could improve their income when taking into account social transfers like disability benefits and cash payments by the government, especially, for those people in lower income class who are entitled to receive state benefits (Zaidi et al., 2002).

In order to analyse the health factor in elderly persons' income mobility, the original variables relating to respondents' health status within the both datasets called 'w01c005' (limitation of activity by health) 'w01c001' & 'w01c152' (respondent's subjective health)

from the KLoSA and 'hlwrk' (health problem limits the work), 'hehelf' and 'hegenh' (respondent's subjective health) form the ELSA were used.

As to different scales[27] were used for the self-reported health status variable between the waves in ELSA, a new variable was created [health] and recoded into three categories 'poor or very bad', 'fair', 'good or excellent'. Similarly, a new variable was created for KLoSA with three categories and matched scales with [health].

3.8.3 Human capital factor (educational qualification)

The 'Education' in the human capital theory is an important factor in mobility (Birdsall & Graham, 2000; Rycroft, 2009). The educational variable is the contributor as well as the result itself of the mobility pattern. In studies on the income mobility, the education is considered as a significant variable and affects the mobility or inequality.

As shown in Table 23, the level of education in the ELSA is composed of: Not applicable, NVQ4/NVQ5/Degree or equlv, Higher ed below degree, NVQ3/GCE A Level equlv, NVQ2/GCE O level equlv, NVQ1/CSE other grade equlv, Foreighn/other, No qualification. In KLoSA, the level of education is composed as: No formal education (illiterate), No formal education (capable of reading), Elementary, Middle school, High school, Two-year college, college grad, Master, Doctor.

For cross-nationally comparative research, it is often desirable to code country-specific educational qualifications into categories capturing their closest equivalents in other countries. Two categorical coding schemes that are known in use for this purpose are CASMIN and ISCED2011. This thesis used the ISCED 2011 education attainment classification for England and Korea (see Table 24).

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[27] In wave 4 and 5, the scales are: Excellent, Very Good, Good, Fair, and Poor. In wave 3 and 6 scales are Very good, Good, Fair, Bad, and Very Bad.

Table 23 ISCED 2011 classification of educational qualification with original categories in
education variable of ELSA and KLoSA

ISCED2011	Level	ELSA	KLoSA
Pre-primary No qualification	0	No qualification	No formal education (illiterate, capable of reading)
Primary education	1	NVQ1/CSE & Foreign / other	Elementary
Lower secondary	2	NVQ2/GCE O	Middle school
Upper secondary	3	NVQ3/GCE A	High school
Post secondary	4		
Short-cycle tertiary	5	Higher ed below degree,	Two year college
Bachelor's or equivalent level	6		College grad
Master's or equivalent level	7	NVQ4/NVQ5/ Degree	Master
Doctor or equivalent level	8		Doctor

Source: author's own analysis using UNESCO Institute for Statistics (2012), International Standard
Classification of Education ISCED 2011, KLoSA Wave 1 User Guide (2006) & Banks et
al., (2003) Health, Wealth and Lifestyles of the older population in England (Wave 1
report)

Because the respondents of the current study are the older cohorts of individuals and many
of them have no formal or low educational qualification particularly female elderly persons
who are from a generation when their main role was housekeeping and caring for a
children or elders (Scholes et al., 2008), the variable categories were adjusted into three
groups (as shown in table 24) and was named 'edu' for both datasets.

Table 24 Educational qualification category coding

New group	ISCED2011	Level	ELSA	KLoSA
Low	Pre-primary No qualification / Primary education / Lower secondary	0 1 2	No qualification, NVQ1/CSE & Foreign / other NVQ2/GCE O	No formal education (illiterate, capable of reading) / Elementary Middle school
Middle	Upper secondary Post secondary Short-cycle tertiary	3 4 5	NVQ3/GCE A Higher ed below degree,	High school Two year college
High	Bachelor's Master's or equivalent Doctor or equivalent	6 7 8	NVQ4/NVQ5/ Degree	College grad Master Doctor

Source: author's own using International Standard Classification of Education ISCED 2011 and
        ELSA and KLoSA data

3.8.4   Employment factor

Much literature identifies that changes in the employment status of older people (from employed to retired) is associated with a decrease in income and raises the likelihood of poverty (Bardasi and Jenkins, 2002). Zaidi (2008) suggests that leaving the workforce significantly influences changes in the income of older people, particularly affecting downward income mobility.

In ELSA, the original employment status variable [Wpdes] includes counts of employed, self-employed, unemployed (i.e., not employed but actively seeking work), retired, looking after home or family, adds looking after home or family to the categories in the self-response variables and several catch-all categories (see table in Appendix D for coding details). This variable was used to derive a new variable [empst] and recoded into three categories of 'Unemployed', 'Retired or Semi-retired', 'Employed or Self-employed' the other variable [Wpdes_R] recodes the catch-all categories into a combined catch-all category and [Wpever] asks if the respondent has ever done any paid work, which has a large number of not applicable responses because the respondent is not disabled. The variable used for the analysis is as follow:

Table 25 Employment related variables included in the data set

Data	Variable name	Definition
ELSA	wpdes	Employment status of respondent
	wpever	Have you ever done any paid work?
	wpdes_R	Recode of wpdes that combines, other, refused, and don't know
KLoSA	W01D001, W02D001, W03D001, W04D001	Currently work?
	W01D005, W02D005, W03D005, W04D005	Job searching activity
	W01D010, W02D006 W03D006, W04D006	The respondent's status of labour market (retirement status)

Source: author's own using ELSA and KLoSA data

In contrast, KLoSA, the original work status variable [W01D001, W02D001, W03D001, W04D001] simply asked whether or not the respondent is currently working and no additional information is available, thus, this variable was used to derive a new variable named [empst] (see table in Appendix E). Because there is a separate question asking if the respondent is retired or not, it used the retirement status variable was used [W01D010, W02D006, W03D006, W04D006] (see table in Appendix F for coding details) and then, the category of 'Retired' was imputed among the unemployed category in the [empst] variable.

3.8.5   Social welfare system factor

One's social class mobility can be promoted by removing instances of so-called social disorder such as gender discrimination, unfair education opportunities, and unequal family backgrounds through redistribution policy and welfare systems (social security and benefits), and by taking back the privileges from individuals in order for them to utilize their own ability fully (Markanya, 1984).

Therefore, the welfare system becomes a significant factor in increasing income mobility (Kim et al., 2013), and the social security maintains or pushes the minimum standard of living upward (Graham et al., 2012). According to Sen's (1999) capability point of view, the social protection not only keeps people surviving, but also is considered as a mechanism for them to invest in their ability to better function or productivity (Graham et

al., 2012 recited). Especially, many studies proved the expansion of the social welfare system with re-distribution purpose eased the income inequality and the poverty in the market standard (Atkinson et al., 2002).

Moreover, public transfer income plays an important role in helping older people to escape extreme deprivation. This is cash income that comes to older people from the state. According to the both datasets, public transfer income includes social security benefits, health-related benefits, old age benefits, and benefits from the national pension systems.

If examined in detail, social insurance pay refers to public pensions, employment insurance, and workers' compensation, and other government aid includes disability allowance, basic old-age pension, single-parent family support, home care allowance, agricultural and fishing government aid (Korean case), emergency welfare support, voucher support, energy reduction (fuel benefits for England), and so on.

The original variables that used to derive a state pension and benefits are already showed in Table 16 for KLoSA and Table 18 for ELSA.

3.9   Analysis contents and methods

All statistical analysis results for England and Korea have been produced by using data from the ELSA and KLoSA, with four waves each covering the period between 2006 to 2012. The analysis contents for each RQs are summarised in Table 26.

Table 26 Analysis content based on RQ 1-4

RQ	Analysis Method	Measurement
RQ1. Analysis of the absolute mobility of older people in England and Korea?	Fields and Ok (1996) mobility index	$m(x,y) = \dfrac{\sum_{i=1}^{N} |x_i - y_i|}{\sum_{i=1}^{N} x_i}$ N: number of individuals in the population, x_i: income in the initial year of individual i y_i: the final year income of same individual i.
	Income Trajectories (Rigg and Sefton, 2004)	**Flat**: no significant income change observed over the four waves (plus or minus 15 quasi-percentiles from the mean). **Flat with blips** with one wave or two blips, defined as a deviation of more than 15% from the mean, in either direction. **Rising**: upwards or flat (with a change of more than 15% quasi-percentiles at least once). **Falling**: downwards or flat (with a change of more than 15% quasi-percentiles at least once). **Fluctuating**: income movement from wave to wave starts with up → fall → up or fall → up → fall over the measured periods. **Other**: all other possible income movements not included in the above five types.
RQ2. Analysis of the relative income mobility of older people in England and Korea?	Rank Mobility (Wodon & Yitzhaki, 2001)	$S = \dfrac{(1 - \Gamma^{12})G^1 + (1 - \Gamma^{21})G^2}{G^1 + G^2}$ G: Gini index Γ: The covariance between income and rank 1: base year 2: measure years.
	Transition Matrix	1. M(5) × M(5) unit matrix M: income part number (quintile) 2. Graphical tool (Van Kerm, 2011) Transition plots using colours
RQ3. What determines income mobility differences across in England and Korea?	Decomposition of mobility using Fields and Ok' (1996) and Ruiz-Castillo's formula using Chakravarty, Dutta and Weymark (CDW) (1985) mobility index	$m_n(x,y) = K(x,y) + T(x,y)$ $= \dfrac{1}{n}\sum_{j=1}^{n}(\log y_j - \log x_j) + \dfrac{2}{n}\left(\sum_{j \in L_n(x,y)}(\log x_j - \log y_j)\right)$ K= economic growth T= exchange mobility $M_{CDW}(x,y) = SM(x,u) + EM(x,u) + GRM(x,y,u)$ (see section 3.7.4.3 for explanation of Ruiz-Castillo's formula)
RQ4. Analysis of the factors affecting the income mobility of older people	Zaidi and De Vos's (2002) Multinomial logistic regress analysis	- Dependents variable (Five categories as above absolute measure) $\Pr(Y = m) = \dfrac{e^{X\beta^{(5)}}}{1 + e^{X\beta^{(2)}} + \ldots + e^{X\beta^{(m)}}}$

Note: 1) Refer to Chapter 2, Measurement of Income Mobility (section 2.3) for details about the measurement methods for Research Questions 1-4 , 2) Base year: 2006, measured years: 2008, 2010, 2012

For **RQ1**, from the macroscopic perspective, it analyses the changes in the absolute income mobility of older people in England and Korea using 2006 as the base year and comparing it with each of the next three waves between 2008 and 2012 as measured years. It uses Fields and Ok (1996) index and income trajectories using six income categories [(1) flat, (2) flat with blips, (3) rising, (4) falling and (5) other (6) fluctuating or zigzag] developed by first Gardiner & Hills (1999), subsequently Zaidi, Rake & Falkingham (2001), Zaidi and De Vos (2002) and Rigg and Sefton (2004).

For **RQ2**, from the macroscopic side, it will analyse the changes in the relative income mobility of older people in both England and Korea using 2006 (Wave 3 ELSA and Wave 1 KLoSA) as the base year and compare it with each of the next three waves between 2008 and 2012 as measured years. Wodon and Yitzhaki (2001) measured relative mobility using rank-mobility.

Specifically, due to the limitation of rank-mobility in measuring the direction of income mobility, it will use a transition matrix to analyse the direction of mobility by putting two groups into parts (quintiles). In addition to this, a graphical device by Van Kerm (2011) that is developed to help understand the transition matrix easily will be used for RQ2. The advantage of this transition colour plots is that they visually show the extent of mobility in income through the use of colours. For example, Figure 6 presents examples of transition probability plots showing (a) perfect immobility, (b) perfect mobility (rank reversal), and (c) perfect mobility (origin independence). There is a strip for each income group, with the poorest group at the top row (blue) and the richest group at the bottom row (red).

Figure 6 Example transition probability plots, base year, (a) perfect immobility, (b) perfect mobility (rank reversal), (c) perfect mobility (origin independence)
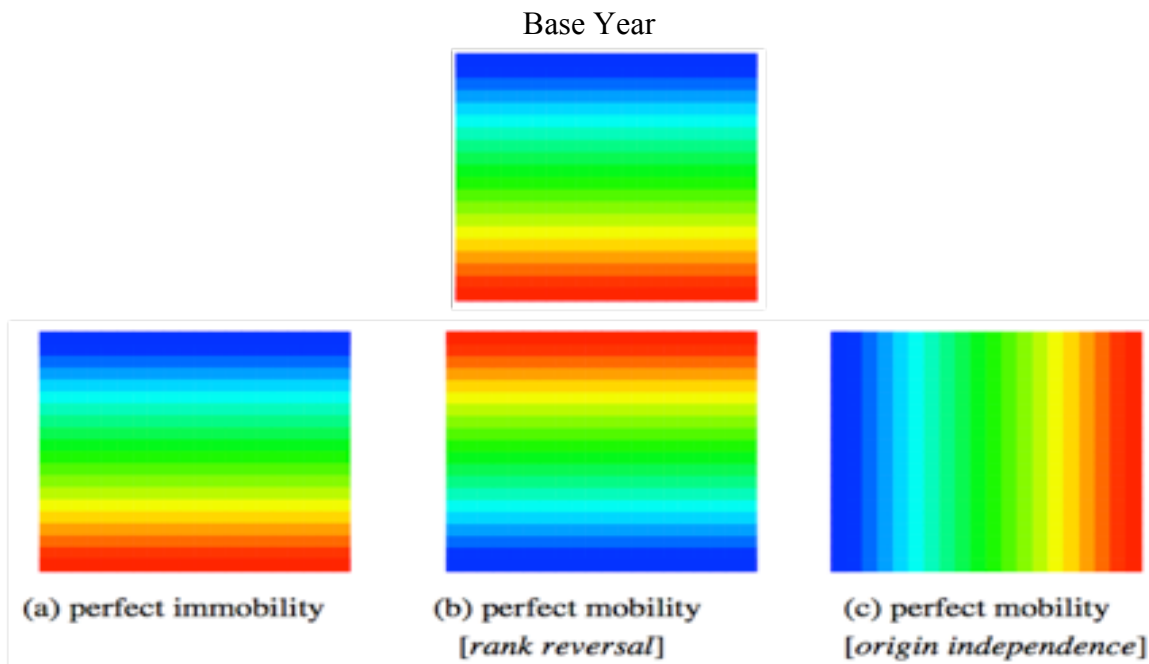
Source: Jenkins (2011) Changing Fortunes Income Mobility and Poverty Dynamics in Britain

An individual's income are colour-coded and divide into 20 equal-sized group according to their income origin in the base-year income distribution. The destination (wave t+1) income decile group is shown on the y-axis. Figure 6 (a) shows no changes in relative position over time, therefore, it is identical to the base-year picture. If there were maximal mobility, then the picture would look as (b) which shows perfect mobility defined in terms of a complete reversal of position. Finally, the last picture (c) presents an example of perfect mobility (complete independence of destination from the origin), as if every individual had an equal chance of moving to another income decile, there would be equal numbers from each origin group in each destination group.

For **RQ3**, using 2006 as a base year and each of the three waves between 2008 (short-term) and 2012 (medium-term) as measured years, the analysis examines what determines income mobility differences across England and Korea. For this, it uses the decomposition of axiomatic measurements developed by Fields and Ok (1996) and that of Ruiz-Castillor (2004) with the Chakravarty, Dutta and Weymark (CDW) (1985) mobility index.

For **RQ4**, from the microscopic perspective, the thesis will analyse the factors that influence the income mobility of older people over the three waves measurement period from 2008 to 2012, using 2006 as a base year for comparison. For the income mobility of older people, it will use Zaidi and De Vos (2002)`s absolute mobility coefficient and

income trajectories to understand the factors that influence the upward or downward mobility in the individual actual income of older people. The statistics programme used for the analysis was STATA 13/MP.

3.10   Limitations of the methodology

It is well-known that there are difficulties in comparing the cross-national data. This type of data is collected in different ways, at different times, by different methods, and are thus not always strictly comparable (Lindner and Comolet, 2007). One of the major methodological challenges for cross-national study is accomplishing a comparability between the data sets in a situation where there are inevitably some variations in the data, such as sampling methods, interview method and language terms used in the questionnaire (Angrisani and Lee, 2011). Although the ELSA and KLoSA data sets used in this thesis collected similar information on demographic, health and socio-economic characteristics, there are some data limitations:

- Even though KLoSA modelled its survey design on the USA's Health and Retirement Survey (HRS), as well as ELSA, the sampling design is somewhat different from ELSA's. For example, ELSA interviewed eligible-age respondents (50 or over) and their partners regardless of their partners' ages, while KLoSA interviewed eligible-age respondents (45 or over) and their partners only when their partners were also at the eligible age or over. Because of this, most of the income components presented in section 3.6 were measured at the couple or individual level for ELSA but at the individual level only for KLoSA. In addition, ELSA provides very detailed information on respondents' partner's employment- and non-employment-related income, while KLoSA only provides the total household disposable income. As a result, without details of "income of other household members" in KLoSA, it was not possible to construct more comprehensive measures of household income data. Although this does not hamper data harmonisation *per se,* it may lead to less accurate comparisons.
- Moreover, while the respondents in KLoSA reported their income after tax, some income sources for ELSA reported before tax and others after tax. This may affect reliability when the two data sets are compared. This is may be due to the survey questions not being clear about whether respondents should answer with reference to their pre- or post-tax income.

- Furthermore, both ELSA and KLoSA adapted an "unfolding bracket" design in order to collect at least partial income information for those respondents who did not want to give exact amounts or simply did not know the amounts. Because the two studies used different income categories and reference periods, this design may affect the income data derived for the mobility analysis.

- Another data limitation is that, since the survey was conducted every two years for both ELSA and KLoSA, it cannot be known whether individuals moved into and out of their income class between the survey years. For example, an elderly person classified as poor in both wave 1 and wave 2 may have moved out and returned between the years. It may be safe to say that the income movement of older people is more stable than that of other age groups. However, there can be information missing between the survey years that might lead to an unclear picture, particularly when analysing short-term mobility. This thesis assumes that there is continuity between the observed waves.

- Finally, as discussed earlier in section 3.4 and 3.5, all longitudinal studies face a problem with non-responders and attrition, but this appears to be more serious in studies about ageing because of a higher rate of attrition compared to other longitudinal studies (Gardette et al., 2007). The sample used in this thesis may suffer from non-random attrition, as it shown in table 13, participants who drop out from the survey may differ from those who remain in the survey continuously. Attrition can lead to a biased result because of a reduced sample size, which affects the representativeness of the survey. To minimise the potential effects of attrition, this thesis uses longitudinal weighting variables for the data analysis which can reduce bias in estimates derived from longitudinal data.

In order to minimise the limitation of the comparability of data, this thesis took several approaches to constructing the relatively comparable data set; this has been discussed throughout this chapter. The empirical choices made for the analysis of income mobility are summarised in Table 27 below.

3.11   Chapter summary

This thesis aims to examine the income mobility of older people in England and Korea at the macroscopic level, and to investigate the factors that have a significant influence on the income mobility of the elderly population at the microscopic level. Using longitudinal datasets from four waves of ELSA and KLoSA, each running from 2006 to 2012, a number

of measures for analysing both relative and absolute income mobility of older people in the two countries were discussed in this chapter. The analysis methods applied in this thesis are:

- Fields and Ok's (1996) mobility index and income trajectories for RQ1;
- Rank-mobility and transition matrix for RQ2;
- Decomposition of axiomatic and welfare measurements of mobility for RQ3; and
- Multinomial logistic regress analysis for RQ4.

In this thesis, income mobility, taking a macro perspective for RQ 1-2, means the absolute and relative mobility of individual income between the base year and the final year, bringing together intra-generational income mobility. In other words, it will refer to both how much an individual's final-year income has moved relative to the base year and to other people, and it will also refer to whether the value of absolute income has changed as "income mobility". Most people like to know both their relative positions compared to others in their cohort (intra-generational mobility) and absolute changes in their own income. Older people are no different; they are interested in both.

Fields and Ok's (1996) absolute mobility index can show how much absolute income mobility is observed for older people in Korea and England between the base year and the final year from a macroscopic perspective (RQ1). However, it has a limitation of illustrating the directional movement, therefore, this thesis will adapt Zaidi and De Vos's (2002) absolute mobility coefficient and income trajectories to understand the patterns (actual movement) of income mobility of older people in both countries. For RQ2, similar to measures used in RQ1, Wodon and Yitzhaki's (2001) Gini mobility index-rank mobility measures the macroscopic aspects of the relative income mobility of older people in England and Korea. In order to resolve the limitations of Wodon and Yitzhaki (2001)'s Gini mobility index-rank mobility coefficient and illustrate the directional nature of an individual's relative income mobility, it will supplement its explanation using a transition matrix as a supplement for relative mobility.

Decomposition of axiomatic and welfare measurements of mobility index used for RQ3 can help to examine what determines income mobility differences across in England and Korea and how the different compoenents of income sources contribute to older people's income mobility and longitudinal variability in these various different components. Finally, for RQ4, from a microscopic perspective, it analyses the factors that affect absolute income mobility of older people adapting an approach developed by Zaidi and De Vos's (2002)

multinomial logistic regression with five categories of income mobility variable as a dependent variable.

These RQs from the central tenet of the analysis undertaken in this thesis, to allow investigating the extent of income mobility experienced by older people in England and Korea, and also what are the associations between individuals' demographic, health, and socio-economic characteristics with changes in income in old age.

The decision regarding which income mobility measure to use was based on the appropriateness of each measure to answering the RQs. The methodological challenges when analysing income mobility using a longitudinal study were discussed in Chapter 2, section 2.4 and the data limitation of this study was also discussed in section 3.10. In addition, other information on the panel data set of both countries, attrition issues, empirical choices, income data and data set manipulations have been discussed in this chapter. Table 27 below summarises the essential empirical choices the author has made in relation to the measurement of income mobility.

Table 27 Empirical choices for the data analysis

	Empirical choice for the analysis
Observation periods	- Four waves from 2006 to 2012 for each country
Unit of analysis	- Individual
Income variable	- Household annual net income from all sources
Equivalence scales	- Square root scale - Consumer Price index - Purchasing Power Parity index

Income mobility (dependent) variable	- RQ1: Base year income and final income for Fields and Ok index
	- RQ2: Using 2006 as the base year and 2008-2012 as measured years
	- Income trajectories:
	  1 = Fall, more than 15% => Long-range downward income mobility
	  2 = Fall, 6 to 14% => Short-range downward income mobility
	  3 = Less than 5% change => No income mobility
	  4 = Rise 6 to 14% => Short-range upward income mobility
	  5 = Rise, more than 15% => Long-range upward income mobility

Explanatory variables	- Demographic attributes: age, gender, marital status, living arrangement - Health attributes: ill heath, disability - Human capital attributes: education (low, medium, high) - Employment attribute: currently work, retired, unemployed - Welfare attribute (income sources): benefits, pension, private, investment

Source: author's own

The methodological issues and information related to the empirical choices discussed in this chapter provide a reference point for the results chapters, Chapters 5 and 6. Chapter 5 will provide a descriptive analyses and a number of results of the mobility index analysis (RQ1–RQ2), while Chapter 6 will focus on examining what determines aggregate income mobility differences across in England and Korea (RQ3) and analysing the factors associated with the income mobility of older people in England and Korea (RQ4).

Chapter 4: Pensions and the Social Benefit System in England and Korea

4.1 Introduction

This chapter examines the pension systems of England and Korea in order to better understand the differences found in the data on income and institutional set-up of the two countries. The aim of this chapter is, therefore, to provide information on the different components of income from pensions, non-pensions and social benefits in the two countries, ahead of contrasting and analysing the income mobility of older people in England and Korea, which will be done in the next two chapters. This will help to understand the contextual differences for the elderly population of the two countries, and to examine which groups of elderly people face inadequate levels of income. The chapter is organised in the following way:

- The second section of this chapter will first discuss the importance and characteristics of the state pension system for older people in the two countries (section 4.2).
- The third section examines the occupational and income-related pensions of the two countries (section 4.3).
- This is followed by a description of the private pension system (section 4.4).
- The social benefits systems (for old age) of the two countries will then be explored next (section 4.5).
- Finally, a conclusion (section 4.6) will present a synthesising discussion of the chapter, helping to illustrate the differences in institutional set-up between the two countries.

4.2 The importance and characteristics of the income security system for older people in England and Korea

The pace that the population is ageing in Korea is dramatically fast, one of the fastest in world history, and, according to the latest population projection by Statistics Korea (2013),[28] if Korea's current rate of ageing continues, the challenge for the working-age

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[28] Statistics Korea, "2013 Senior Citizen Statistics," 30 September 2013.

population (15–64) to support the elderly population will rapidly increase. In order words, six working people currently support one elderly person; it is predicted that that figure will drop to 4.5 working people in 2020, 2.6 in 2030 and, after 2040, 1.7. Further, if the ageing of the population continues, the social cost of supporting the elderly population will rapidly increase. A similar demographic shift can be found in England, but at a rather slower pace than in Korea, as England had already experienced a significant ageing of the population between 1950 and 2000 (Lloyd-Sherlock, 2010). In 2010, 3.1 working people supported each elderly person. That figure is predicted to change to 2.9 working people in 2020 and 2.6 in 2035 (Office for National Statistics, 2011).

The elderly dependency ratio figures above can be questioned, since they were produced by economists who were more focused on taxpayers than all the other subgroups of the population and overlooked a number of important aspects, such as the significance of higher rates of unemployment, early retirement and the employment of women (Falkingham, 1989). Nonetheless, given the relatively weak social security system for older people in countries such as Korea (the country's public expenditure on old-age social benefits is 2.1% of GDP in 2009, more than three times below than the OECD average of 7.3%), as the process of population ageing continues there will be a concern for the government because the capacity of families to support old people is decreasing (Yang and Klassen, 2010).

In Korea, the importance of the welfare role of families and businesses is very large when compared with that of England. In Korea, it is estimated that nearly 70% of older people received income support from their children in 2009 and that the average amount received was about 25% of the average income of the elderly population (Kim and Cook, 2009). By contrast, in 2012/13, nearly half of elderly people aged 65 or over received income from public pensions transfers in England; this figure increased to 71% when occupational pensions were included (Department for Work and Pensions, 2014).

If the burden of caring for the elderly population continues to be on families and businesses in the way that it currently is in Korea, the polarisation, in terms of elderly welfare, between families and classes will increase, and the probability is high that the imbalance between elderly people's old-age income will worsen, because of the segmentation of the social safety net (Howe et al., 2007, Phang, 2011).

Although average life expectancy has risen a great deal (the life expectancy of males and females aged 60 in 2012 is recorded as being 21.6 and 26.6 additional years, respectively

(Statistics Korea, 2014) and the population is ageing quickly, the phenomena of early retirement, a low retirement age from business, voluntary retirement etc. are developing in the opposite direction from the ageing population. In Korea, the trend is for people to leave their lifetime major workplace earlier (usually at the age of 53–55) than the state pension age (SPA) of 60 (Higo and Klassen, 2015). Over half of male workers aged 45 or over are self-employed (Lee and Lee, 2011). A considerable number of people have retired early to start their own business. It is understood that many of these self-employed workers continue to work beyond the SPA; many older men aged 65 or over are economically active and 49% of them are self-employed. A possible explanation for why older people work longer is due to a relatively immature state pension system and a high rate of self-employment among workers, who are less able to build a decent retirement pension income than full-time employed workers (Lee and Lee, 2011, Yang and Klassen, 2010).

According to the 2013 Laws Regarding the Prohibition of Age Discrimination in Employment and Employment Promotion for the Aged, while the age of 60 became the compulsory retirement age, the elderly are still ignored by employment policy. This is because older people in the labour market are viewed in terms of retirement and the supply and demand of pensions, not as active income earners. Once elderly people have retired or left the labour market, it is difficult for them to re-enter it because firms favour younger workers due to the cost of wages (Jones and Urasawa, 2014). In the case of elderly people, the difference in specialised abilities or skills works as a kind of discrimination in employment, and, ultimately, not only does it reduce the exchange opportunities of labour and wages, but it is also connected to the loss of opportunities to earn income, so there is a significant concern that individuals will fall into a vicious circle of poverty is significant (Shin, 2010).

While the importance of public pension incomes for old-age income earners is gradually increasing (the proportion of the elderly population for which a pension is their main source of income rose from 14% in 2000 (Kim and Cho, 2005) to 16.3% in 2008 (OECD, 2013b)), the history of the government introducing public pensions is short in Korea, so the scale of the pension payment expenses is still insignificant. Thus, many older people continue to work as long as they physically can (Korea has one of the highest rates of economically active people over the age of 65), but this does not necessarily prevent them from falling into poverty (International Labour Organization, 2014). As shown in Figure 7, Korea has one of the highest rates of old-age poverty, with a relatively weak public pension provision, whereas other advanced countries, including England, have a greater

public pension provision for older people, resulting in a low poverty level. In England, the public pension system, first passed by legislation in 1908, and social security schemes serve as a basic income for many older people in their later life. Since the beginning of the welfare state, for example, in the 1940s, pension systems have been the main source of finance for older people in poverty and vulnerable situations (Spicker, 2011).

Figure 7 Correlation between greater public pension provision and lower poverty levels, OECD countries
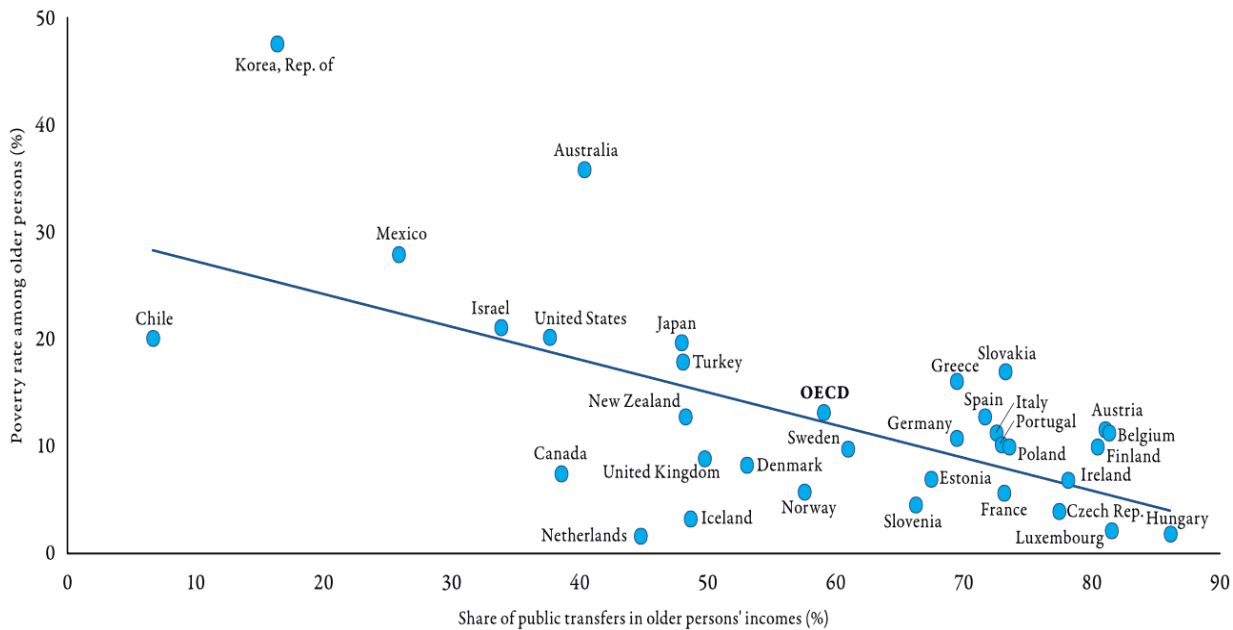
Source: International Labour Organization 2014, Social protection for older persons: key policy trends and statistics

By contrast, older people in Korea rely heavily on private support from their children (Yang and Klassen, 2010). It can be said that the reason for this is that comprehensive income security for older people is not yet available. With the weakening of the family ties that existed in the nuclear family, the mental framework of taking care of family members is likewise weakening. In this situation, public income security policies for elderly persons are extremely important. For elderly individuals unable to achieve financial independence, whether or not their adult children support them economically can greatly influence their degree of satisfaction with their later years. In terms of income security, it is precisely social security pay (in other words, public pensions) that must function as this structure for elderly people with limited employment prospects (Kim, 2009). Thus, public pensions are of great importance to older people.

Having considered how the importance of income security for older people, the characteristics of the two countries' state pension systems will be discussed below. These are summarised in table 28.

Table 28 A comparison of the pension schemes in England and Korea

Type	Korea		England	
	Coverage	Contribution Rate	Coverage	Contribution Rate
Basic State Pension	As of the year 2013, a total of 20,745,000 participated, and the total number of beneficiaries in the same year amounted to 3,653,000.	The contribution rate (2005–09) for the employed sector is set at 9% of the standard monthly wage of the participant. The contribution rate had grown gradually from 3% to 6%, then to the current level.	Universal coverage	2%
Earning-related Pension	Covers private- and public-sector employees. It is a fully-funded defined-benefit (DB) scheme, financed by participants' and employers' contributions	Around 7–17% depending on the job sector. E.g. civil servants: 17%, military Personnel: 17%, and private school teacher: 12.6%	Automatic enrolment of the employees.	7%
Private Pension	Employed workers and the self-employed. Fully-funded defined-contribution (DC)	N/A	To support automatic enrolment, the government established the National Employment Savings Trust (NEST), a trust-based occupational defined-contribution scheme	8%

Source: National Pension Statistics Facts Book 2013, Pensions at a glance, 2013 United Kingdom

4.2.1 State pension in England and Korea

4.2.1.1 The Basic State Pensions (BSP) in England

England prepares for the dangers of income loss in old age, and the representative system that secures the stable income of elderly persons is the pension system. England's public pensions have grown while showing one distinct difference from continental European countries, which use German-style social insurance as their core measures. England has a basic pension, but it is driven mainly by contributions and it has a fixed-rate basic pension rather than having payments proportional to income. For England, basic pensions are not the core: "Occupational Pensions" have had led income security, beginning at the start of

the twentieth century and developing continuously since then. England's pension system is Beveridgean, while at the same time having liberal attributes. A Beveridgean system focuses on supporting people who have a low income, while a "liberal system", according to Esping-Andersen (1990)'s[29] "Three World Theory", is characterised as one in which the state plays a limited role in providing social care provision, but focuses strongly on the strengths of the market. Thus, the state's role is limited to guarantees of a minimum income, and an interest in the eradication of poverty reflects its Beveridgean ideals, while for all other purposes individuals are intended to have an active role, which is a liberal characteristic (Aysan, 2012).

The English pensions system is quite complex and has been reformed numerous times since it was introduced in the 1940s. To understand England's pension system, the chart below is used to explain its multi-tier system. As Chart 1 shows, it currently has a three-and-a-half tiers. Tier 1 is provided by the state and consists of a basic level of pension provision, which provides a minimum level of retirement income to the elderly population; this includes the Basic State Pension (BSP) and Pension Credit (PC). The remaining tiers involve income-proportional pension sector (Tier 2), a public-private partnership of individualised pension provision (Tier 2½) and private insurance (Tier 3), operating on the principle of voluntary registration. There a number of characteristics of the pension system. First, Tiers 1 and 2 operate through the National Insurance system. Tiers 2½ and 3 are private pensions provision, which is voluntarily funded by individuals or their employers.

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[29] Many theories have emerged to explore the differences between the countries' welfare systems. Among them, Esping-Andersen's (1990) 'Three World Theory' or 'Welfare State Regime Theory' has been widely used for comparing international variations of welfare systems. There are three types of welfare regimes: liberal, conservative and social democratic. In a 'Liberal welfare model', the state encourages private sectors to involve themselves in the provision of welfare services and only interferes when market failures occur. The second welfare model 'the conservative or corporatist model' is strongly reliant on family, therefore, it only occurs when a family fails to look after its own family members. It provides a relatively low level of welfare services. The Korean system is close to this model to some extent. The last model is 'Social democratic' which promotes the autonomy of wage-earners from the market principles and pursues the universalism. The state forms strong regulations in the public sector and provides a greater gender equality and high level of welfare benefits. Scandinavian countries such as Sweden and Denmark are an example of this model.

Chart 1 The reformed English pensions system

Tier 1	Tier 2	Tier 2½	Tier 3
Public	**Public**	**Public-Private partnership**	**Private**
Unfunded	Unfunded	Funded and incentivised	Funded and incentivised
Compulsory for most workers	Compulsory for employees (unless contracted out) but not the self employed	Compulsory for employer if employee does not opt out	Voluntary
		Auto-enrolment into NEST or qualifying pension scheme	
BSP: Basic State Pension	**S2P: State Second Pension**		**Occupational and personal pensions**

Public Means-tested	**Pension Credit = Guarantee Credit + Savings Credit**

Source: Pension Policy Institute 2016

The main pension benefit available to pensioners in England is the basic state pension (BSP), also known as the retirement pension (Bozio, Crawford and Tetlow, 2010). It was introduced in 1948. BSP is paid on a weekly basis to individuals who are over the state pension age (SPA) and make National Insurance (NI) contributions. These are run on a pay-as-you-go basis. In order to receive complete basic pension payments, an individual needs 30 qualifying years, with at least one of the following conditions: a) working and paying National Insurance (NI), b) getting National Insurance Credits because of unemployment or sickness, c) paying voluntary National Insurance contributions (Department for Work and Pensions, 2015).

Table 29 below shows the current full weekly rates of the BSP. A BSP based on an individual's own past NI contributions is termed as Category A pension. An individual who is not entitled to a full BSP on the basis of his or her NI contribution record may be entitled to a pension based on his or her partner's record. This is termed a category B pension. Basic State Pensions, categories A, B and D, were increased in April 2014 by 2.5% (Age UK, 2015).

Table 29 The full weekly rates of the state pension in 2016

Type of pension	Weekly amount
Category A State Pension	£ 119.30
Category B late spouse's or civil partner's contributions	£ 119.30
Category B spouse's or civil partner's contributions	£ 71.50
Category D non-contributory, over – 80 pension	£ 71.50

Source: Government website, https://www.nidirect.gov.uk/articles/state-pension-and-pension-credit-rate

In addition to the BSP, there are a number of public means-tested benefits available for pensioners, such as Pension Credit (PC), Guarantee Credit (GC), Savings Credit (SC), Housing Benefit (HB) and Council Tax Benefit (CTB). As Chart 1 above shows, PC comprises two components: GC and SC. GC is the main means-tested benefit paid to those who have below a certain level of income, and SC provides for pensioners who have made some private provision for retirement. The other benefits, HB and CTB, are all means-tested and are available to both pensioners and people under SPA (further information on social benefits will be discussed in section 4.5).

On average, net income from the state pension[30] has been raised over the last decade (2003–2013) at a rate faster than the Consumer Price Index (CPI) (see Figure 8). However, as shown in table 30, when compared with national average earnings (NAE), the value of the BSP has gradually decreased since 1979 and reached 18.4% of NAE in 2015 (Pensions Policy Institute, 2015). The real-term growth of the BSP between 2005 and 2015 has been around 5%, while the NAE value increased by 18% during the same period. As the role of Tier 2 pensions becomes weaker, the number of pension recipients who rely on means-tested benefits increases. If this trend continues, by around the year 2040 approximately 70–80% of the elderly are expected to be pension recipients through means tests (Pensions Policy Institute, 2015).

Figure 8 Mean income from state pensions, 2003 to 2013 (£ per week net at 2013 prices)
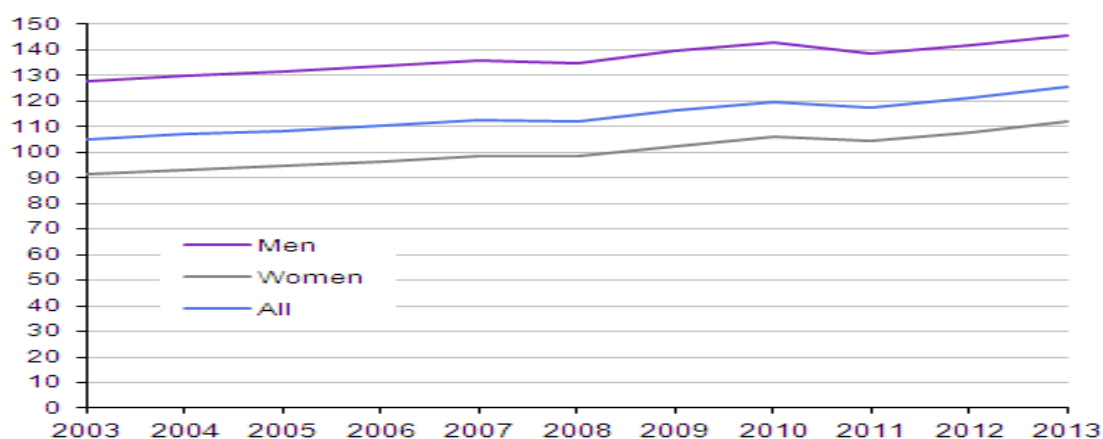
Source: Department for Work and Pensions (2013) Pension Trends Chapter 5: State Pensions, 2013 Edition

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[30] Here, state pension includes Basic State Pension and an additional state pension (Tier 2), such as Graduated Retirement Benefit State Earnings-Related Pension Scheme (SERPS) and state second pensions (S2P).

Table 30 Historical uprating of BSP in relation to National Average Earnings

	BSP – Weekly Amount	Adjusted to April 2015 prices	Weekly National Average Earnings	BSP as a percentage of NAE
October 1972	6.75	78.11	32.00	21.1%
July 1974	10.00	92.77	41.70	24.0%
November 1977	17.50	95.05	70.20	24.9%
November 1979	23.30	99.77	89.60	26.0%
November 1982	32.85	102.53	136.50	24.1%
April 1987	39.50	100.11	198.90	19.9%
April 1992	54.15	100.65	304.60	17.8%
April 2000	67.50	102.38	425.10	15.9%
April 2001	72.50	108.06	449.70	16.1%
April 2002	75.50	110.87	472.10	16.0%
April 2003	77.45	110.28	487.10	15.9%
April 2004	79.60	110.59	498.20	16.0%
April 2005	82.05	110.48	516.40	15.9%
April 2006	84.25	110.62	534.90	15.8%
April 2007	87.30	109.66	549.80	15.9%
April 2008	90.70	109.35	574.30	15.8%
April 2009	95.25	116.19	587.30	16.2%
April 2010	97.65	113.08	598.30	16.3%
April 2011	102.15	112.43	602.60	17.0%
April 2012	107.45	114.32	607.10	17.7%
April 2013	110.15	113.90	620.30	17.8%
April 2014	113.10	114.12	620.20	18.2%
April 2015	115.95	115.95	630.12	18.4%

Source: Pensions Policy Institute (2015), UK pension system guide June 2015

Following means testing, elderly persons below the poverty line (middle and upper income is set at 60%) are provided with income up to the level of the minimum income guarantee so that all of the elderly individuals within the pension system are guaranteed to receive the minimum income level. The minimum income level can be increased in line with wages, which has the role of greatly raising the pay of poorer pension recipients.

Having considered England's pension framework, it is time to look at its Korean counterpart.

4.2.1.2 The National Pension Scheme (NPS) in Korea

Korea's implementation of a basic pension was an imitation of Japan's pension scheme (Kang and Lee, 2009). It initially tried to cover the entire population, except civil servants, teachers and military workers, with a single scheme. It was very ambitious: eligibility started at age 60 for full benefits and providing a replacement rate set at 70% of lifetime income, while the contribution rate was very low, 3% (Yang and Klassen, 2011). Obviously, the plan did not work out; it was developed without an accurately measured plan, which resulted in vigorous competition among diverse programmes to expand their coverage (Kim, 2013).

Currently, similarly to England, it has a multi-pillar income support system for the elderly population. The system offers (see Chart 2) social security, made up of two basic components ("Zero Pillar"), the Basic Livelihood Security Programme (BLSP) and the Basic Old-Age Pension System (BOAP). In addition to this are public pensions (the National Pension Scheme) and occupational pensions (which make up the first and second pillars), and, finally, "private pensions" (savings), which includes company pensions, and schemes to promote individual savings (the third pillar).

The pensions system in Korea is composed of three occupational pension schemes (the Military Personnel Pension Scheme (MPPS), the Government Employee Pension Scheme (GEPS) and the Private School Teachers Pensions Scheme (PSTPS)), the National Pension Scheme (NPS) and a Retirement Allowance (which refers to private schemes) (Kim et al. (2005). The NPS is based on taxes and is considered to be the single largest pension scheme in Korea, covering all workers, aged between 18 and 60, in businesses with more than five employees, as well as the self-employed (Poston and Davis, 2009).

Chart 2 Korea's pensions system for older people

Third Pillar	Personal pensions (8 million, 2014)			
Second Pillar	Company pension (Retirement pension) 4.7 million insured persons, 2014			Public Occupational pension schemes (Approximately 1.5 million)
First Pillar	National Pension Scheme (2.1 million, 2014)			
Zero Pillar	Basic Old-Age Pension (Non-contributory and means-tested, 64.7% of the elderly aged 65 or over, 4.04 million beneficiaries, as of 2013			
	Basic Livelihood Security Programme 1.6 million beneficiaries			
Covered Groups	Employees	Self-employed	Others	Civil Servants Private-school teachers Military personnel

Covered group

Source: Kim (2013) and National Pension Statistics Facts Book (2013) and UNESCAP (2016)

Since 1999 to date, the contribution rate to the NSP was 9% of employees' final salary. Self-employed participants paid the full amount by themselves, while the burden for workplace-insured participants was equally shared between employer and the employee (4.5% to be paid by each) (National Pension Service, 2011).

As shown in Figure 9, the number of persons insured by the national pension in 1988 was approximately 4.4 million people; this has been dramatically increased over the last three decades and the total number of participants reached 20.7 million in 2013. In addition, the total number of beneficiaries in the year 2013 amounted to 3.6 million (Figure 10). The NPS is a defined-benefit plan, in which participants and beneficiaries can choose to receive pension benefits through either monthly annuities or a lump-sum pay-out. The lump-sum pay-out is a single payment by which beneficiaries receive all of their benefits at once, as opposed to gradually. This number increased by nearly 1,000,000 people in four years, to approximately 3,500,000 in 2012.

Figure 9 Number of insured persons between 1988 and 2013 (thousands)
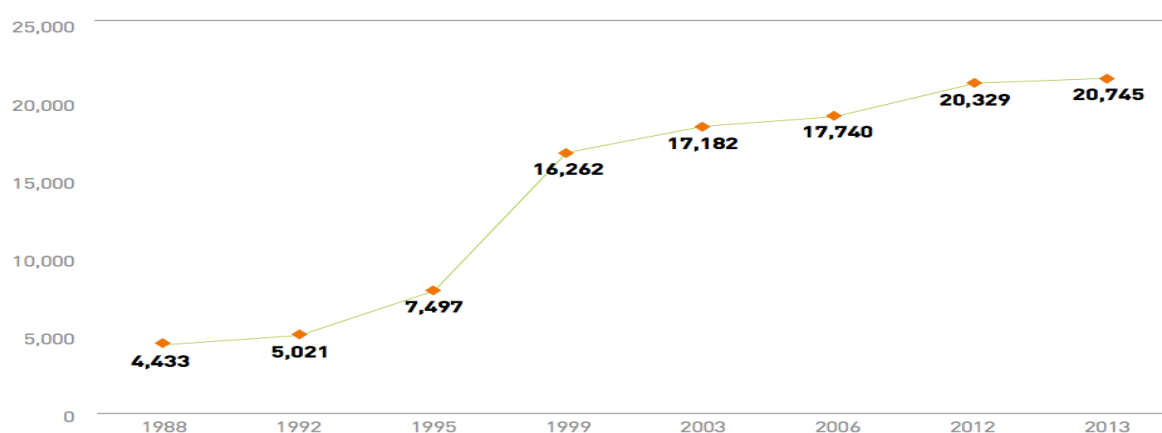
Source: National Pension Statistics Facts Book (2013)

Figure 10 Number of beneficiaries (thousands)
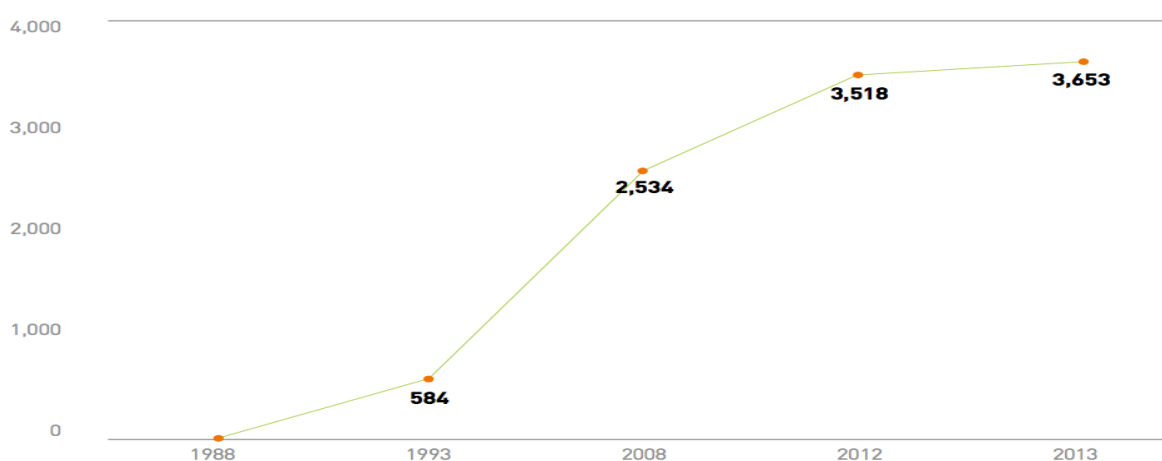
Source: National Pension Statistics Facts Book (2013)

As shown in table 31 below, in the year 2013 the monthly average amount of the old-age pension was 313,620 KRW (appx £220.70[31]) and those of the disability and survivor pensions were 419,790 KRW and 248,590 KRW respectively. The old-age pension amounted to only 59.5% of the minimum cost of living (in 2013 it was estimated at 572,000 KRW, which is designated to be the minimum level above absolute poverty: see Table 32), while the disability pension amounted to around 73.4% and the survivor pension to 43.5%. When comparing with the national average income, the value of the old-age pension amounted to 14.3%, disability pension to 19.1% and survivor pension to 11.3% respectively.

Table 31 Monthly Average Pension Benefits (KRW)

Type of Pension	Average
Old-age Pension	313,620 (£220.70)
Disability Pension	419,790 (£295.42)
Survivor Pension	248,590 (£174.94)

Source: National Pension Monthly Report (2013.12)

Table 32 The minimum cost of living in Korea (Thousand, KRW per month for a single person)

Year	Minimum cost of living[1] (A)	Average wage[2] (B)	Minimum cost of living as % of average wage (A)/(B)	Average income[3] (C)	Minimum cost of living as % of average income (A)/(C)
2009	489	2 636	18.6	1 810	27.0
2010	504	2 806	18.0	1 979	25.5
2011	532	2 844	18.7	2 068	25.7
2012	553	2 996	18.5	2 121	26.1
2013[4]	572	3 080	18.6	2 197	26.0
2014[4]	603	3 188	18.9	2 295	26.3

1. Based on 11 categories of consumer goods. An income below this level is classified as absolute poverty.
2. All industries.
3. Gross domestic product divided by population. The median income is somewhat lower than the average.
4. OECD projections for average wages and income.

Source: Bank of Korea, Statistics Korea, Ministry of Health and Welfare and OECD estimates.

4.3   Earnings-related (Occupational) Pension in England and Korea

In England, the earnings-related state pension income was introduced in 1961 (Bozio et al., 2010). The characteristics of occupational pensions in England are similar to the liberal model (Hall and Soskice, 2001) under which the state plays a limited role, while occupational pension provision has developed on a voluntary basis with a less-regulated

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[31] Current exchange rate is £1 = 1421 KRW (Oct 2016)

manner (Bridgen and Meyer, 2009). Considerable growth in occupational pension schemes occurred in the 1970s. Later, the Social Security Pensions Act 1975 introduced the State Earnings-Related Pension Scheme (SERPS), which was implemented in 1978. As showed in Chart 1 above, a higher-tier provision in England has had three different schemes since 1961: a) Graduated Retirement Benefit (GRB, 1961 to 1975), b) State Earnings Related Pension Scheme (SERPS, 1978 to 2002) and c) State Second Pension (S2P, from April 2002). SERPS was introduced with the objective of providing people with an earnings-related pension that is inflation-proof and is available through a private occupational scheme or an additional state scheme. In addition to the BSP, eligible individuals are also paid an additional pension. However, an individual does not have to be eligible for BSP in order to be eligible for the additional pension. In order to claim the additional pension, an individual is required to pay NI contributions for at least one tax year. The objective of introducing SERPS was to provide individuals with a pension of 25% of band earnings. The reforms to SERPS have reduced the value of the benefits of this scheme (Pensions Policy Institute, 2014).

Through the enactment of the Child Support, Pensions and Social Security Act 2000, which came into force in 2002 with the goal of protecting the low-income working class, the state second pension replaced SERPS. State second pensions are for those elderly population from the low-income class, who could not have made pension arrangements because they cared for children, because they were disabled or because they had suffered from illness for a long time, and for guardians who through additional income support could prevent a drop of pension amounts (Spicker, 2011). The goal of state second pensions, too, is to provide pension payments to low-income elderly people who had continually worked in the labour market so that they might have more than the basic pension and might stay above the poverty line. This kind of national secondary pension was originally introduced in an income-related format, like that of SERPS, but a switch was made to a fixed amount system in 2007 to care for the lower-income class and to preserve the aims of the system known as exclusion from application revitalization from private pensions.

By contrast, although Korea is the world's 11th largest economy, excepting public sector employees (teachers, public servants and military workers) only in 2005 did it introduce an earnings-related or occupational pension system to provide an income after retirement (Gordon and Lee, 2009). Since that time, occupational pensions have been increased several times as a result of political pressures, though this was done without assessing the

financial consequences. The increase in pensions was dependent on government subsidies. A 2009 reform proposed measures to enhance the financial viability of the civil service pension scheme. Those measures included raising the contribution rate from 5.5% to 7%, reducing the accrual rate from 2.1% of career average gross earnings to 1.9%, and raising the pension eligibility age from 61 to 65 (Jones and Urasawa, 2014).

In Korea, there are three specialised pension schemes for public sector workers and teachers: Government Employee Pension Scheme (GEPS), Military Personnel Pension Scheme (MPPS) and Private School Teachers Pension Scheme (PSTPS). GEPS was the first Korean public pension fund and was introduced in 1960 (Kim and Kim, 2005). It covers government employees such as policemen and public school teachers (Kim and Moon, 2011). In 2009, GEPS had approximately 1,050,000 active participants and roughly 293,000 beneficiaries (Kim, 2011). The contribution rate is equivalent to 8.5% of the employees' monthly salary until 33 years of service. The government contributes another 8.5 per cent, bringing the overall contribution to 17 per cent (Bae, 2011).

MPPS covers military personnel and was established in 1960, initially as part of GEPS but separated from it in 1963 (Moon et al., 2005). As of 2007, MPPS had a combined contribution rate of 10.5%. 6.5% is contributed by the employee while the other 4% is by the employer (Bateman, 2007). Finally, PSTPS started to cover teachers and professors in private schools, junior colleges and universities from 1974 (Moon et al., 2002). The contributions for PSTPS come from three parties: in 2012, 7% of individuals' salaries contributed to their pensions. The school institute contributed 4.1%, while the government contributed 2.9%, meaning that the total contribution rate is 14%.

4.4   Private Pension in England and Korea

The private pension system in England has developed over recent decades. Private pensions have been seen to play an important role in the provision of individuals' retirement income. In the late 1980s, the introduction of personal pensions and the declining trend of defined-benefit (DB) pensions among employees of the private sector have increased the importance of defined-contribution (DC) pensions (Crawford and Tetlow, 2012). The relative importance of DC pensions is expected to increase in the coming years. Auto-enrolment was introduced in 2012 and all eligible employees will be automatically registered into a pension scheme by their employer unless employees opt out. It has increased pension coverage and individuals are now in a position to accumulate more

pension wealth before retirement. The increase in the coverage and savings of pensions and coverage is in defined-contribution schemes. The aim of the British government policy[32] is to increase the flexibility of DC pensions and, to this end, policies have been designed in a way that makes it easier for individuals to navigate the market so that they can reinvigorate private pension saving (ibid).

By contrast, the private pension system in Korea is not as developed as in England. In other words, the Korean private pension system is still in its infancy. Most Korean households have inadequate long-term savings, as they save little for retirement on their own, which is why the government introduced the corporate pension system. However, the size of this scheme remains small and its role is uncertain (Phang, 2010). Most households invest their wealth in the housing (ibid). A personal pension system was introduced in 1994, but only 11% of workers save through it. Households tend to invest in retirement savings only in life insurance (Howe, Jackson and Nakashima, 2007).

Korea has a high national savings rate, which consists mostly of corporate earnings and government savings. However, the overall household savings rate is very low, at only 6.5% of GDP (Howe, Jackson and Nakashima, 2007). There is a vast difference in the savings rates between of upper- and lower-income households. The rates are high and increasing for upper-income households, while lower and falling in lower-income households (ibid).

As in England, many developed countries have private pension systems that work alongside public retirement systems and family support networks. Korea does not have a system like this. The principal employer-sponsored retirement benefit for private sector employees consists of a lump-sum severance pay allowance, paid as the employee leaves the firm. The Korean government is replacing the unfunded severance pay system with a funded corporate pensions system. Firms can replace their old severance pay scheme with a defined-benefit (DB) or defined-contribution (DC) pension plan, of the kind prevalent in England. But, unlike England, pension plan coverage in Korea is limited only to workers with long-term employment contracts. The government is trying to encourage the development of genuine private pension plans, but the reform is taking place at a slow pace. So far this chapter has considered pensions as an income source for older people. Consideration is now given to other social benefits.

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[32] It is to be noted that, while the government of the United Kingdom is referenced here, the data in ELSA relates only to England.

4.5   Social benefits for older people in England and Korea

In England, social benefits, that is, those based on means-testing, play an important role in income support for older people, as the basic state pension is lower than the minimum standard level (Zaidi, 2008). There are a variety of non-contributory social benefits available for older people, such as income, housing, health and medical, regional and community-based welfare services, that can be utilised. Some social benefits are based on an assessment of individuals' needs, such as disabilities or care needs. When those with special living circumstances have a hard time maintaining their livelihood with regular income, these may be provided:

(1) Winter fuel payment;
(2) Bereavement Allowance (previously known as widows' pensions);
(3) Bereavement payments (lump sum);
(4) Cold weather payments;
(5) Over 80 pensions;
(6) Christmas bonuses;
(7) Housing Benefit (HB);
(8) Council Tax Benefit (CTB); and
(9) Attendance Allowance (AA) and Disability Living Allowances (DLA).

(Government website, gov.uk (2015))

In 2003, the government halted the decline in incentives to save or make individual preparations for old age due to the minimum income guarantee. Instead, in order to increase the incentives, a pension credit system was introduced (Office for National Statistics, 2013a). Pension credit, as a system that targets elderly people (aged 60 and over) residing in England, is paid out differently depending on income. Payments are not imposed and, in order for payments to be made, the process is operated with a non-contribution payment principle, so insurance premiums do not have to be made. Pension credit has three conditions: age, residency and income/assets. Payments are made based on applications (Department for Work and Pensions, 2005).

Furthermore, the pension credit system divides the existing minimum income guarantee into Guarantee Credit and Savings Credit. In order to receive Guarantee Credit, as shown in Table 33 below, the maximum income in 2014–2015 per week for an individual was £151.20 and £230.85 for a couple; additional amounts are also available for special needs. If there were only the existing minimum income guarantee system, for every pound earned up to the minimum income guarantee line there would be a pound-for-pound withdrawal. However, for pension credit, while maintaining the existing minimum income guarantee

(Guarantee Credit), through the introduction of the Savings Credit a compensation of 60 pence is awarded for every pound saved (that is, a compensation rate of 60%) between the minimum income guarantee and the maximum income eligibility conditions (Office for National Statistics, 2013a).

Table 33 Current rates of Pension Credit guarantee credit, £ per week

Standard Amount	Single	151.20
	Couple	230.85
	Each additional spouse in a polygamous marriage	79.65
Additional Amount	Severe disability	61.85*
	Carer	34.60*

Note: * Twice this amount is payable if both partners qualify
Source: www.gov.uk (2015)

Moreover, older people in England have also been able to claim lump-sum winter fuel payments (WFPs) since their introduction in 1997; these are available to residents over the qualifying age for PC. This is a non-contributory and non-means-tested benefit. It was reported that, in 2014–15, the regular payment was £200 for older people under 80 and £300 for aged 80 or over (gov.uk, 2015).

Another state means-tested benefit is Housing Benefit (HB), which is available for people with low incomes (or who receive Income Support) who live in a rented home. The amount payable depends on the maximum HB, the applicable amount, and the elderly person's income and capital. If pensioners receive the GC part of PC, they are entitled to maximum HB (Age UK, 2015b). Pensioners can also receive Council Tax Benefit (CTB). This is also means-tested and helps older people who have low incomes and are liable to pay council tax on a property they currently live in.

Finally, other non-contributory and non-means-tested health and care related benefits are also available to older people, including Attendance Allowance (AA) and Disability Living Allowance (DLA). DLA has two principal components: a care component and a mobility component. Each component is assessed at different rates (corresponding to a different weekly benefit), depending upon the severity of one's disability. There are three rates of DLA (care) – low (that is, the individual needs care for a significant part of a day), middle (needs frequent attention during the day), and high (needs care for day and night) (Spicker, 2011). The mobility component is paid at higher and lower rates, and the higher rate is available for older people who cannot walk for physical reasons.

AA is a benefit paid to older people aged 65 or over with relatively severe disabilities. It is paid at two rates (see Table 34 below): the lower rate, paid if the disability conditions for the middle rate of DLA (care component) are met, and the higher rate, paid if the conditions for the highest rate of DLA (care component) are met. Note that AA and DLA are not counted as income when calculating entitlements to means-tested benefits such as IS, HB, CTB and PC. Therefore, entitlement to AA could result in upward mobility when an individual becomes ill or disabled. As individual ages, there is a greater chance that he or she could receive this benefit, and if he or she does, that results in an increase in their income. However, as Zaidi (2008: 84) stated, it is questionable whether "such rises in income will have any positive impact on older people's economic wellbeing, mainly because these benefits will only cover additional health-related needs and costs".

Table 34 Current rates of Attendance Allowance and Disability Living Allowance (Care & Mobility), £ per week

Attendance Allowance	Higher rate	82.30
	Lower rate	55.10
Disability Living Allowance (Care)	Highest rate	82.30
	Middle rate	55.10
	Lowest rate	21.80
Disability Living Allowance (Mobility)	Higher rate	57.45
	Lower rate	21.80

Source: www.gov.uk (2015)

By contrast, in Korea, in order to guarantee a subsistence-level standard of living for older people in the low-income bracket, basic livelihood support is provided through the national Basic Livelihood Security Programme (BLSP), introduced in 2000, and the Basic Old-Age Pension (BOAP), introduced in 2008.

The BLSP protects older people who are poor enough that they receive less than the minimum cost of living (that is, they live in absolute poverty), and varies according to disability level and category. It has the characteristic of a residual income support system, providing both cash and a package of in-kind benefits such as housing and education (Jones and Urasawa, 2014). Absolute poverty is defined as an income below the minimum cost of living (MCL), which the government sets each year at 40% of the national median income. The BLSP provides a benefit matching the MCL, which is equivalent to around 26% of average income (see Table 29 above). BLSP benefits were provided to 1.4 million

persons (2.8% of the population) in 2011, with total expenditures of 0.6% of GDP. The number of BLSP recipients has decreased slightly since then, because of the introduction of an integrated information system for the better enforcement of the eligibility criteria.

The eligibility criteria for the BLSP are very strict, which results in limited coverage. The income criteria include asset ownership, which is deemed to be property income. In addition, those who could receive family support from their children are not eligible for benefits under the so-called "family support obligation rule". However, many children cannot or will not help their elderly parents. Currently, around 380,000 elderly people (6.3% of Korea's over-65 population) receive BLSP benefits (Jones and Urasawa, 2014). The number of recipients is small relative to the 2.3 million elderly people who live in absolute poverty.

Another social benefit for the elderly population is the Basic Old-Age Pension (BOAP). BOAP is a non-contributory means-tested pension with flat-rate benefit. The government sets and announces the baseline level of income and property to be eligible for BOAP every year. As shown in Table 35 below, the baseline level for 2008 was a monthly income of 400,000 KRW (£281.49) for a single household and 640,000 KRW (£350.39) for a couple, but by 2014 it had risen to 870,000 KRW (£612.24) for a single household and 1,392,000 KRW (£979.59) for a couple.

Table 35 Trends in the baseline level for BOAP eligibility (thousand, KRW, per month)

Type	2008	2009	2010	2011	2012	2013	2014
Single	40	68	70	74	78	83	87
Couple	64	108.8	112	118.4	124.8	132.8	139.2

Source: National Pension Statistics Facts Book 2013

In 2013, BOAP's beneficiaries numbered around 4,045,000, 64.7% of the population aged 65 and over. The benefit level was established deliberately low to make the scheme affordable; by the end of 2013, it was capped at 96,800 KRW per month for singles and 154,000 KRW per month for couples. This is the equivalent of 5% of the average monthly income of the NPS participants (National Pension Statistics Facts Book, 2013). While the coverage of BOAP is very large compared with other countries (see Figure 11 below), the amount of benefit received is only 3% of average earnings and it is the lowest of the OECD countries.

Figure 11 Basic, non-contributory pensions in OECD countries in 2012

A. Amount of non-contributory, basic pension benefits[1]

B. Coverage of non-contributory, basic pension[2]
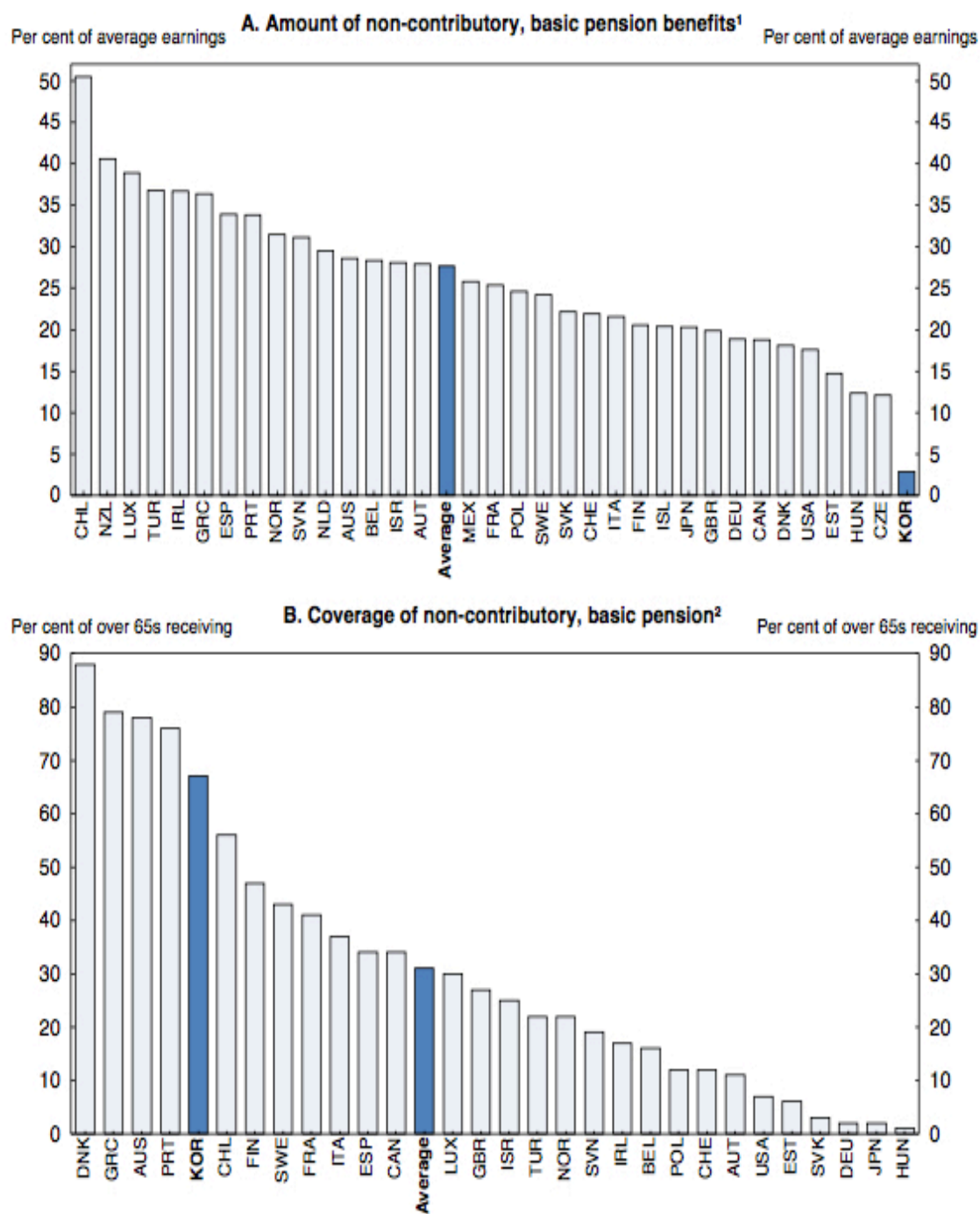
Note: 1. As a per cent of economy-wide average earnings

2. As a per cent of the population aged 65 and over.

Source: OECD (2013)

4.6   Conclusion

This chapter has discussed the social security systems for older people in England and Korea. It reviewed first income security systems and their importance and characteristics.

It then discussed the pension systems and their characteristics, looking at basic state pensions, occupational pensions (income-related pensions) and private pensions. Following the examination of the pension systems, this chapter discussed the current social benefits that are available to older people in the two countries.

Both countries face similar demographic pressures, in that the average life expectancy has risen considerably and that the proportion of older people within the population has been growing continuously, while old age support ratio is predicted to decrease dramatically over the next few decades. While the importance of social security for older people is increasing gradually, the history of introducing public pensions is brief in Korea, so the scale of the pension payment expenses is still insignificant. By contrast, in England, a social security system was established in 1908 and it serves as a basic income for many older people.

The English pension mechanism is known as a liberal (Beveridgean-model) pension system, which allows private personal pension schemes to operate in a major way alongside occupational and state pensions. The system combines "pay-as-you-go" and a flat rate, which work in such a way that current workers pay for current pensioners. A significant part of the social security system involves contributory benefits, but means-tested benefits serve an important role in supporting the income level of older people. By contrast, the Korean pension mechanism takes a more Bismarckian model, and the state pensions system was only introduced in 1988. Thus, the family's welfare role is still important when compared with that of England. This is because comprehensive income security for the elderly is not yet available and the country's state pensions system is relatively immature. With the weakening of the family ties that existed within the nuclear family, public income security policies for the elderly have been increasingly important.

Compared with England, it is important to note that Korea has followed a different path. It implemented and developed income-related pension systems, and then introduced the basic old-age pension scheme in 2008. In England, the basic pension first started in 1908 and an income-related pension system was implemented later.

In both countries, the value of the basic state pension has increased only marginally over the past decade; thus, it has had less impact on income change. However, means-tested social benefits may have a greater impact on income change in later life.

Finally, England has developed a private pension system in recent decades that has provided strength to the pension system. However, the Korean private pension system is

still in its initial stages; most Korean households do not have a systematic saving pattern, thus putting some additional financial burden on the government.

Chapter 5:   Empirical Results: Descriptive Analysis

5.1   Introduction

The aim of this chapter is to analyse longitudinal data for England and Korea and examine the patterns of income mobility among older people in these countries, over the period between 2006 and 2012. The exploration of the literature on both theoretical and empirical works (in Chapter 2: literature review) on the topic of income mobility has helped to identify a number of common factors associated with income mobility before and after retirement. The review has also been useful to gain insights from the data analysis undertaken in this chapter.

The empirical results analysed below can be divided into descriptive statistics relating to the sample used in the present research and univariate results using a number of income mobility indices (aggregate measures, income transition matrices, and income trajectories) to present the patterns of income mobility of older people in the two countries (Chapter 5). The bivariate analyses identify factors important to study further and motivate to select possible explanatory variables for the econometric multivariate analyses in the next Chapter 6.

The objective of this chapter is to analyse short-term and medium-term income mobility among older persons which illustrates longitudinal changes in income between one wave to the next. The analyses are extended to later waves for the longer-term analysis. This chapter examines two of the research questions set out in this thesis (RQ1. How much absolute income mobility is observed for older people in Korea between 2006 and 2012 and how did this compare with income mobility in England? – RQ2. How much relative income mobility is observed for older people in Korea between 2006 and 2012 and how did this compare with income mobility in England?).

The chapter is organised into several parts and subsections, as outlined below:

- Before providing the results of the analysis, the demographic characteristics and health status of the study sample will be set out (sections 5.2 and 5.3), followed by its educational profile (section 5.4). Next, there will be a discussion of the personal economic attributes (section 5.5) and the relative economic status (section 5.6) of older people in the two countries.

- The second part of this chapter will present the descriptive results on the income mobility of older people in England and Korea. From a macroscopic view, it will use both the aggregate measures of "absolute mobility" (section 5.7) and "relative mobility" (section 5.8), and will consider the origins and destinations of income to describe income movements. This analysis will help the author to examine research questions RQ1 and RQ2 (as set out in Chapter 1). For RQ2, this chapter will also use graphical and tabular methods to summarise the income mobility patterns.

- Finally, the chapter will conclude by setting out the findings of the descriptive income mobility analyses. This chapter will serve as a foundation for the subsequent econometric multivariate analysis (multinomial logistic regression analysis), addressing RQ4 in Chapter 6.

5.2   Demographic profile of the study sample

Among the most commonly discussed factors associated with income mobility is age. The literature suggests that age is closely associated with income change (Johnson and Stears, 1998; Bardasi and Jenkins, 2002; Zaidi, 2008). It was anticipated that people close to retirement would tend to have a higher income and that they would experience a decline in both economic activity rates and work hours in the years leading up to retirement, typically resulting in a decline in individual and household income. However, in Zaidi's (2008) study, people in the oldest age group tended instead to experience upward mobility due principally to their increasing entitlement to old-age and disability benefits as they become frail. To explore this phenomenon, the age profiles of respondents were examined first.

5.2.1   Age

Table 36 shows the mean and median ages of respondents at their first entry into the datasets (wave 3 for ELSA and wave 1 of KLoSA and full samples in all waves). To maintain confidentiality, the age of individuals aged 90 years or older was coded as 90 plus in ELSA. Omitting these individuals, the average age in the sample is 66, with a median of 64 at their first wave of entry, and this is nearly identical for the full waves. In Korea, age is not determined by the number of full years since one's birthdate, as it is in Western countries, but is instead derived by subtracting the year of birth from the current year, which in this case is the year the survey was administered. The average age in the sample is 61.7, with a median of 61, at the first wave, and both median and average age is 64 for

the full waves. Life expectancy at age 60 is high for both countries, with 24 further years of life expected in both England and Korea (HelpAge International, 2015).

Table 36 Mean and Median age of individuals at the first entry* in the dataset and full waves**

Variable	Country	Obs	Mean	Std. dev.	Median***
Age	England	8,810*	65.93	10.87	64
		36,955**	65.95	12.28	65
	Korea	10,254*	61.69	11.14	61
		34,348**	64.12	10.92	64

Source: author's own analysis of ELSA wave 3-6 and KLoSA wave 1-4, * Extracted sample number at base year, ** Full sample numbers from all four waves, *** KLoSA has a lower age limit of 45 years for panel respondents than ELSA's age limit of 50.

To examine the relative positions of older people, it is necessary to break down the age variable into a categorical variable. This will help to show the age distributions in various subgroups, which will later allow a comparison of the income mobility of different age groups. Table 37 shows the sample size categorised by age. It shows that the Korean sample is younger than the English sample. This is mainly because KLoSA has a lower age limit (45 years) for panel respondents (i.e., the people who are followed over time) than ELSA (the lower limit of which is 50).

Table 37 Sample size of ELSA and KLoSA by age categories

Age Category	Kor *Freq*	Eng *Freq*	Kor *Perc*	Eng *Perc*	Kor *Cum*	Eng *Cum*
45-49	5,857	-	17.1	-	17.1	-
50-54	*5,200*	3,278	15.1	9	32.2	9
55-59	4,866	6,693	14.2	18.3	46.4	27.3
60-64	4,861	7,135	14.2	19.5	60.5	46.8
65-69	5,199	5,933	15.1	16.2	75.6	63
70-74	3,907	5,248	11.4	14.4	87	77.5
75-79	2,659	4,007	7.7	11	94.8	88.3
80-84	1,214	2,520	3.5	6.9	98.3	95.2
85+	585	1,758	1.7	4.8	100.00%	100.00%
Total	34,348	36,572	100.00%	100.00%	-	-

Source: author's own analysis of ELSA waves 3-6 and KLoSA wave 1-4

5.2.2 Gender

A second demographic variable that has been identified to influence income mobility in later life is gender (Choudhury and Leonesio, 1997; Wilson and Hardy, 2002). The literature suggests that gender affects income mobility in different ways according to

income class (low, middle or high) for each measuring period, and that disabled female older people are more likely to face downward mobility and change in their income (Zaidi, 2008). These findings are in line with those of Nam (2015), which showed that the heads of the household in the downward mobility group were more likely to be female than male.

Individual characteristics of respondents are provided in Table 38. Of the 10,254 Korean respondents in the sample, 56% were women and 44% were men. Similar proportions were sampled in ELSA: of the 8,810 individuals, 55% were women and 45% were men.

Table 38 Individual characteristics at entry into the data set by gender

	Korea (Wave 1)		England (Wave 3)	
Gender	Freq.	%	Freq.	%
Male	4,466	43.5	3,941	44.7
Female	5,788	56.5	4,869	55.3
Total	**10,254**	100%	**8,810**	100%

Source: author's own analysis using wave 1 (KLoSA), 2006 and wave 3 (ELSA), 2006 respectively

In addition, table 39 below shows the age distribution of the ELSA sample by gender over the four waves. It clearly shows that the age groups with the greatest representation were the 50–54, 55–59 and 60–64 age groups. There were more women than men. By contrast, the KLoSA sample had younger respondents; the age groups with the most respondents for KLoSA were 45–54 and 65–69. In the 45–49 age category there was a large number of people in wave 1, but this number gradually decreased as the respondents aged, and there was no representative sample for this age group at wave 4.

Table 39 ELSA and KLoSA Age distribution by gender and waves

ELSA	Wave 3 Male		Female		Wave4 Male		Female		Wave 5 Male		Female		Wave 6 Male		Female	
Age	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
50-54	663	16%	755	16%	477	11%	562	10%	101	3%	114	2%	279	7%	356	7%
55-59	745	19%	913	19%	821	19%	1033	19%	790	20%	963	20%	645	16%	782	16%
60-64	663	17%	758	16%	913	21%	1100	20%	879	22%	1096	22%	755	19%	970	20%
65-69	541	14%	635	13%	703	16%	794	15%	713	18%	821	17%	804	20%	922	19%
70-74	525	13%	605	12%	670	15%	785	14%	652	16%	737	15%	586	15%	688	14%
75-79	384	10%	524	11%	405	9%	499	9%	460	11%	565	12%	517	13%	653	13%
80-84	275	7%	348	7%	263	6%	346	6%	257	6%	389	8%	268	7%	374	7%
85+	175	4%	331	7%	173	4%	340	6%	146	4%	230	5%	157	4%	206	4%
Total	3971	100	4869	100	4425	100	5459	100	3998	100	4915	100	4011	100	4951	100

KLoSA	Wave 1 Male		Female		Wave 2 Male		Female		Wave 3 Male		Female		Wave 4 Male		Female	
Age	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
45-49	779	17%	1017	18%	369	8%	514	10%	106	3%	165	4%	0	0%	0	0%
50-54	672	15%	841	15%	599	16%	771	16%	552	16%	740	16%	412	13%	595	14%
55-59	642	14%	758	13%	558	15%	663	13%	521	15%	642	14%	524	16%	666	16%
60-64	637	14%	753	13%	559	15%	619	13%	547	16%	633	14%	524	16%	631	15%
65-69	674	15%	831	14%	559	15%	738	15%	522	15%	652	14%	500	16%	587	14%
70-74	530	12%	641	11%	554	15%	652	13%	538	16%	657	15%	513	16%	665	16%
75-79	309	7%	514	9%	313	8%	480	10%	350	10%	468	10%	414	13%	528	12%
80-84	155	3%	268	5%	171	5%	288	6%	180	5%	335	7%	220	7%	372	9%
85+	68	2%	165	3%	84	2%	197	4%	94	3%	218	5%	107	3%	228	5%
Total	4466	100	5788	100	3766	100	4922	100	3410	100	4510	100	3214	100	4272	100

Source: Author's own analysis of ELSA wave 3-6 and KLoSA wave 1-4

Furthermore, table 40 shows the average household size in 2006 in England was 1.38 and in Korea was 2.98; this has remained stable over the last 3 waves in England (average remained at 1.4), but there was a slight decrease from 2.98 in 2006 to 2.49 in 2012 in Korea. The largest household size was 5 in England and 11 in Korea.

Table 40 Household size at entry into the data set

Variable	Country	Obs	Mean	Std. dev.	Median	Smallest	Largest
Age	England	8,810	1.38	0.51	1	1	5
	Korea	10,254	2.98	1.36	3	1	11

Source: author's own analysis using wave 1 (KLoSA), 2006 and wave 3 (ELSA), 2006 respectively

5.2.3   Marital status and Living arrangement

The final demographic variable to be examined is the marital status and living arrangements of the sample of both data sets. The literature suggests that older people who live in multi-person households have significantly different income mobility patterns than older people who live alone or solely with their partner (Lim, 2010; Woolard and Klasen, 2004; Zaidi et al., 2001). The literature also suggests that an individual's marital status, regardless of their age group, can influence income dynamics, but it is one of the most important factors in income mobility in old age, because becoming a widow or widower is one of the most important demographic transitions to affect older people (Zaidi, 2008).

In Korea, as shown in table 41, 78% of the respondents were married and almost all of these couples had children. Less than 1% of respondents were never married, while 3% were divorced and 19% were widowed. In England, a much larger proportion of respondents were 'Single' 6% and 'Divorced' (12%). The majority (87%) of respondents in England had children. Nearly two-thirds of the respondents, 65% (significantly lower than in Korea), were married or in civil partnerships, and 18% were widowed.

Table 41 Family characteristics at entry into data set (Wave 1, KLoSA and Wave 3, ELSA)

	Korea		England	
Marital status	Freq.	%	Freq.	%
Single never married	92	0.9	519	5.9
Married & Civil partnered & Remarried	7,971	77.7	5,724	65.0
Divorced	283	2.8	1,015	11.5
Widowed or missing (dispersed family*)	1,906	18.6	1,552	17.6
Total	**10,254**	**100**	**8,810**	**100**
Have children	9,934	96.9	7,673	87.1
No children	319	3.1	1,137	12.9
Total	**10,254**	**100**	**8,810**	**100**

Source: author's own analysis, *dispersed family is a family that is divided between North and South Korea due to civil war in 1950.

Table 42 below shows the marital status of the sample by gender and waves. It shows that the percentage of respondents who were widowed increased by age, and females who were widowed comprised a higher proportion than their male counterparts. This is more extreme in the Korean case; over 90% of elderly women aged 85 or above were widowed in each of the four waves, compared with the male elderly, of whom only around 20–34% were widowed. This is no surprise given the fact that there is a wide difference between life expectancy for women (85 at birth) and men (78 at birth) in Korea (OECD, 2013a). By

contrast, in England, 70–78% of elderly women aged 85 or above were widowed, while the proportion of the widowed male elderly was 55% in wave 3; this decreased by wave 6, in which 38% were widowed.

Table 42 ELSA and KLoSA marital status by wave and gender

ELSA

Age Cat	Marital status	Wave 3				Wave 4				Wave 5				Wave 6			
	Gender	Male		Female		Male		Female		Male		Female		Male		Female	
	Single	70	11%	61	8%	72	15%	51	9%	18	18%	9	8%	40	14%	45	13%
	Couple	468	74%	524	69%	331	69%	389	69%	63	63%	86	75%	194	69%	219	61%
50-54	Divorced	89	14%	151	20%	69	15%	101	18%	19	19%	18	16%	43	15%	78	22%
	Widowed	6	1%	19	3%	5	1%	21	4%	1	1%	1	1%	2	1%	14	4%
	Total	**633**	**100%**	**755**	**100%**	**477**	**100%**	**562**	**100%**	**101**	**100%**	**114**	**100%**	**279**	**100%**	**356**	**100%**
	Single	51	7%	47	5%	75	9%	77	7%	86	11%	83	9%	97	15%	64	8%
	Couple	568	76%	642	70%	626	76%	716	69%	592	75%	641	66%	442	69%	522	67%
55-59	Divorced	99	13%	167	18%	105	13%	189	18%	101	13%	192	20%	97	15%	160	20%
	Widowed	27	4%	57	6%	15	2%	51	5%	10	1%	47	5%	9	1%	36	5%
	Total	**745**	**100%**	**913**	**100%**	**821**	**100%**	**1033**	**100%**	**789**	**100%**	**963**	**100%**	**645**	**100%**	**782**	**100%**
	Single	51	8%	26	3%	61	7%	46	4%	52	6%	55	5%	58	8%	57	6%
	Couple	527	79%	536	71%	721	79%	771	70%	693	79%	769	70%	590	79%	669	69%
60-64	Divorced	63	10%	111	15%	102	11%	181	16%	103	12%	180	16%	92	12%	171	18%
	Widowed	22	3%	85	11%	28	3%	102	9%	31	3%	92	8%	15	2%	73	7%
	Total	**663**	**100%**	**758**	**100%**	**912**	**100%**	**1100**	**100%**	**879**	**100%**	**1096**	**100%**	**755**	**100%**	**970**	**100%**
	Single	36	7%	23	4%	48	7%	27	3%	46	7%	27	3%	53	7%	29	3%
	Couple	411	76%	399	63%	544	77%	520	65%	557	78%	560	68%	621	77%	630	68%
65-69	Divorced	57	11%	84	13%	68	10%	109	14%	66	9%	115	14%	94	12%	130	14%
	Widowed	37	7%	129	20%	43	6%	138	17%	43	6%	119	15%	35	4%	132	14%
	Total	**541**	**100%**	**635**	**100%**	**703**	**100%**	**794**	**100%**	**712**	**100%**	**821**	**100%**	**803**	**100%**	**921**	**100%**
	Single	27	5%	23	4%	37	6%	29	4%	43	7%	28	4%	36	6%	25	4%
	Couple	410	78%	328	54%	501	75%	438	56%	488	75%	410	56%	447	76%	403	59%
70-74	Divorced	41	8%	68	11%	60	9%	77	10%	60	9%	88	12%	47	8%	92	13%
	Widowed	47	9%	186	31%	72	11%	241	31%	61	9%	211	29%	56	10%	168	24%
	Total	**525**	**100%**	**605**	**100%**	**670**	**100%**	**785**	**100%**	**652**	**100%**	**737**	**100%**	**586**	**100%**	**688**	**100%**
	Single	13	3%	29	6%	14	3%	17	3%	19	4%	21	4%	25	5%	23	3%
	Couple	285	74%	228	43%	303	75%	220	44%	354	77%	266	47%	386	75%	305	47%
75-79	Divorced	24	6%	32	6%	20	5%	49	10%	27	6%	54	9%	36	7%	63	10%
	Widowed	62	16%	235	45%	68	17%	213	43%	59	13%	224	40%	70	13%	262	40%
	Total	**384**	**100%**	**524**	**100%**	**405**	**100%**	**499**	**100%**	**459**	**100%**	**565**	**100%**	**517**	**100%**	**653**	**100%**
	Single	10	4%	24	7%	10	4%	25	7%	8	3%	23	6%	6	2%	15	4%
	Couple	183	67%	95	27%	181	69%	102	29%	171	66%	130	33%	187	70%	127	34%
80-84	Divorced	11	4%	12	3%	8	3%	17	5%	12	5%	26	7%	13	5%	26	7%
	Widowed	71	26%	217	62%	64	24%	202	58%	66	26%	210	54%	62	23%	206	55%
	Total	**275**	**100%**	**348**	**100%**	**263**	**100%**	**346**	**100%**	**257**	**100%**	**389**	**100%**	**268**	**100%**	**374**	**100%**
	Single	1	1%	27	8%	2	1%	30	9%	2	1%	16	7%	4	3%	16	8%
	Couple	76	43%	41	12%	86	50%	46	13%	84	58%	30	13%	90	57%	37	18%
85 or more	Divorced	2	1%	7	2%	1	1%	9	3%	2	1%	5	2%	3	2%	6	3%
	Widowed	96	55%	256	77%	84	48%	255	75%	58	40%	179	78%	60	38%	147	71%
	Total	**175**	**100%**	**331**	**3%**	**173**	**100%**	**340**	**100%**	**146**	**100%**	**230**	**100%**	**157**	**100%**	**206**	**100%**
	Single	259	7%	260	5%	319	7%	302	6%	274	7%	262	5%	319	8%	274	5%
	Couple	2928	74%	2793	57%	3293	74%	3202	59%	3002	75%	2892	59%	2957	74%	2912	59%
Total	Divorced	386	10%	632	13%	433	10%	732	13%	390	10%	678	14%	425	11%	726	15%
	Widowed	368	9%	1184	24%	379	9%	1223	22%	329	8%	1083	22%	309	8%	1038	21%
	Total	**3941**	**100%**	**4869**	**100%**	**4424**	**100%**	**5459**	**100%**	**3995**	**100%**	**4915**	**100%**	**4010**	**100%**	**4950**	**100%**

Chapter 5

KLoSA

Age Cat	Marital status	Wave 1 Male		Wave 1 Female		Wave 2 Male		Wave 2 Female		Wave 3 Male		Wave 3 Female		Wave 4 Male		Wave 4 Female	
	Single	31	4%	14	1%	22	4%	10	1%	20	4%	8	1%				
	Couple	704	90%	911	90%	557	89%	758	90%	501	89%	693	91%				
45-49	Divorced	39	5%	56	5%	39	6%	39	5%	35	6%	32	4%				
	Widowed	5	1%	36	4%	5	1%	32	4%	5	1%	33	4%				
	Total	**779**	**100%**	**1017**	**100%**	**623**	**100%**	**839**	**100%**	**561**	**100%**	**766**	**100%**				
	Single	12	2%	9	1%	10	2%	7	1%	11	2%	7	1%	16	4%	5	1%
	Couple	630	94%	726	86%	537	93%	623	86%	490	93%	575	85%	360	87%	540	91%
50-54	Divorced	21	3%	41	5%	19	3%	31	4%	20	4%	24	4%	32	8%	23	22%
	Widowed	9	1%	65	8%	10	2%	63	9%	8	1%	69	10%	4	1%	27	4%
	Total	**672**	**100%**	**841**	**100%**	**576**	**100%**	**724**	**100%**	**529**	**100%**	**675**	**100%**	**412**	**100%**	**595**	**100%**
	Single	5	1%	3	0%	4	1%	3	0%	3	1%	2	0%	9	2%	7	1%
	Couple	606	94%	625	82%	522	94%	533	82%	479	93%	508	81%	488	93%	562	84%
55-59	Divorced	16	3%	21	3%	15	3%	18	3%	16	3%	18	3%	17	3%	32	5%
	Widowed	15	2%	109	14%	13	2%	100	15%	15	3%	98	16%	10	2%	65	10%
	Total	**642**	**100%**	**758**	**100%**	**554**	**100%**	**654**	**100%**	**513**	**100%**	**626**	**100%**	**524**	**100%**	**666**	**100%**
	Single	5	1%	3	0%	1	1%	3	0%	3	1%	3	0%	4	1%	3	0%
	Couple	593	93%	577	77%	512	93%	499	76%	495	94%	469	76%	491	94%	526	83%
60-64	Divorced	18	3%	13	2%	15	3%	14	2%	12	2%	11	2%	18	3%	18	3%
	Widowed	21	3%	160	21%	19	3%	144	22%	18	3%	138	22%	11	2%	84	14%
	Total	**637**	**100%**	**753**	**100%**	**547**	**100%**	**660**	**100%**	**528**	**100%**	**621**	**100%**	**524**	**100%**	**631**	**100%**
	Single	1	0%	1	0%	1	0%	0	0%	1	0%	0	0%	2	1%	1	0%
	Couple	615	91%	515	62%	534	91%	432	60%	491	90%	389	57%	466	93%	432	74%
65-69	Divorced	14	2%	10	1%	11	1%	9	1%	11	2%	8	1%	15	3%	13	2%
	Widowed	44	7%	305	37%	38	7%	283	39%	40	7%	289	42%	17	3%	141	24%
	Total	**674**	**100%**	**831**	**100%**	**584**	**100%**	**724**	**100%**	**543**	**100%**	**686**	**100%**	**500**	**100%**	**587**	**100%**
	Single	0	0%	4	1%	0	0%	2	0%	0	0%	3	1%	3	1%	0	0%
	Couple	488	92%	322	50%	409	92%	272	50%	370	91%	223	45%	465	91%	387	58%
70-74	Divorced	6	1%	15	2%	4	1%	9	2%	4	1%	8	2%	9	2%	7	1%
	Widowed	36	7%	300	47%	32	7%	260	48%	33	8%	264	53%	36	7%	271	41%
	Total	**530**	**100%**	**641**	**100%**	**445**	**100%**	**543**	**100%**	**407**	**100%**	**498**	**100%**	**513**	**100%**	**665**	**100%**
	Single	1	0%	3	1%	0	0%	3	1%	0	0%	2	1%	0	0%	2	0%
	Couple	275	89%	153	30%	88	88%	125	28%	188	86%	93	24%	376	91%	247	46%
75-79	Divorced	1	0%	5	1%	0	0%	4	1%	1	0%	3	1%	5	1%	7	1%
	Widowed	32	10%	352	69%	12	11%	308	70%	29	13%	284	74%	33	8%	272	52%
	Total	**309**	**100%**	**513**	**100%**	**405**	**100%**	**440**	**100%**	**218**	**100%**	**382**	**100%**	**414**	**100%**	**528**	**100%**
	Single	0	0%	0	0%	0	0%	1	0%	0	0%	0	0%	0	0%	3	1%
	Couple	128	83%	45	17%	97	81%	31	14%	63	81%	15	9%	186	84%	79	22%
80-84	Divorced	2	1%	1	0%	1	1%	0	0%	0	0%	1	0%	2	1%	5	1%
	Widowed	24	16%	222	83%	22	18%	189	86%	15	19%	157	91%	32	15%	285	76%
	Total	**154**	**100%**	**268**	**100%**	**120**	**100%**	**221**	**100%**	**78**	**100%**	**173**	**100%**	**220**	**100%**	**372**	**100%**
	Single	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%	0	0%	3	1%
	Couple	51	75%	7	4%	34	67%	3	3%	21	64%	2	2%	84	80%	19	8%
85 or more	Divorced	1	1%	3	2%	0	0%	3	3%	0	0%	0	0%	0	0%	1	0%
	Widowed	16	24%	155	94%	17	33%	111	95%	12	34%	80	96%	23	20%	205	90%
	Total	**68**	**100%**	**165**	**3%**	**51**	**100%**	**117**	**100%**	**33**	**100%**	**83**	**100%**	**107**	**100%**	**228**	**100%**
	Single	55	1%	37	1%	40	1%	29	1%	38	1%	26	1%	34	1%	24	1%
	Couple	4090	92%	3881	67%	3435	91%	3276	66%	3098	91%	2967	66%	2916	91%	2792	65%
Total	Divorced	118	3%	165	3%	105	3%	127	3%	99	3%	105	2%	98	3%	106	2%
	Widowed	202	4%	1704	29%	186	5%	1490	30%	175	5%	1412	31%	166	5%	1350	32%
	Total	**4465**	**100%**	**5787**	**100%**	**3766**	**100%**	**4922**	**100%**	**3410**	**100%**	**4510**	**100%**	**3214**	**100%**	**4272**	**100%**

Source: author's own analysis of ELSA waves 3-6 and KLoSA waves 1-4

The living arrangements variable distinguished between older people living independently as a household, living with a partner as a couple, or living as a couple with young children in the same household. This situation can arise where older people move to their children's house or when their children move back to their parents' house. In addition to this, elderly people might live with their children and grandchildren.

Table 43 shows the basic comparative scheme used in this thesis, which includes five categories that are used most in the literature (see, for example, Shanas et al. (1968); Palmore (1975); UN 2005). The proportion of the elderly population who lived alone was very low in Korea (8.7% at wave 1) compared to England (with 27.8% at wave 3, the figure is three times higher than in Korea). In addition, the proportion of the elderly population who lived only with their partner was also slightly higher in England (47.4%) compared with Korea (34.3%). However, the proportion of the elderly couples who lived with their children was very high in Korea, with just over 40%, while in England the figure was only 15.6%. Interestingly, only a few older people lived with their children and grandchildren in England (marked as less than 1%), compared to 14% in the Korean sample. This is no surprise given that cohabiting with adult children is less common in Western countries (Cheng et al., 2015), whereas the Korean structure is more based on an extended family. However, this is rapidly shifting to a nuclear family structure (Yang and Klassen, 2010).

Table 43 Living arrangements at entry into the data set (wave 1, KLoSA, and wave 3, ELSA)

Living arrangement	Korea		England	
	Freq.	%	Freq.	%
Living along	888	8.7	2,452	27.8
Living with spouse only	3,513	34.3	4,178	47.4
Couple with children	4,164	40.6	1,373	15.6
Couple with children, grand children	1,442	14	42	0.5
Other	247	2.4	765	8.7
Total	**10,254**	**100**	**8,810**	**100**

Source: author's own analysis of ELSA wave 3 and KLoSA wave 4

5.3   Health profile of the study sample

There is a strong argument in both economic and social epidemiology literature that poor health limits a person's ability to access employment. This is because people may be unable to get paid work if they are ill, or may lose their jobs or need to retire on becoming ill (Martikainen et al., 2003, 2009). This may result in a reduction of their income. To

explore the notion that poor health in later life influences income mobility, a health variable will be used in the data analysis.

Figures 12 and 13 demonstrate respondents' perceptions of their current health status in each wave of the studies in England and Korea. In England, people generally reported "very good" and "good" (68%) and "fair" (25%) at the entry wave (wave 3) but the proportion of individuals who reported "poor" and "very poor" dramatically increased from 7.1% at wave 3 to 26.7% in waves 4 and 5 and 28% in wave 6.

Figure 12 Self-reported[33] general health in England, by wave

Source: author's own analysis, ELSA waves 3 - 6

By contrast, almost 30% of respondents in each wave in the Korean study reported their health status as "poor" and "very poor". The percentage of people in the "very good" and "good" health categories gradually decreased from 38% at the entry wave to 29% in wave 4.

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[33] The question is asked about the respondent's current health status (Q: would you say your health is Very good or good, Fair, Poor or Very poor?)

Figure 13 Self-reported general health (%) in Korea, by Waves

Source: Author's own analysis, KLoSA Wave 1 - 4

While Figures 12 and 13 alone cannot illustrate which age groups and gender was more likely to report better health, tables included in Appendix G and Appendix H show the health status of the sample by age groups, gender and wave. These results show that, in general, the percentage of the younger age group reporting their health as "very good" is larger than that of older age groups. This is expected, as people become frailer as they age. For example, among the 50–54 age group, 21% of both female and male respondents reported "poor" health, compared to 43% of the female and 40% of the male respondents in the aged 80 or over group. This trend was similar across waves 3 and 6 of ELSA and it was even more apparent in the Korean case that younger adults tended to report their health as "poor": only 10–15% at age 45–54 reported their health as "poor", compared to 45–60% of people aged 75 or over. This result supports the notion that older people are more likely than younger age groups to be in poor health.

To analyse respondents' health status further, Tables 44–45 below were computed to explore whether health affected respondents' physical activities. The tables show that the proportion of elderly men with long-standing illness and limited physical activity problems in England is higher than older women in waves 4, 5 and 6, except for the age group of 85 or over in wave 3. As was anticipated, individuals increasingly experience physical difficulties due to ill-health as they age (World Health Organization (WHO), 2011). Compared with England, in Korea, older women seem to have considerably more physical difficulties due to long-standing illness in all age groups. This is apparent across all waves and supports the evidence that younger adults tend to have better health than older age groups.

Table 44 Long-standing illness limit activities by gender, age groups, ELSA waves 3-6

Age Cat	Wave 3		Wave 4		Wave 5		Wave 6	
	Male	Female	Male	Female	Male	Female	Male	Female
50-54	21.5%	14.9%	19.2%	12.9%	15.0%	11.6%	15.1%	12.1%
55-59	31.9%	20.5%	27.0%	19.7%	19.0%	13.6%	19.8%	16.8%
60-64	42.1%	26.9%	34.4%	21.8%	28.2%	17.4%	29.6%	18.9%
65-69	48.1%	33.0%	46.6%	30.2%	38.6%	24.9%	39.2%	29.6%
70-74	55.9%	41.1%	54.1%	38.4%	46.7%	36.1%	52.2%	35.1%
75-79	66.1%	48.7%	62.5%	45.7%	56.2%	41.7%	59.7%	48.1%
80-84	64.7%	63.9%	61.5%	54.4%	64.2%	43.3%	64.2%	57.3%
85 +	69.1%	73.1%	74.1%	63.1%	62.8%	57.4%	72.8%	59.8%
Total	39.5%	27.5%	39.2%	27.3%	35.5%	24.8%	39.9%	29.7%

Source: author's own analysis, ELSA waves 3 - 6

Table 45 Long-standing illness limit activities by gender, age groups, KLoSA waves 1-4

Age Cat	Wave 1		Wave 2		Wave 3		Wave 4	
	Male	Female	Male	Female	Male	Female	Male	Female
45-49	11.1%	15.9%	13.3%	13.8%	14.2%	10.3%		
50-54	14.9%	21.5%	12.9%	19.2%	11.6%	15.0%	12.1%	15.1%
55-59	20.5%	31.9%	19.7%	27.0%	13.6%	19.0%	16.8%	19.8%
60-64	26.9%	42.1%	21.8%	34.4%	17.4%	28.2%	18.9%	29.6%
65-69	33.0%	48.1%	30.2%	46.6%	24.9%	38.6%	29.6%	39.2%
70-74	41.4%	55.9%	38.4%	54.1%	36.1%	46.7%	35.1%	52.2%
75-79	48.7%	66.1%	45.7%	62.5%	41.7%	56.2%	48.1%	59.7%
80-84	63.9%	64.7%	54.4%	61.5%	43.3%	64.2%	57.3%	64.2%
85 +	73.1%	69.1%	63.1%	74.1%	57.4%	62.8%	59.8%	72.8%
Total	27.5%	39.5%	27.3%	39.2%	24.8%	35.5%	29.7%	39.9%

Source: author's own analysis, KLoSA waves 1 - 4

Looking at Tables 46 and 47, it is evident that patterns were relatively similar throughout the waves for men and women who had self-reported health difficulties/disability that limit them to participating in economic activity. Evidently, younger age groups tended to have fewer health/disability problems than older groups, but economic inactivity due to those health/disability problems increases with age. For example, in England, only 12–21% of younger adults (male and female) aged between 50 and 55 reported that their paid work participation was limited because of a health/disability problem, whereas around 70% of older people aged 85 or over reported that their health conditions limit paid work. Similar patterns were found in the Korean case, with female elderly people tending to have more health/disability problems than their younger counterparts.

Table 46 Self-reported health problem/disability that limit paid work by gender, age groups, ELSA

Age	Wave 3		Wave 4		Wave 5		Wave 6	
	Male	Female	Male	Female	Male	Female	Male	Female
50-54	15.0%	20.4%	16.8%	19.1%	20.0%	29.2%	0%	0%
55-59	18.5%	23.1%	18.6%	18.9%	16.6%	19.7%	16.9%	20.0%
60-64	26.3%	22.8%	24.1%	27.0%	23.1%	24.4%	20.7%	22.6%
65-69	26.6%	29.4%	27.3%	27.9%	25.4%	28.6%	25.3%	26.4%
70-74	33.2%	29.6%	28.0%	31.2%	30.8%	34.3%	33.2%	31.5%
75-79	30.0%	38.6%	37.3%	41.4%	38.5%	38.7%	37.5%	39.7%
80-84	28.0%	44.8%	37.3%	45.1%	50.3%	48.3%	39.1%	49.2%
85 +	42.9%	43.9%	44.7%	48.2%	51.4%	51.5%	49.5%	51.9%
Total	24.5%	27.2%	26.3%	28.9%	28.8%	31.4%	29.4%	31.9%

Source: author's own analysis, ELSA waves 3 - 6

Table 47 Self-reported health problem/disability that limit paid work by gender, age groups, KLoSA

Age	Wave 1		Wave 2		Wave 3		Wave 4	
	Male	Female	Male	Female	Male	Female	Male	Female
45-49	11.3%	16.0%	13.3%	13.8%	14.2%	10.3%	0%	0%
50-54	14.4%	21.8%	12.9%	19.2%	11.6%	15.0%	12.1%	15.1%
55-59	20.9%	31.7%	19.7%	27.0%	13.4%	19.0%	16.8%	19.8%
60-64	26.8%	42.2%	21.8%	34.4%	17.4%	28.3%	18.9%	29.6%
65-69	33.1%	48.3%	30.2%	46.6%	24.9%	38.5%	29.6%	39.2%
70-74	41.1%	55.5%	38.4%	54.1%	36.1%	46.7%	35.1%	52.2%
75-79	48.5%	66.5%	45.7%	62.5%	41.7%	56.2%	48.1%	59.7%
80-84	63.9%	64.6%	54.4%	61.5%	43.3%	64.2%	57.3%	64.3%
85 +	72.1%	69.1%	63.1%	74.11%	57.5%	62.8%	59.8%	72.8%
Total	27.5%	39.6%	27.3%	39.2%	24.8%	35.5%	29.4%	39.9%

Source: Author's own analysis, KLoSA Wave 1 - 4

5.4 Educational profile of the study sample

The literature has identified that education plays an important factor in mobility (Birdsall and Graham, 2000; Rycroft, 2009). It is understood that there is a better chance to earn relative more income in later life if one has a higher educational level than those with low educational qualification (Jang 2002, Seok, 2009, Crawford et al., 2011, American Council on Education, 2007).

Table 48 provides respondents' educational levels. It is clear that, in both England and Korea, higher percentages of males report a high educational level in the cohort under study. In England, 68% of female respondents at wave 3 had a low educational level (no qualification or below NVQ2 level) and 12.9% of them had a high educational level (above degree level), whereas fewer male respondents had a low educational level (51.8%) and considerably more had a high educational level (21.8%). However, the difference is much higher in Korea, as only 4% of females achieve a high educational level (above degree), compared to males, of whom 17% did. Broadly speaking, older people in England have a more advanced educational level than older people in Korea. As may be expected, the cohort of the current study is older people, many of whom have no formal education or low educational qualifications. This is particularly the case for female elderly persons (aged 65 or over) in Korea, who are from a generation whose main role was housekeeping and caring for children or elders (Yang and Klassen, 2010).

Table 48 Educational Level by gender at wave 1 in KLoSA and wave 3 in ELSA

Education Level*	England				Korea			
	Male		Female		Male		Female	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Low	2,039	51.8	3,299	67.8	2,124	47.6	4,275	73.9
Middle	1,041	26.4	943	19.4	1,597	35.8	1,265	21.9
High	857	21.8	626	12.9	742	16.6	243	4.2
Total	**3,937**	100	**4,868**	100	**4,463**	100	**5,783**	100

Note: for cross-national comparison, International Standard Classification of Education ISCED 2011 was used to compute new categories.
Source: author's own analysis of ELSA wave 3 and KLoSA wave 1
Note: *see Table 25 in Section 3.8.3 about the educational qualification category

5.5 Personal economic attributes of the study sample

Further, much of the literature identifies that change in the employment status of older people (from employed to retired) is associated with a decrease in income and raises the likelihood of poverty (Bardasi and Jenkins, 2002; Gruber and Wise, 1999). Zaidi (2008)

suggests that leaving the workforce significantly influences change in the income of older people, particularly affecting downward income mobility and the chances of downward mobility were about three times greater for those who were retiring than for those who had already retired. This section provides information related to the socio-economic status of the sample in this study.

Table 49 provides the employment statuses of the study sample in both countries. In England, in Wave 3, nearly half of older people were retired, 34% were employed and 14.6% were unemployed. By contrast, in Korea, there was a considerably larger number of respondents who were unemployed in wave 1 (41%, nearly three times higher than in England) while the proportion of those who were employed was slightly higher (27.9%) than England, but the proportion who were retired (21.1%) was less than half that of England. The reason that the unemployment rate is higher in Korea might be explained by the fact that many older women (especially between 70-85 age group) had in-and-out employment history or never had a job; their main roles were housekeeping and caring for children (Choi and Chang, 2016). The difference can be seen more clearly when employment statuses are broken down by age group and gender in table 50 below.

Table 49 Employment status at entry into data set

Current employment status	Korea		England	
	Freq.	%	Freq.	%
Unemployed	4,200	41	1,288	14.6
Employed	3,888	37.9	3,002	34.1
Retired	2,166	21.1	4,517	51.3
Total	**10,254**	100	**8,807**	100

Source: Author's own analysis of ELSA Wave 3 and KLoSA Wave 1

Table 50 and 51 shows when individuals start to leave the labour market in order to entre retirement. For example, in the 55–59 age group in England, 74% of males and 63% of females are employed in wave 3, whereas in the 65–69 age group only 13% of males and 9% of females had the same engagement in the labour market. However, in Korea (table 51), there is a considerably lower proportion of older people (aged 55 to 59) in employment, with 69% of males and 28% of females, however the proportion of male elderly people aged between 65 and 69 who were still active in the labour market is three times higher than in England (39%). In general, in England, once individuals pass the state pension age (SPA), the proportion of older people in retirement increases with age. This was apparent across all waves. By contrast, the proportion of older people – particularly male elderly persons – who worked beyond the age for pension eligibility is considerably

higher in Korea (19% of aged 70–74 group is employed in wave 2 and this figure is increased to 27% in wave 3 and 25% in wave 4 respectively).

Table 50 Employment status by age groups, gender and wave in England

Age Cat	Wave	Wave 3				Wave 4				Wave 5				Wave 6			
	Gender	Male		Female		Male		Female		Male		Female		Male		Female	
50-54	Unemployed	70	11%	171	23%	61	13%	138	25%	15	15%	27	24%	36	13%	74	21%
	Employed	543	86%	568	75%	391	82%	410	73%	79	78%	85	75%	235	85%	273	78%
	Retired	20	3%	16	2%	22	5%	14	2%	7	7%	2	2%	6	2%	5	1%
	Total	633	100%	755	100%	474	100%	562	100%	101	100%	114	100%	277	100%	352	100%
55-59	Unemployed	106	14%	236	26%	116	14%	261	25%	116	15%	225	23%	96	12%	187	24%
	Employed	551	74%	576	63%	625	76%	673	65%	595	76%	652	68%	467	52%	512	66%
	Retired	88	12%	100	11%	80	10%	98	10%	73	9%	84	9%	80	36%	78	10%
	Total	745	100%	912	100%	821	100%	1032	100%	784	100%	961	100%	643	100%	777	100%
60-64	Unemployed	94	14%	122	16%	115	13%	138	13%	116	13%	146	14%	89	2%	126	13%
	Employed	341	52%	231	31%	498	55%	359	33%	457	52%	342	31%	393	20%	330	34%
	Retired	228	34%	405	53%	299	33%	603	55%	298	34%	602	55%	272	78%	78	53%
	Total	663	100%	758	100%	912	100%	1100	100%	871	100%	1090	100%	754	100%	534	100%
65-69	Unemployed	16	3%	112	18%	25	4%	102	13%	27	4%	94	12%	19	3%	86	9%
	Employed	68	13%	56	9%	128	18%	78	10%	135	19%	93	11%	159	8%	120	13%
	Retired	457	84%	467	74%	549	78%	613	77%	549	77%	632	77%	624	89%	712	78%
	Total	541	100%	635	100%	702	100%	793	100%	711	100%	819	100%	802	100%	918	100%
70-74	Unemployed	15	3%	97	16%	20	2%	89	11%	13	2%	83	15%	20	2%	63	9%
	Employed	31	6%	18	3%	43	6%	25	3%	51	8%	27	11%	44	8%	29	4%
	Retired	479	91%	489	81%	607	91%	671	86%	586	90%	627	77%	522	89%	596	87%
	Total	525	100%	604	100%	670	100%	785	100%	650	100%	737	100%	586	100%	688	100%
75-79	Unemployed	11	3%	89	17%	10	3%	66	13%	10	2%	60	11%	10	2%	59	9%
	Employed	12	3%	5	1%	10	2%	4	1%	19	4%	7	4%	22	4%	9	1%
	Retired	361	94%	430	82%	384	95%	429	86%	431	94%	497	85%	484	94%	584	90%
	Total	384	100%	524	100%	404	100%	499	100%	460	100%	564	100%	516	100%	652	100%
80-84	Unemployed	9	3%	66	19%	5	2%	40	12%	7	3%	46	11%	7	3%	33	9%
	Employed	1	0%	1	0%	5	2%	1	0%	5	2%	3	1%	3	1%	3	1%
	Retired	265	97%	280	81%	253	96%	305	88%	245	95%	339	88%	258	96%	338	90%
	Total	275	100%	347	100%	263	100%	346	100%	257	100%	388	100%	268	100%	374	100%
85 or more	Unemployed	6	3%	68	21%	8	5%	64	19%	3	2%	40	12%	2	1%	17	8%
	Employed	0	0%	0	0%	0	0%	2	1%	1	1%	0	1%	2	1%	0	0%
	Retired	169	97%	263	79%	165	95%	274	81%	142	97%	188	87%	153	97%	188	92%
	Total	175	100%	331	100%	173	100%	340	100%	146	100%	228	100%	157	100%	205	100%
Total	Unemployed	327	8%	961	20%	360	8%	898	17%	307	8%	721	15%	279	7%	645	13%
	Employed	1547	39%	1455	30%	1700	49%	1552	28%	1342	34%	1209	25%	1325	33%	1276	26%
	Retired	2067	53%	2450	50%	2359	53%	3007	55%	2331	59%	2971	61%	2399	60%	3007	61%
	Total	3941	100%	4866	100%	4419	100%	5457	100%	3980	100%	4901	100%	4003	100%	4928	100%

Source: author's own analysis using ELSA waves 3-6

Table 51 Employment status by age groups, gender and waves in Korea

Age Cat	Wave	Wave 1 Male		Wave 1 Female		Wave 2 Male		Wave 2 Female		Wave 3 Male		Wave 3 Female		Wave 4 Male		Wave 4 Female	
	Gender	Male		Female		Male		Female		Male		Female		Male		Female	
45-49	Unemployed	55	7%	446	44%	23	6%	172	33%	10	9%	57	32%				
	Retired	23	3%	110	11%	9	3%	46	9%	3	3%	12	11%				
	Employed	701	90%	461	45%	337	91%	296	58%	93	88%	96	57%				
	Total	779	100%	1017	100%	369	100%	514	100%	106	100%	165	100%				
50-54	Unemployed	59	9%	398	47%	40	7%	295	38%	32	6%	231	37%	24	6%	240	36%
	Retired	50	7%	106	13%	18	3%	94	12%	16	3%	93	14%	16	4%	121	18%
	Employed	563	84%	337	40%	541	90%	382	50%	504	91%	416	49%	372	90%	304	46%
	Total	672	100%	841	100%	599	100%	771	100%	552	100%	740	100%	412	100%	665	100%
55-59	Unemployed	88	14%	415	55%	62	11%	278	42%	45	9%	245	43%	38	7%	248	40%
	Retired	111	17%	129	17%	58	10%	122	18%	46	9%	92	20%	42	8%	163	27%
	Employed	443	69%	214	28%	438	79%	263	40%	430	82%	305	36%	444	84%	201	33%
	Total	642	100%	758	100%	558	100%	663	100%	521	100%	642	100%	524	100%	612	100%
60-64	Unemployed	117	18%	455	61%	78	14%	305	49%	59	11%	283	49%	58	11%	288	47%
	Retired	181	28%	137	18%	126	22%	146	24%	117	21%	134	26%	121	23%	191	31%
	Employed	339	53%	161	21%	355	64%	168	27%	371	68%	216	25%	345	66%	130	21%
	Total	637	100%	753	100%	559	100%	619	100%	547	100%	633	100%	524	100%	609	100%
65-69	Unemployed	122	18%	537	65%	86	15%	391	53%	62	12%	327	50%	41	8%	312	48%
	Retired	288	28%	157	19%	215	38%	178	24%	194	37%	173	27%	214	43%	215	33%
	Employed	264	39%	137	16%	258	46%	169	23%	266	51%	152	23%	245	49%	123	19%
	Total	674	100%	831	100%	559	100%	738	100%	522	100%	652	100%	500	100%	650	100%
70-74	Unemployed	120	23%	465	73%	78	14%	362	56%	74	14%	333	57%	51	10%	253	53%
	Retired	281	53%	123	19%	282	51%	184	28%	265	49%	183	31%	270	53%	171	36%
	Employed	129	24%	53	8%	194	35%	106	16%	199	37%	141	12%	192	37%	51	11%
	Total	530	100%	641	100%	554	100%	652	100%	538	100%	657	100%	513	100%	475	100%
75-79	Unemployed	79	26%	390	76%	61	19%	311	65%	49	14%	260	62%	45	11%	203	60%
	Retired	193	62%	102	20%	194	82%	133	28%	206	59%	156	31%	267	64%	121	36%
	Employed	37	12%	22	4%	58	19%	36	7%	95	27%	52	7%	102	25%	15	4%
	Total	309	100%	514	100%	313	100%	480	100%	350	100%	468	100%	414	100%	339	100%
80-84	Unemployed	51	33%	226	84%	31	18%	198	69%	22	12%	220	70%	18	8%	90	65%
	Retired	88	57%	38	14%	120	70%	83	29%	133	74%	93	28%	171	78%	47	34%
	Employed	16	10%	4	2%	20	12%	7	2%	25	14%	22	2%	31	14%	1	1%
	Total	155	100%	268	100%	171	100%	288	100%	180	100%	335	100%	220	100%	138	100%
85 or more	Unemployed	34	50%	143	87%	26	31%	140	71%	19	20%	147	65%	10	9%	31	62%
	Retired	30	44%	19	12%	50	60%	55	28%	63	67%	69	34%	83	78%	19	38%
	Employed	4	6%	3	2%	8	9%	2	1%	12	13%	2	1%	14	13%	0	0%
	Total	68	100%	165	100%	84	100%	197	100%	94	100%	218	100%	107	100%	50	100%
Total	Unemployed	725	16%	3475	60%	485	13%	2452	50%	372	11%	2103	47%	285	9%	1905	45%
	Retired	1245	28%	921	16%	1072	28%	1041	21%	1043	31%	1005	22%	1184	37%	1147	27%
	Employed	2496	56%	1392	24%	2209	59%	1429	29%	1995	58%	1402	31%	1745	54%	1220	29%
	Total	4466	100%	5788	100%	3766	100%	4922	100%	3410	100%	4510	100%	3214	100%	4272	100%

Source: Author's own analysis using KLoSA wave 1-4

Another important component to look at older people's personal economic attributes is homeownership, which also represents a key component of the household asset. Home ownership is a good proxy for wealth of older people and it can be seen as the financial asset that can be used the economic buffer (as they may transform into annuity, or lump sum cash) (OECD, 2013).

In England, as shown in table 52, the overwhelming majority of the sample, 81.4%, were homeowners, as opposed to 17.5% who were renters. By contrast, the Korean sample showed slightly fewer homeowners, 76.3%. However, a high proportion 11.6% lived in leased homes and were not required to pay a monthly rent. The notable difference between the two samples was that more of the English older people lived in rented homes (including rent-free houses provided by local authorities). Housing wealth is a major part of the retirement resources that older people may find useful when they face a shock to their income (OECD, 2013).

Table 52 Housing tenure at entry into the data set

Housing tenure	Korea		England	
	Freq.	%	Freq.	%
Owned	7,811	76.3	7,175	81.4
Lease without monthly rent (Jeonse*)	1,187	11.6	n/a	n/a
Tenant	854	8.3	1,541	17.5**
Other/ Refuse to answer	402	3.8	94	1.1
Total	**10,254**	100	**8,810**	100

Source: author's own analysis of ELSA wave 3 and KLoSA wave 1
Note: * Jeonse is a real estate term unique to Korea, under which the renter will not pay a monthly rent but has to pay a lump sum deposit on a rental house or flat at anywhere from 50% to 80% of the market value. ** Among this group, 1.3% (112) live in a rent-free home provided by the local authority.

5.6   Relative economic status of older people in England and Korea

Having discussed personal economic attributes of older people, now it examines the relative economic status of older people in both countries. Table 53 presents the total monthly income per wave by gender for different age groups for both England and Korea. It shows that males have a higher income than females in both countries. The relative economic status of older people in England is slightly higher than in Korea. In particular, females earn nearly twice as much as their Korean counterparts and their income seems to be stable and increase slightly over time. In both countries, older age groups have a lower average income than the younger age group (65 or under).

In both countries, older people have experienced a steady increase in income between the studied 2006 and 2012 periods. This may be due to the inclusion in the sample of additional older people (who had a much better economic position than people who had already retired) in various waves in England, whose income reached a peak close to their retirement. It is evident that subgroups of very old people aged 80 or over are significantly more disadvantaged than younger age groups (under 65) in both countries. This is especially the case in Korea. For example, in Korea, female elderly people who were aged between 80 and 84 had an equivalised monthly mean income of US$133 in 2006 (wave 1) whereas the same age group in England had an income nearly four times higher (US$558).

Table 53 Equivalised monthly total income by waves, gender, and age groups (expressed in the US $)

Age	Wave 1 / Wave 3(ESLA) KLoSA		ELSA		Wave2 / Wave 4(ELSA) KLoSA		ELSA		Wave3 / Wave 5 (ELSA) KLoSA		ELSA		Wave4 / Wave 6 (ELSA) KLoSA		ELSA	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
45-49	1327	352	0	0	1420	433	0	0	1245	406	0	0	0	0	0	0
50-54	1243	344	1956	990	1340	392	1888	1040	1497	473	1995	1164	1714	493	2134	1336
55-59	1048	293	1717	738	1186	389	1732	886	1292	420	1823	980	1499	439	1761	1056
60-64	861	267	1188	665	988	354	1163	727	937	336	1209	774	1095	359	1319	945
65-69	645	252	837	472	730	311	903	3914	758	294	1025	565	819	290	1115	645
70-74	574	254	721	470	527	271	812	493	482	278	825	560	593	284	995	591
75-79	447	191	707	500	464	233	748	583	409	233	804	586	407	255	957	629
80-84	364	133	643	558	385	170	729	578	381	225	789	638	461	355	895	688
85+	258	71	655	611	249	101	720	705	205	124	760	645	421	306	945	681

Source: author's own analysis
Note: the income data are adjusted to monthly per capita income for both countries and converted to US dollars using the Purchasing Power Parity (PPP). The income number for KLoSA and ELSA are obtained as follows: first, the gross numbers were obtained from the survey data. Then a web converter was used to calculate the same value in US dollars (http://salaryconverter.nigelb.me/). The data used by this web converter comes from the World Bank. Throughout this chapter, household income is expressed in per capita terms and in constant 2013 purchasing power parity (PPP) in US dollars.

Table 54 below also illustrates the relative economic wellbeing of older people in both countries. It compares the average (equivalent) income for older people who are aged 65 or over and the younger adult group (aged between 50-64 for England and 45-64 for Korea) at two points in time. The analysis uses median income as the measure of average income in order to minimise the extreme values. In addition, it uses annual net household income and after adjusting for inflation using Consumer Price Index (CPI) income was expressed in UK pound using the Purchasing Power Parity (PPP).

As it shown in Table 54, in both countries, younger age groups had a higher income than older people over 65 groups, however, the relative economic wellbeing of older people in Korea was worse compared to older people in England. This is partly caused by the

immature state pension system and lower value of the Korean benefits system for the elderly population. In addition, as was discussed in Chapter 4, the English state pension and benefits system is more generous and has a higher value than in Korea.

Table 54 also shows the poverty incidence for both the elderly group and younger adult group in England and Korea, using 60% of the median income in each year as the poverty line. The results were calculated from a sample of both datasets using equivalised household annual income (square root of household size). In both countries, older people are more likely to be poorer than younger adults but the differences are larger in 2006 than in 2012, and more noticeable in Korea compared to England. The poverty incidence for older people is nearly two times higher in Korea than in England. In addition, it appears that the poverty incidence for the younger adult group in Korea is also higher than in England but the poverty rate declined significantly and it is half that in the elderly group. Moreover, similar to the poverty line, the poverty gap for older people is significantly higher in Korea than in England. This is partly caused by the fact that cash benefits (minimum income for poor people) are significantly lower in Korea than in England.

Table 54 Cross-national comparison of relative economic wellbeing of older people in England and Korea between 2006 and 2012

England	Wave 3	Wave 6 (A)	Ratio W6/W3	Wave 6 (B)	Ratio W6/W3
1. Median Income (eq. annual, in 2008 (wave 4) prices, in pounds)					
1.1 Elderly population (65 or more)	11,442	14,163	**1.24**	13,863	**1.21**
1.2 Younger adult groups (age 50-64)	16,415	18,678	1.14	19,178	1.17
Total	13,239	15,461	1.17	16,121	1.22
2. Poverty rate (60% cut-off)					
2.1 Elderly population	28.9%	21.1%	**0.73**	24.6%	**0.85**
2.2 Younger adult groups (age 50-64)	18.2%	14.5%	0.80	14.2%	0.78
Total	20.9%	18.2%	0.87	18.9%	0.90
3. Median poverty gap					
3.1 Elderly population	15.6%	13.3%	**0.85**	14.3%	**0.92**
3.2 Younger adult groups (age 50-64)	11.2%	10.8%	0.96	10.4%	0.93
Total	13.0%	11.7%	0.90	11.9%	0.92
Korea	Wave 1	Wave 4 (A)	Ratio W4/W1	Wave 4 (B)	Ratio W4/W1
1. Median Income (eq. annual, in 2008 prices, in pounds)					
1.1 Elderly population (65 or more)	2,355	4,791	**2.03**	4,694	**1.42**
1.2 Younger adult groups (age 45-64)	7,150	9,973	1.39	10,170	1.99
Total	4,996	7,080	1.42	7,041	1.41
2. Poverty rate (60% cut-off)					
2.1 Elderly population	51.7%	42.7%	**0.82**	43.7%	**0.85**
2.2 Younger adult groups (age 45-64)	27.2%	20.3%	0.75	19.7%	0.72
Total	37.1%	28.2%	0.76	29.7%	0.80
3. Median poverty gap					
3.1 Elderly population	24.1%	25.7%	**1.07**	25.1%	**1.04**
3.2 Younger adult groups (age 45-64)	17.7%	12.7%	0.72	12.4%	0.70
Total	15.1%	16.3%	1.08	15.5%	1.03

A: The column shows only the observations present in the 2012 Wave 6 (ELSA) and WAVE 4(KLoSA)
B: All the observations in Waves 3 & 6 (ELSA) and Waves 1 & 4 (KLoSA)
Note: in order to compare income in real term, incomes are expressed in pound (using PPP index) and 2008 prices for both countries

The two tables shown in this sub-section provide the context for later results on income mobility and its correlates in the next Chapter 6. It is evident that, in general, older people's economic wellbeing in both countries is improving between 2006 and 2012, and exploring their income movement on each measured year is the next step. The following section will present descriptive results on income mobility for older people in England and Korea.

5.7 Cross-national comparison on income mobility (Absolute mobility) - Income trajectories descriptive results (RQ1)

As discussed in the literature review (Chapter 2), in the relative income mobility, some people move from the low-income to high-income groups and some people move down to the low-income group, but such income movements do not happen in one go. Thus, it is important to understand why different people follow different income trajectories and whether movements over time are chaotic or follow discernible patterns. It is especially important to analyse the low-income groups and those who are moving in and out of poverty, as this will help policy makers to analyse what factors or policies might help those people with low income to move onto a rising income trajectory.

Applying the absolute income mobility term, analysis of income trajectories will allow an exploration of the following research question in more detail:

RQ1) How much absolute income mobility is observed for older people in Korea between 2006 and 2012 and how did this compare with income mobility in England?

Addressing RQ1 requires an analysis of the absolute income mobility of older people from a macroscopic perspective, using 2006 as the base year and 2008–2012 as the measured years. To answer RQ1, the following measurements of income mobility will be used:

- Fields and Ok's (1996) mobility index.
- Income trajectories using six categories.

5.7.1 Fields and Ok (1996) mobility index

Fields and Ok's absolute mobility measures how much income mobility is observed from the initial year to the final year. The measure is defined as below:

$$m(x,y) = \frac{\sum_{i=1}^{N} |x_i - y_i|}{\sum_{i=1}^{N} x_i}$$

Where N is the number of individuals in the population, x_i is income in the initial year of individual i and y_i is the final-year income of the same individual i.

Table 55, the Fields and Ok mobility index shows the total change in older people's income between 2006 and 2008 (short-term), and 2006–2010 and 2006-2012 (medium-term) in England and Korea. Overall, the result confirms that there is considerably more income mobility (total change in older people's income) in Korea, with 60.4% (2006–2008), 67.3% (2006–2010) and 78.2% (2006–2012) than in England where older people experienced less mobility over the same periods, with 36.5% (2006–2008), 39.9% (2006–2010) and 48.1% (2006–2012). This result indicates strong evidence that older people in both countries experienced income mobility over the measured years. However, the reason behind why income mobility was higher in Korea may explain by few elements; Korean sample is younger than England, the immaturity of state pension system, and many older people receive income from family or self-employment. However, this measurement simply shows the total sum of absolute changes in income from the initial year to the final year, so one limitation is that it cannot be clear about the directional movement, that is, whether it was a rising mobility or falling mobility. Thus, using income trajectories within six selected categories, the analysis below will investigate the characteristics of income mobility using the income information for the periods covered. This approach quantifies the income mobility outcomes based on the different thresholds of income changes and whether income increased or decreased.

Table 55 Income mobility amongst older people in England and Korea: Fields & Ok income mobility measures between 2006-2012

Country	Fields & Ok 'absolute' mobility index: Percentage mobility		
	2006-08	2006-10	2006-12
England	36.5%	39.9%	48.1%
Korea	60.4%	67.3%	78.2%

Source: author's calculations using the ELSA (waves 3-6) and KLoSA (waves 1-4)

5.7.2 Income trajectory

Before carrying out the income trajectory analysis that was developed by Gardiner and Hills (1999) and, subsequently, Zaidi et al. (2001) and Sefton and Rigg (2004) (which divided income trajectories into six categories: *flat, rising, falling, flat with blips, fluctuating, and other*; see section 3.7.4.1), we need to understand the data in a more complex way than what can be derived from two-dimensional transition matrices. To

explore the two data sets, the author followed Gardiner and Hills's (1999) approach, using a diagram to illustrate how people move between the low-income (bottom 20%) groups and high-income (highest 80%) groups. It generates eight possible trajectories for each group.

Diagram 1 shows the pattern of movement between the four waves of ELSA. There are altogether sixteen possible trajectories; Diagram 1 shows that 392 people moved from the bottom 20% (b.2) groups to the top 80% (t.8) groups between wave 3 and wave 4. This represents around 36.7% of the bottom 20% and 9.2% of the top 80% of earners. It can be seen that those who drop from the high-income group (top 80%) to the low-income group (bottom 20%) between wave 3 and wave 4 have a greater propensity of moving back into the high-income group in waves 5 and 6 than those who were in the bottom 20% income group in the first two waves. These individuals move back to the high-income group in wave 5 (56%) and in wave 6 (64%). By contrast, of those who shift from the low-income group to the high-income group nearly 56% remained in that position in the following wave (e.g. Wave 3 ↑ 4 ➔5➔6).

Diagram 1 Income trajectories in first four Waves of ELSA
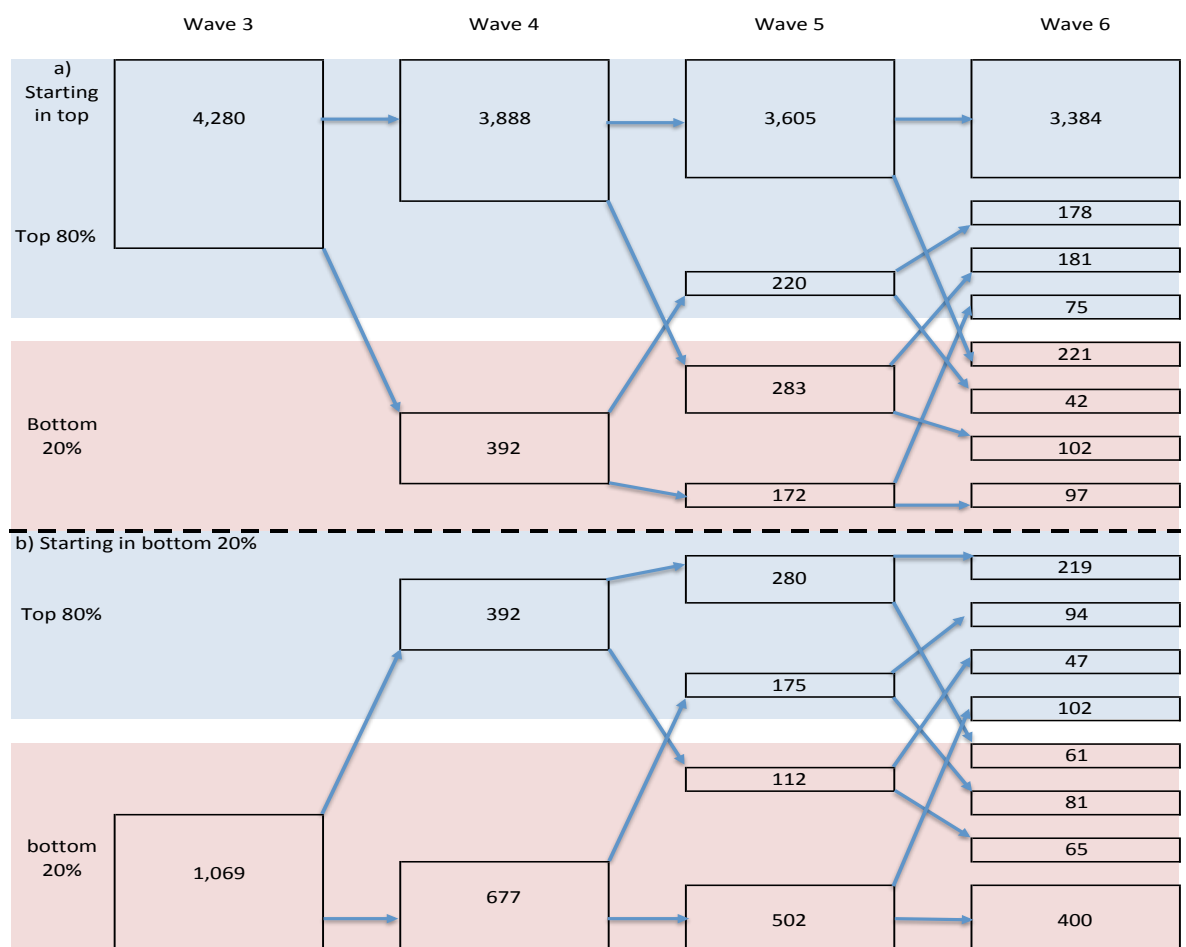
Source: author's own analysis of ELSA from 2006 to 2012

From the people who moved from the top 80% to the bottom 20%, who numbered 392 (wave 3 → wave 4) and 283 (wave 4 → wave 5), 56% (220) moved back to the top 80% in wave 5 and 64% (181) moved back to the top 80% in wave 6. Over the same period, 29% of people (392→112) moved back to the bottom 20% between wave 3 and wave 5 and 46% (175→81) did so between wave 4 and wave 6. Finally, the analysis confirms that, of those who started at the bottom in wave 3, 57% remained or dropped back to their original group in wave 6.

By contrast, in Korea, Diagram 2 shows that 53.3% of people (697) moved from the bottom 20% to the top 80% (wave 1 → wave 2), which is 13 percentage points higher than compared with England (40.9%). Of those who left the bottom 20% between wave 1 and wave 2, only 71 (10%) in wave 3 and 37 (24.8%) in wave 4 dropped back to the bottom 20%. This is a lot less than in England, which seems to point to a longer flow between income classes in Korea.

Diagram 2 Income trajectories in first four Waves of KLoSA

Source: author's own analysis of KLoSA from 2006 to 2012.
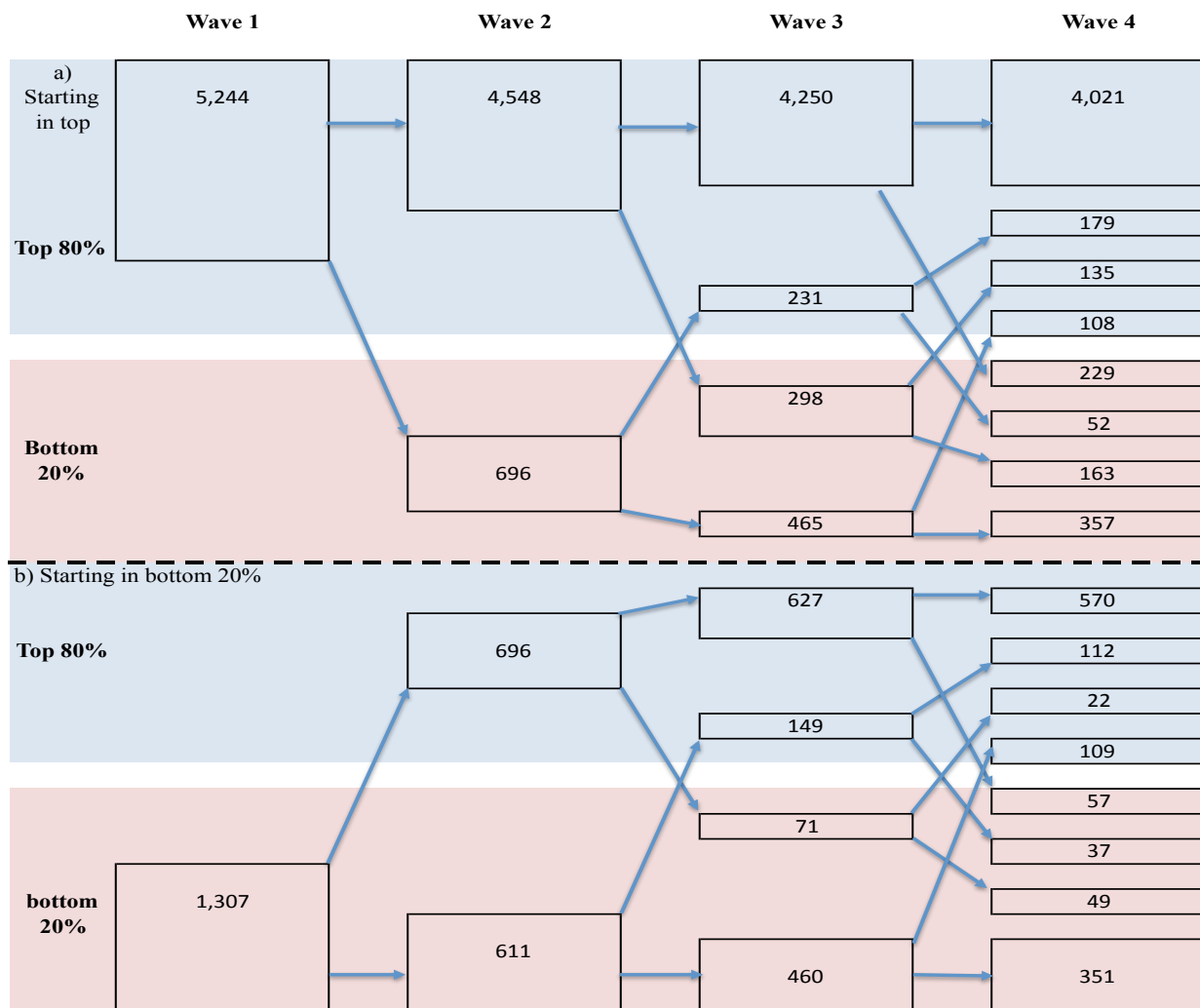
The two diagrams shown above clearly indicate that, contrary to conventional wisdom that older people experience less income change in old age, older people with low income do not always stay in their income position throughout the measured years, but, a large proportion of older people in both countries in fact experienced income mobility (in and out) which motivates this study to investigate further about what factors affecting income mobility in old age (in Chapter 6).

Although the above analysis illustrates the complexity of the pattern, it has a number of drawbacks. One is that this type of analysis cannot show how large or small the movements were between the waves, and another is that it cannot show much detail about the movements within the top 80%. To solve these limitations, the author uses the income trajectory approach developed by Zaidi et al (2001) and Sefton and Rigg (2004) to summarise income mobility over the measured periods by broad categories according to the type of income change.

Table 56 shows the breakdown of income trajectories. One can see that England shows a lot more stability than Korea for the income classes; the percentage of cases in which the trajectory is flat is 36.6% for England, higher than Korea's 28.6%. By contrast, Korea shows a much higher percentage of occurrences of the "rising" (20%) and "falling" (25.2%) categories than England does (14.8% "rising" and 13.9% "falling"). In both countries it appears that "fluctuating" movement is limited: this occurs for only 4.5% of respondents in England and 2.3% of respondents in Korea. This result confirms similar patterns found in the above diagram analysis and suggests that there is more income mobility in Korea, particularly long-range mobility (more than 15% up or down), than in England.

Table 56 Income trajectories by types

Trajectory Types	England	Korea
Flat, less than 15%	36.6%	28.6%
Flat with blips	8.6%	17.4%
Rising more than 15%	14.8%	20%
Falling more than 15%	13.9%	25.2%
Fluctuating	4.5%	2.3%
Other	21.6%	6.5%

Source: author's own analysis of ELSA and KLoSA four waves from 2006 to 2012.

It is evident that people who are in different age groups with particular demographic characteristics may be associated with different income trajectories. For example, the younger age group has a better economic status than older groups, and single households

with children earn much less than couples with no children. In addition, most female elderly people who are aged 65 or over and are single tend to have a higher income risk than male elderly people. To explore this, and how strong the association is between individuals' demographic characteristics and income trajectories, the following descriptive data analysis was carried out, placing the age cut-off line at 65. This age is the most commonly used age cut-off line in the literature (e.g. Rigg and Sefton, 2004 and Zaidi, 2008).

Table 57 shows the proportion of individuals who experienced each of the six income trajectories. The figures are broken down according to individuals' demographic situation in the entry wave (wave 1 for Korea and wave 3 for England). First, it is obvious that the group with the largest number of individuals in England was "couples under 65 years old with no children". The second largest group was "couples over 65 years old with no children". By contrast, in Korea, the two groups with the highest number of occurrences are "couples under 65 with children" and "couples over 65 with children". The evidence strongly illustrates that different demographic situations are associated with particular income trajectories. The results confirm that "flat" trajectories, in all categories, are more common in England than in Korea. However, for England one can see that among "flat" trajectories, the largest groups were the "single" categories; in Korea, it is not clear whether single individuals or couples had a higher occurrence of "flat" trajectories. The most downward mobility group in Korea is "single over 65 with no children", with 46% in the falling trajectory. This is six times higher than in England, which showed an equivalent figure of 7%. The pattern shown in Table 56 confirms the evidence on how changes in family circumstances are likely to affect people's income according to their demographic situation.

Table 57 Income trajectories by types

Situation	% of cases Eng	% of cases Kor	#Obs Eng	#Obs Kor	Flat Eng	Flat Kor	Flat&Blips Eng	Flat&Blips Kor	Rising Eng	Rising Kor	Falling Eng	Falling Kor	Flactuating Eng	Flactuating Kor	Other Eng	Other Kor
Single adult, under 65, no children	8.87	0.89	530	58	50.6	29.3	10	25.9	11.9	25.9	8.7	15.5	2.6	3.4	16.2	13.8
Single adult, under 65, with children	2.63	5.51	157	361	54.1	27.7	12.1	18	7	18	8.9	17.7	3.2	2.2	14.6	15.8
Single adult, over 65, no children	15.18	0.56	907	37	67.4	13.5	10.4	16.2	9.2	16.2	7.1	45.9	0.9	0	5.1	5.4
Single adult, over 65, with children	1.56	10.76	93	705	64.5	31.2	10.8	13.5	5.4	13.5	5.4	27.5	2.2	2.4	11.8	5.4
Couple, under 65 no children	29.29	1.04	1750	68	32	27.9	12.2	13.2	15.1	13.2	15.4	23.5	5.1	8.8	20.2	11.8
Couple, under 65 with children	16.7	56.79	999	3720	32.3	30.3	6.1	17.9	11.6	17.9	13.6	18.4	4.9	2.4	31.4	12.6
Couple, over 65, no children	23.67	0.26	1414	17	41.4	23.5	14.3	17.6	12.5	17.6	15.1	17.6	2.8	0	14	11.8
Couple, over 65, with children	2.08	24.19	124	1585	46	26.3	13.7	18.6	8.9	18.6	21	31	1.6	1.6	8.9	4.8

Source: author's own analysis of ELSA and KLoSA from 2006 to 2012

5.8 Cross-national comparison of income mobility (Relative mobility) - descriptive results (RQ2)

This section analyses, from a cross-national and macroscopic perspective, the relative mobility of older people in England and Korea. Relative income mobility investigates the positional changes in a person income rank relative to the other people in the sample (Section 5.8.1 and 5.8.2). This measures how an individual moves up or down the income scale over the short term (year on year) and over the medium-to-long term. This analysis will enable this thesis to explore the following research question:

> **RQ2)** How much relative income mobility is observed for older people in Korea between 2006 and 2012 and how did this compare with income mobility in England?

Addressing RQ2 requires an analysis of the relative income mobility of older people from a macroscopic perspective, using 2006 as the base year and 2008–2012 as the measured years. First, a measurement using the rank-mobility index must be made. This is measured using the rank-mobility calculation suggested by Wodon and Yitzhaki (2001). As Wodon and Yitzhaki's (2001) rank-mobility calculation explains the phenomenon of overall income mobility (i.e. "there is/is not income mobility" or "there is a great deal of/little income mobility"), it poses limitations in terms of grasping the direction and scale of the rank-mobility. Thus, in order to measure in a supplementary way the positional movement of rank over time, a second analysis involving a quintile transition matrix was used.

5.8.1 Rank Mobility

The rank mobility of older people in the sample was measured by investigating how much income rank mobility there was between the base period of 2006 and the final period of each of the years 2008, 2010 and 2012.

The method for calculating the rank-mobility index is $S = \frac{(1-\Gamma^{12})G^1 + (1-\Gamma^{21})G^2}{G^1 + G^2}$. The rank-mobility index (S) is composed of the Gini index G of the base year and the measured years and the covariance index Γ between the rank and income of the base and measured years. Based on these results of Γ, the rank-mobility index (S) has a value of $0 \leqq S \leqq 2$. If $\Gamma = 0$, S becomes closer to 1, which means that there is much income mobility. If $\Gamma = 1$,

$S = 0$ meaning that there is no or very little income mobility. If $\Gamma = -1$, $S = 2$, specifically, if $1 < S < 2$, there is inverse income mobility between the high-income groups and the low-income groups, and if $S = 2$, there is perfect inverse mobility between the two groups.

Table 58 Rank mobility index (reference year is wave 1 for KLoSA and wave 3 for ELSA)

Group	Measure	Income types	Wave 1-2		Wave 1-3		Wave 1-4	
			Eng	Kor	Eng	Kor	Eng	Kor
Aged 65 or over	Γ^{21} (backward Gini Correlation coefficient)	Equivalised household income*	.634	.479	.602	.440	.741	.392
	Rank mobility (S)	Equivalised household income*	.185	.459	.311	.516	.247	.629
Aged 45/50 - 64	Γ^{21} (backward Gini Correlation coefficient)	Equivalised household income*	.512	.485	.476	.460	.424	.415
	Rank mobility (S)	Equivalised household income*	.444	.453	.507	.515	.569	.575

Source: author's own analysis, using ELSA waves 3–6, and KLoSA, waves 1-4
Note: * Equivalised Household income (square root scale)
    Used weight and balanced panel.

If we take a closer look at the characteristics of the relative income mobility of the elderly population in England and Korea, it can be concluded that in Korea there was generally mid-level income mobility of older people aged 65 or over between 2006 and 2012. However, compared with Korea, the same group in England experienced low-level income mobility over the same period. Specifically, when we examined the household equivalised income of elderly people aged 65 or above as the standard, the values found were between 0 and 1, with 0.459 being the lowest (in 2008) and 0.629 the highest (in 2012). There was also mid-range mobility at 0.516 (in 2010). In addition, the younger age group (aged 45–65) were similarly revealed to have mid-range rank-mobility in Korea. Neither group had a rank-mobility (S) value over 1, and the inverse mobility between the wealthy and the low-income groups was relatively small. By contrast, in England, using household equivalised income as the standard, elderly people (aged 65 or above) experienced low-level income

mobility between the measured years, with 0.185 being the lowest (in 2008) and 0.311 as the highest (in 2010); there was also a value of 0.247 (in 2012). However, in a similar way to Korea, the younger age group (aged 45–65) was shown to experience mid-range rank mobility, with 0.444 (in 2008), 0.507 (in 2010) and 0.569 (in 2012).

To clarify this explanation of rank-mobility (S) further in the two countries, the correlation coefficient value Γ^{21} income rank was examined for 2006 and each of the measured years between 2008–2012. In Korea, considering the equivalised household total income of older people (aged 65 or above), the correlation between the base year and the measured years was generally close to the middle of 0 and 1, with 0.479 in 2006–2008, 0.440 in 2006–2010 and 0.392 in 2006–2012. In the younger age group, as well, the results were close to the middle of 0 and 1, with the income rank of the base year having a medium-level influence on the ranks of the measured years. By contrast, in England, considering the equivalised household income of elderly people (aged 65 or above), the correlation between the base year and the measured years was generally close to 1, with 0.634 in 2006–2008, 0.602 in 2006–2010 and 0.741 in 2006–2012, with the income rank of the base year having a large influence on the ranks of the measured years. In the case of younger people (aged 50-65), the correlation between the base year and the measured years was very similar in both countries.

In addition, the result shows that the rank mobility (S) value for older people in both countries was not above 1 and below 2, and the correlation Γ^{21} between the income ranks of the measured years and the base year was not negative. This means that from 2006 to 2012, income rank-mobility barely existed for the rich and the poor – in other words, those groups above and below the average ranks. These results were similar to those for the younger age groups.

Moreover, the rank-mobility (S) of older people in Korea rose faster than that of older people in England over the 2008–2012 period, and the rank-mobility value for older people in Korea was larger than for older people in England. Further, the correlation Γ^{21} between the base year and measured years' income ranks was likewise less than for older people in England.

This kind of analysis needs to measure the direction in which rank mobility is moving for a clear explanation to be reached. Therefore, in the next section, the direction of rank-mobility is measured with a transition matrix.

5.8.2   Transition Matrix

Generally, the rate of change of a quintile income category cannot explain the dynamics within each distribution. Accordingly, there are limitations in describing this kind of change within a distribution. Thus, to analyse the dynamics within the distribution, people in each category were examined to see what kind of movement they had experienced in the measured years 2008–2012. Therefore, in order to understand the scale and direction of income mobility for older people in England and Korea, a quintile matrix is employed, using equivalised household income as the standard, to analyse the movements of income rank.

Table 59 presents the wave-on-wave average transition probabilities of mobility in disposable income quintiles. It shows, first, that, compared with Korea, higher proportions of older people in England remained in the same income group in wave t+1, wave t+2 and wave t+3. The quintile with the least mobility in each country was the fifth quintile, and the next lowest was the first quintile. In other words, the majority of people located in the first and fifth quintiles for 2006, in both groups, were located in the same quintiles from 2006–2012. In the case of the first quintile, at the lowest point, 38.3% (Wt+3) in Korea and 60.3% (Wt+2) in England were found in the same quintile. At the highest point, 46.7% of persons (Wt+1) in Korea and 66.2% (Wt+1) in England were in the same quintile. By contrast, the highest income groups were the least likely to move, with 66.2% (t+1), 60.3% (t+2) and 61.2% (t+3) in England; the corresponding numbers in Korea were 61.3% (t+1), 56.3% (t+2) and 50.7% (t+3).

The transition table shows that there is much mobility in income between waves, and it appears that Koreans experience more mobility in the lowest two quintiles compared with their English counterparts. This is typically the case for short-distance moves (to the next quintile, rather than three or four quintiles higher or lower). In addition, there is much more mobility in income over a longer period in both countries. Specifically, the second (Korea) and third (England) quintiles had the lowest persistency rate. The lowest rate was 28.9% (Wt+1), 27.1% (Wt+2) and 25.2% (Wt+3) for Korea, and 45.9% (Wt+1), 39.9% (Wt+2) and 37.1% (Wt+3) for England. This means that people in the second (Korea) and third (England) quintiles experienced the most mobility, and were in an unstable position.

Table 59 Transition matrices of older people's income mobility in England and Korea

Quintile Wave1	Quintile (Wt+1)					
	1	2	3	4	5	Total
Korea	Row Percentages					
1	46.7	21.4	16.2	11.5	4.2	100
2	38	28.9	11.4	10.3	11.4	100
3	9.3	36.4	32.8	14.8	6.8	100
4	2.4	7.7	33.5	40	16.3	100
5	1.4	4.6	6.9	25.9	61.3	100
England						
1	66.2	20.7	7.7	2.9	2.6	100
2	22.6	50.1	17	7.6	2.7	100
3	10.4	21.6	45.9	16.4	5.7	100
4	5.4	8.9	21.2	48.9	15.6	100
5	4	4.2	7.6	19.4	64	100
Quintile Wave1	Quintile (Wt+2)					
	1	2	3	4	5	Total
Korea	Row Percentages					
1	42.8	22.8	17.4	11.2	5.8	100
2	36.5	27.1	13.7	11.5	11.1	100
3	13.4	29.6	32.1	16.2	8.7	100
4	5.5	9.7	29.4	35.5	19.9	100
5	3.5	6.6	9.8	23.8	56.3	100
England						
1	60.3	24.1	8.2	4.2	3.2	100
2	26.3	45.1	18.9	7.2	2.5	100
3	13.8	22.4	39.9	17.8	6.2	100
4	5.1	12	21.8	43.9	17.2	100
5	5.1	3.6	8.9	21.3	61.1	100
Quintile Wave1	Quintile (Wt+3)					
	1	2	3	4	5	Total
Korea	Row Percentages					
1	38.3	25.6	17.33	12.9	5.9	100
2	36.5	25.1	13.2	13.7	11.5	100
3	14.7	33.2	25.3	18.5	8.3	100
4	5.1	16.3	22.9	35.5	20.2	100
5	5.4	9.2	10.5	24.2	50.7	100
England						
1	61.2	24.3	8	3.7	2.8	100
2	28.3	42	19.3	7.2	3.3	100
3	15.2	25.5	37.1	16.8	5.4	100
4	6.5	13.1	25.3	39.4	15.7	100
5	4.4	6.2	10.6	22	56.8	100

Source: Author's own analysis of ELSA Wave 3 and KLoSA Wave 1, a weight has been applied.

If we examine Table 59 of the transition matrix mobility in the first, third and fifth quintiles, the persistence rate of older people in England in the first quintile is much higher than that of older people in Korea, and mobility in the other quintiles is much less than that

of Korea (see Table 60). However, in spite of this, in England those who moved from the first quintile in Wt+1 (2008) generally moved to the second quintile; movement to the fourth or fifth quintile was 5.4% (Wt+1, 2008) and 7.4% (Wt+2, 2010) respectively. The level of movement to the third quintile was also minimal, with 7.7% (Wt+1, 2008) to 8% (Wt+3, 2012) only. A similar phenomenon was found in Korea.

Table 60 The Direction of Mobility for Each Quintile of the Equivalised Income of older people
(Base Year: 2006 Wave 1 (KLoSA) and Wave 3 (ELSA)

Country	Mobility	Wt+1 (2008) %	Wt+2 (2010) %	Wt+3 (2012) %
England	1 quintile -> 2 quintile	20.7	24.1	24.2
	1 quintile -> 3 quintile	7.7	8.3	8
	1 quintile -> 4–5 quintile	5.4	7.4	6.6
	3 quintile -> 1–2 quintile	32	36.2	40.7
	3 quintile -> 4–5quintile	22.1	23.9	22.2
	5 quintile -> 4 quintile	19.4	21.3	22
	5 quintile -> 3 quintile	7.6	8.9	10.6
	5 quintile -> 1–2 quintile	8.2	8.7	11.6
Korea	1 quintile -> 2 quintile	22.8	22.8	25.6
	1 quintile -> 3 quintile	16.2	17.5	17.3
	1 quintile -> 4–5 quintile	15.7	16.9	18.8
	3 quintile -> 1–2 quintile	45.6	43	47.9
	3 quintile -> 4~5 quintile	21.6	24.9	26.8
	5 quintile -> 4 quintile	25.9	23.8	24.2
	5 quintile -> 3 quintile	6.9	9.8	10.5
	5 quintile -> 1–2 quintile	6	10.1	14.6

Source: author's own analysis of ELSA wave 3-6 and KLoSA wave 1-4, a weight has been applied.

Furthermore, those who were in the third quintile in the base year were more likely to experience downward movement into the first or second quintiles than upward movement into the fourth and fifth quintiles in the measured years. The movement into higher income quintiles (the first and second quintiles) from the middle income quintile (third quintile) was 32% (Wt+1, 2008) and 40.7% (Wt+3, 2012) in England and same movement was slightly higher in Korea with 45.6% (Wt+1, 2008) and 47.9% (Wt+3, 2012) respectively. In particular, the persistence rate of the third quintile was the lowest of the quintiles, and, over time, connected with the rapid decrease shown in the results, older people's middle-class economic level was more unstable in Korea than in England. Lastly, the fifth quintile's persistence rate was also lower in Korea than in England, and it was shown that that quintile's mobility was not limited to moves to the fourth quintile only, but also to the third and even the first and second quintiles.

On the other hand, in England, there was much mobility from the first quintile to the second and from the fifth to the fourth, and this is similar to Korea; however, there was very little mobility from the first quintile to the third compared with Korea. Furthermore, from the fifth quintile, most of the movement was directed into the fourth quintile, with very little mobility shown towards the first, second and third quintiles.

Transition probabilities can be also presented graphically using programmes that have been developed for geographical mapping (Van Kerm, 2011). This method helps to show a mass of statistical details in a simple picture so that it is easier to understand. Movement (or a lack thereof) between income groups over time can be shown by the extent to which the original groups ended up in different income groups by the end of the period. The advantage of these transition colour plots is that they visually show the extent of mobility in income through the use of colours. For example, Figure 14 presents examples of transition probability plots showing (a) perfect immobility, (b) perfect mobility (rank reversal) and (c) perfect mobility (origin independence). There is a strip for each income group, with the poorest group at the top row (blue) and the richest group at the bottom row (red).

Individuals' incomes are colour-coded and divided into 20 equal-sized groups according to their income origin in the base-year income distribution. The destination (wave t+1) income decile group is shown on the y-axis. Figure 14 (a) shows no change in relative position over time, therefore it is identical to the base-year picture. If there were maximal mobility, then the picture would look as (b) which shows perfect mobility defined in terms of a complete reversal of position. Finally, the last picture, (c), presents an example of perfect mobility (complete independence of destination from the origin): if every individual had an equal chance of moving to another income decile, there would be equal numbers from each origin group in each destination group.

Figure 14 Example transition probability plots, base year, (a) perfect immobility, (b) perfect mobility (rank reversal), (c) perfect mobility (origin independence)
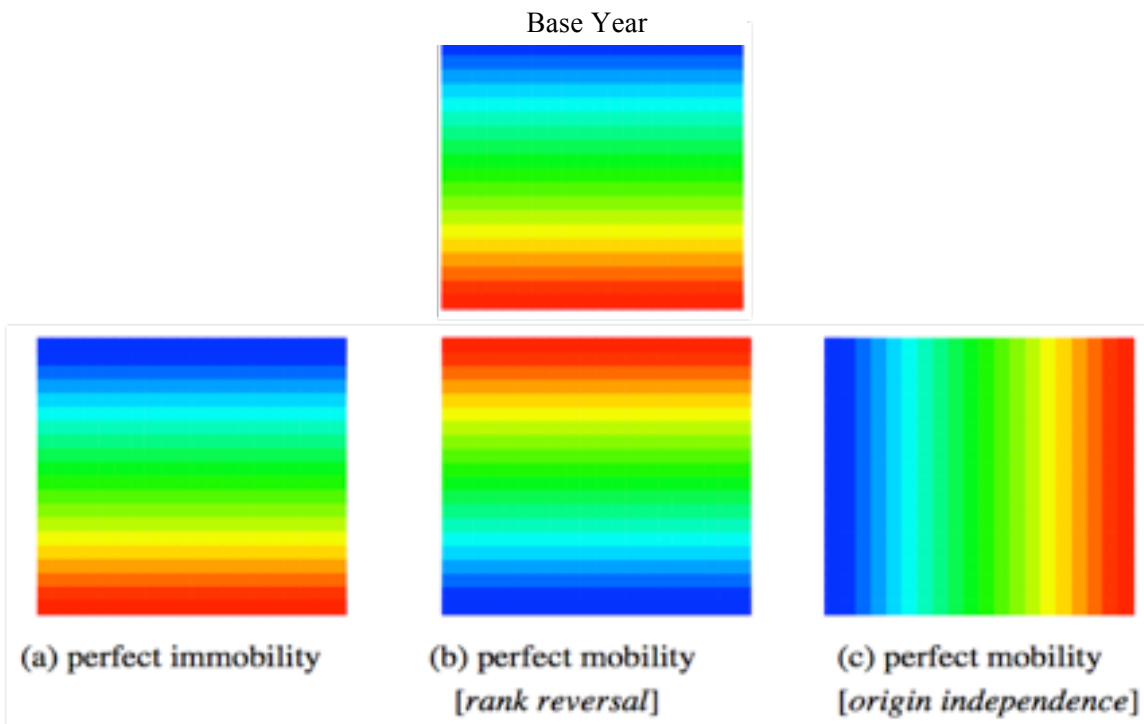
Source: Jenkins (2011) Changing Fortunes Income Mobility and Poverty Dynamics in Britain

The Figure 15 below shows the transition colour graph of waves 1–2, waves 1–3 and waves 1–4. It shows the changes in position at intervals from the base year, wave 1 (2006), to the next wave. It appears that there is considerable mobility even over a one-wave interval, but that mobility is primarily over a short distance. The income transition colour plot for KLoSA shows their paths as very horizontal for the waves 1–2 picture, but this starts to become more vertical in the waves 1–4 picture, which seems to show an increasing flow between income classes over longer time periods. The blue part (low-income groups) also shows a more vertical trend than the red area, which seems to point to a higher flow from the bottom percentiles. The green part takes an S shape, and there is a kind of blue diagonal hitting this green part, which would be related to upward income flow from the lower income groups. The red part appears similar between periods, showing a trend of top income groups towards holding their status.

Figure 15 Changes in relative position over four waves in Korea (eight-year period from 2006 income origin)
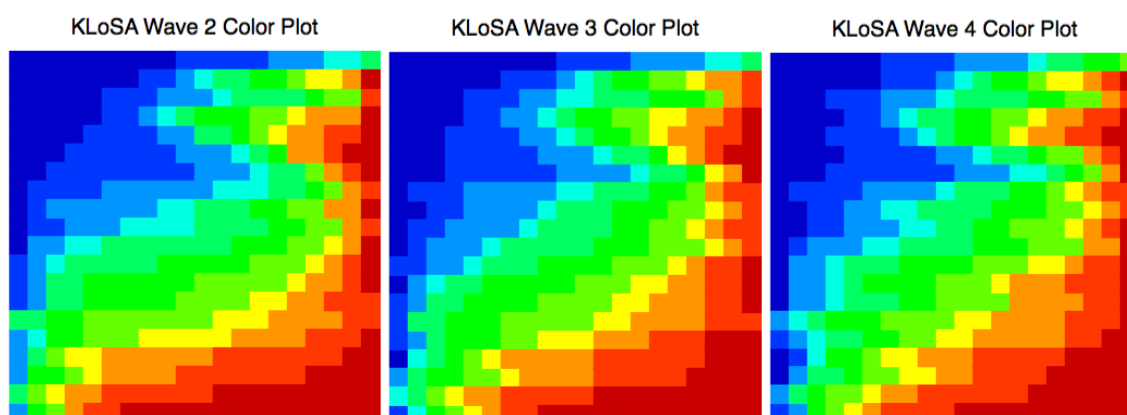
Source: author's own analysis of KLoSA 1-4 waves from 2006 to 2012.
Note: Weighted estimates of transition matrices derived from a balanced sample of all respondents with valid household income data at all four waves.

By contrast, for England, Figure 16 clearly shows that the colour plots are more symmetric over the three wave intervals, therefore it seems that the flow between percentiles is more stable than in Korea. This may relate to the fact that primary income sources for older people include pensions in England, as well other forms of social transfers, whereas Korea has a weak state pension system, resulting in many older people being heavily dependent on income from families or wages (Yang and Klassen, 2010). Similarly to the Korean colour plots, mobility is primarily short-distance and most mobility is to neighbouring income groups.

Figure 16 Changes in relative position over four waves in England (eight-year period from 2006 income origin)
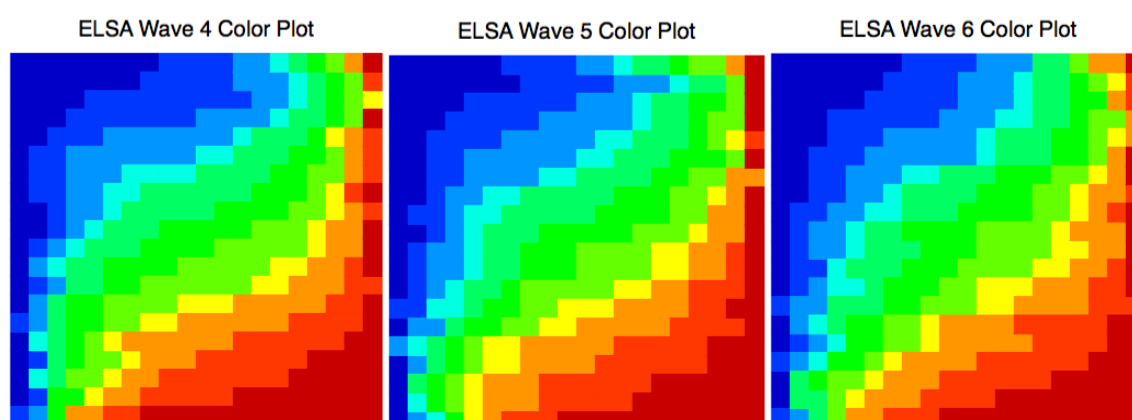
Source: author's own analysis of ELSA 3-6 waves from 2006 to 2012.
Note: Weighted estimates of transition matrices derived from a balanced sample of all respondents with valid household income data at all four waves.

5.9 Income mobility in England and Korea: bivariate results

To this point, the various characteristics and relative economic statuses of the study samples and the descriptive results on the income mobility of older people in England and Korea (RQ1 absolute mobility and RQ2 relative mobility) using various mobility measures have been reported. This section presents descriptive analyses to examine the factors that can affect income mobility in later life. Using the two data sets, from waves 1–4 of KLoSA and from waves 3–6 of ELSA (both for the period 2006–2012). These analyses will show the bivariate association between income mobility and various attributes and events that will serve to select the explanatory variables for the multivariate analysis in Chapter 6. The income experiences are summarised into broad categories according to the type of income mobility over the studied periods. It will use six income trajectories that were used for the absolute mobility analysis in section 5.7.2.

5.9.1 Income mobility experienced by older people in England and Korea

This section considers the income mobility trajectories experienced by different subgroups of respondents. Table 61 below illustrates how older people in England with different health statuses and educational qualifications experience income change in later life. First, it shows that there are very few differences between male and female older people. When examining marital status, the data shows that those who are widowed experience considerably different income trajectories from those with other marital statuses (that is, from people who are single, married or divorced). The widowed group had a disproportionately higher probability of experiencing "flat" or "rising" trajectories, while they had a lower probability of experiencing "falling" income.

Secondly, the breakdowns with respect to living arrangements show that those who lived alone had a higher likelihood of experiencing a "flat" (40.8%) or "rising" (17.7%) trajectory, while elderly couples living with their children and grandchildren had a substantially higher chance of experiencing "falling" income (28.6%). In addition, elderly couples living with their children (without grandchildren) also experienced a higher likelihood (17%) of a "falling" income trajectory.

Thirdly, the employment status breakdowns, which are separated into two groups (employed and retired), show that the transition into retirement causes a significant income change. Older people who were employed in 2006 had a higher chance (20.7%) of "falling" income mobility. However, people who had already retired from work in 2006 had a

substantially higher chance of staying in the "flat" category (41.3%) while 17.6% experienced upward mobility.

Table 61 Income mobility of older people in England by various subgroups using six income trajectories (15% change rule)

Total	Flat	Flat & blips	Rising	Falling	Fluctuating	Other	Total
	36.6	8.6	14.8	13.9	4.5	21.6	100
Gender							
Male	38.1	8.2	14.6	13.1	4.2	21.8	100
Female	35.5	9	15	14.5	4.7	21.3	100
Marital Status in 2006 (WAVE 3)							
Single	37.8	8.3	15.8	12.9	4.3	20.9	100
Married	35.1	8.6	13.9	14.7	4.8	22.9	100
Divorced	37.8	8.8	14.5	16.6	4.1	18.2	100
Widowed	42	8.6	18.6	8.8	3.4	18.6	100
Living arrangement							
Alone	40.8	7.6	17.7	11.3	3.6	19	100
Couple	35.1	8.9	14.9	14	4.9	22.2	100
Couple with children	35.5	7.9	10.6	17	4.6	24.4	100
Couple with Children/grand children	38.1	4.7	14.3	28.6	0	14.3	100
Employment							
Employed	31.1	8.3	9.9	20.7	4.6	25.4	100
Retired	41.3	8.5	17.6	9.7	4.3	18.6	100
Age subgroups							
50-54	38	6.9	10.5	18	4.7	21.9	100
55-59	30	8.6	15.2	15.9	4.6	25.7	100
60-64	32.4	9.1	16.6	14.4	5.3	22.2	100
65-69	42.5	9.7	13	13.9	3.6	17.3	100
70-74	44.3	8.7	14.5	10.8	4.1	17.6	100
75-79	39.3	8.6	16.8	11.3	3.2	20.8	100
80+	33.7	9.6	17.9	7.6	5.2	26	100
Health							
Self-reported health limit (or disability)	37.6	9	16.7	12.3	4.8	19.6	100
Self-reported No health issue	37.7	7.8	14.5	14.3	4.3	21.4	100
Educational Qualification							
High	36.9	9.1	17.8	10.7	4.7	20.8	100
Middle	36.7	8.4	13.6	15.2	4.3	21.8	100
Low	44.7	6.7	11.7	13.8	3.7	19.4	100

Source: author's own analysis using ELSA (waves 3-6), used balanced panel

Table 62 Income mobility of older people in Korea by various subgroups using six income trajectories (15% change rule)

Total	Flat	Flat & blips	Rising	Falling	Fluctuating	Other	Total
	28.6	17.4	20	25.2	2.3	6.5	100
Gender							
Male	28.9	9.6	19.7	24.8	2.2	14.8	100
Female	28.3	8.8	20.2	25.6	2.3	14.8	100
Marital Status in 2006 (WAVE 3)							
Single	23.8	26.2	9.5	26.2	0	14.3	100
Married	28.4	9.3	19.9	25.1	2.3	15	100
Divorced	21.5	12	20.9	25.9	2.5	17.2	100
Widowed	30.6	6.9	20.9	25.9	2.4	13.3	100
Living arrangement							
Alone	31.2	7.7	18.9	30.2	1.2	10.8	100
Couple	26.9	9.7	16.6	31.6	2.2	13	100
Couple with children	29.1	9.3	22.7	19.9	2.5	16.5	100
Couple with Children/grand children	29.2	7.2	22.8	20.5	2.8	17.5	100
Living with others	33.3	13.1	17	22.9	1.3	12.4	100
Employment							
Employed	29.2	8.4	18.8	25.4	2.4	15.8	100
Retired	26.1	10.2	20.8	27.3	2.2	13.4	100
Age subgroups							
45-49	36.4	8.4	24.2	14.7	1.8	14.5	100
50-54	29.9	9.1	21.2	20.6	2	17.2	100
55-59	22.8	10.1	19.3	25.4	3.6	18.8	100
60-64	27	8	17.5	30.5	2.9	14.1	100
65-69	24.7	8.9	19.1	31.6	2.6	13.1	100
70-74	29.8	9.2	18.2	29.2	0.7	12.9	100
75-79	28.9	13.2	17.6	27.8	1.6	10.9	100
80+	29.7	8.1	19.8	28.5	2.3	11.6	100
Health							
Self-reported illness	26.5	9.6	18.9	28.2	2.7	14.1	100
Self-reported No health issue	29.5	9	20.5	23.9	2.1	15	100
Educational Qualification							
High	44	6.9	18.7	15.5	2.3	12.6	100
Middle	30.2	8.6	24.1	20.1	2.2	14.8	100
Low	25.8	9.7	18.3	28.8	2.3	15.1	100

Source: author's own analysis using KLoSA (waves 1-4), used balanced panel

Fourthly, an examination of the age subgroups in 2006 shows that elderly people experienced more stable and rising income trajectories as they aged: a considerably higher

proportion of respondents reported a "flat" trajectory in the 70–74 age group than in the oldest group, of people aged 80 or over, 17.9% of whom experienced a "rising" trajectory.

Finally, the breakdown of older people by health status shows only a marginal difference between those people who reported their health as good and those who had a health problem or disability. Interestingly, people who had advanced educational qualifications experienced a significantly higher occurrence of upward income mobility compared with those who had low educational qualifications.

Compared with England, in general, elderly people in Korea experienced more downward income mobility than upward mobility during the same period. Table 62 shows that there was almost no difference in the income trajectories between male and female elderly people, as had been the case in the English study. However, the breakdowns by marital status show considerably different income trajectories. In 2006, older people who were single (and had never married) had a higher probability of experiencing "flat with blips" and "falling" income trajectories than other groups. All of the other marital groups (married, divorced and widowed) had similar levels of both upward and downward income mobility.

In addition, when examining living arrangements, an interesting outcome is that elderly people who lived alone or only as a couple had higher probabilities of experiencing downward mobility (with 30.2% and 31.6%, respectively, in the "falling" category) while elderly couples who lived with their children, or even with their grandchildren, had a higher chance of experiencing "flat" and "rising" income trajectories. This is the complete opposite of the English case.

Moreover, by analysing the employment statuses of older people in Korea in 2006, people who were engaged in economic activities experienced similar falls in income as their counterparts had in England. However, they also experienced more "flat" income trajectories than people who had already retired, which is considerably different from the English experience.

Furthermore, the breakdown with respect to the age subgroups in 2006 show that the Korean elderly people aged 60 or over had a substantially higher probability of experiencing downward income mobility, while the younger age group (45–49 and 50–54), whose incomes were at their peaks, had a higher probability of experiencing both "flat" and "rising" income trajectories. This is a very different result from that in England; one possible explanation for this difference is that Korea has a considerably weaker pension

system for older people, which results in less income from state benefits when transiting from work to retirement, whereas England's pension system is mature and has a number of additional benefits in retirement, such as age-related benefits and disability benefits (Zaidi, 2008).

Finally, the breakdown by the health statuses of older people in Korea shows similar income trajectory patterns, with people being considerably more likely to experience a downward, "falling", income trajectory, which is the opposite of the English case. In relation to educational qualifications, the data show a similar income trajectory pattern to the one found in England. Older people who had an advanced educational qualification had a considerably higher probability of experiencing a "rising" income trajectory than those who had middle or low education.

Although there are substantial differences in the income trajectories of some subgroups between the two countries, this analysis provides a useful insight in exploring the triggering events associated with income mobility in later life. The findings suggest that, while there is not much difference in income mobility between the genders, marital and employment statuses, by contrast, different age groups, and educational levels are most likely to be associated with income mobility. This corresponds with the findings of the literature review in Chapter 2 and will be discussed critically in Chapter 7. The detailed further in-depth analysis, identifying what lies behind income mobility in later life, will be carried out in Chapter 6.

5.9.2 Income components of older people in England and Korea

Another factor that may be associated with income mobility in later life is social welfare. To analyse how the welfare factor can affect income mobility amongst older people, this thesis looks first at the elderly population's sources of income. Table 63 reveals that, in the base year (2006), labour income accounts for the major share of total income (41%) while state benefit income (public transfers: benefits and state pension) and non-state pensions (private transfers: private pensions and income from family and relatives) account for 45%. Other income (including income from assets) made up 13% of the total. These percentages changed over the period as people aged, and state benefits and non-state pensions (accounting, in total, for 69% of income in 2012) become a very important source of income for older people in England.

Moreover, there was a difference in the percentage of the share of total income over age 65 (over SPA). Specifically, before the age of 65, earned income is relatively high, but in groups older than age 65 the weight of earned income lessens and state benefits and non-state pensions become more important. Especially in the oldest age groups, state benefits and non-state pensions account for about 86% of total income.

By contrast, in Korea, the major income source was labour income in all of the measured years, while there was a slight increase in both state benefits and non-state pension income (see Table 64). Breaking down the age groups shows an interesting result: while labour income decreases as people age, private transfer income and public transfer income become more important in Korea. When an individual stops working, private transfer income from family members was revealed to be very important. For example, in the oldest age groups, non-state pension income accounted for 57% of the income for people aged 75–79 and about 67% for those aged 80 or over. Further, compared with England, Korean older people work until very old age: as the share of income from employment is considerably higher, even in the older age groups, 70–74 (29%) and 80 or over (13%).

Table 63 Income sources of older people by age subgroups, year, and employment status in England

	Labour Income	State Benefits	Non-state pensions	Other Incomes
Year				
2006	41.2	24.6	21.4	12.8
2008	33.4	27.8	25.7	13.1
2010	27.7	33.6	29.2	9.5
2012	21.2	37.8	30.9	10.1
Employment status in 2006				
Employed	81.3	4.7	6.4	7.7
Retired	2.5	40.5	39.1	17.8
Age subgroups in 2006				
50-54	82.7	6.9	2.5	7.9
55-59	72.0	5.4	11.4	11.1
60-64	43.2	19.1	25.5	12.2
65-69	8.5	40.5	33.7	17.3
70-74	4.1	45.4	34.2	16.4
75-79	2.2	51.1	30.5	16.1
80+	0.6	53.6	32.7	13.2
Total	30.6	31.7	26.9	11.3

Note: Labour income: wage income and self-employment income.
       State benefits: total benefits from state and state basic pension
       Non-state pension: private pension and all private transfers such as income from family and relatives
       Other Incomes: all other incomes including asset income
Source: author's own analysis using the ELSA waves 3-6

Table 64 Income sources of older people by age subgroups, year, and employment status in Korea

	Labour Income	State Benefits	Non-state pensions	Other Incomes
Year				
2006	68.7	8.6	19.8	2.7
2008	63.9	11	21.6	3.5
2010	64.4	15.9	15.2	4.4
2012	62.8	16	17.6	3.6
Employment status in 2006				
Employed	89.5	2.5	6.6	1.3
Retired	14	34.2	46.2	5.5
Age subgroups in 2006				
45-49	95	0.7	1.9	2.4
50-54	90.7	1.4	4.9	2.8
55-59	78.9	5.8	11.7	2.8
60-64	57.4	16.1	24.1	2.4
65-69	43.6	15.6	38.2	2.4
70-74	29.9	18.3	48	3.7
75-79	20.3	18.6	57.5	2.8
80+	13.2	17.1	67.4	2.3
Total	64.9	12.8	18.6	3.5

Note: Labour income: wage income and self-employment income.
  State benefits: total benefits from state and state basic pension
  Non-state pension: private pension and all private transfers such as income from family and relatives
  Other Incomes: all other incomes including asset income
Source: author's own analysis using the KLoSA waves 1-4

When examining the income sources, broken down by gender and age groups, an interesting result is revealed that, while older men work longer than their counterparts in England (there is a still a four-year gap between their retirement ages), the most important income source for female elderly people was from state benefits after retirement, whereas older men were more likely to have a large share of non-state pensions alongside state benefits (see Table 65). By contrast, as is shown in table 66, the most important income source for the female elderly population in Korea is family transfers, which amount to over 70% of the total income for people aged 70–74, while the highest income source for male elderly people remained employment, accounting for a 42% share of the total income at age 70–74.

Table 65 Income sources of older people in England, by gender and age sub groups

Age groups	50-54		55-59		60-64		65-69		70-74		75-79		80+	
Gender	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Labour Income	84.7	79.7	73.2	70.2	50.9	33.1	9.8	6.7	5	2.9	3.3	1	0.2	1
State Benefits	4.1	11	3.5	8.3	7.7	34.1	35.6	47.4	38.8	53	40.5	64.2	39.3	68.4
Non-State Pensions	3.6	1	15	6.2	31.5	17.7	39.2	26	43	22.7	40	18.9	44.9	19.9
Other Incomes	7.6	8.2	8.3	15.3	9.9	15.1	15.4	19.9	13.2	20.4	16.2	15.9	15.6	10.7
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: author's own analysis using the ELSA waves 3-6

Table 66 Income sources of older people in Korea, by gender and age sub groups

Age groups	45-49		50-54		55-59		60-64		65-69		70-74		75-79		80+	
Gender	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Labour Income	97.4	88.9	94.9	79.6	86.8	52	68.5	31.4	53.9	25.6	42.1	12.6	21.8	18.3	20.2	4
State Benefits	0.6	1	1.2	1.9	5.7	6.3	18.3	10.9	17.7	11.8	22.3	12.6	25.6	9.3	9.7	26.8
Non-State Pensions	0.3	6	2.2	12.2	4.7	35.6	10.9	55.1	25.8	60.1	30.2	72.7	48.2	70.1	66.5	68.6
Other Incomes	1.7	4.1	1.7	6.3	2.8	6.1	2.3	2.6	2.6	2.5	5.4	2.1	4.4	2.3	3.6	0.6
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: author's own analysis using the KLoSA waves 1-4

5.10   Conclusion

This chapter has used data from ELSA and KLoSA to analyse short- (during the period 2006–2008) and medium-term (during the periods 2006-2010 and 2006–2012) income mobility experienced by older people in England and Korea. After providing a number of descriptive analyses on the data, the main focus of this chapter has been on analysing the absolute income mobility of older people in the two countries (addressing RQ1), and subsequently also their relative income mobility (RQ2). The results reported in this chapter should be interpreted with caution due to measurement errors in the data for Korea, as small changes in income generally affect more the mobility experience of poor income households and less that of high-income households.

In particular, the examination of the income mobility of different subgroups of respondents in England and Korea by using six income trajectories has provided us with useful insights into the possible factors associated with income mobility in later life. The bivariate results discussed in this chapter reveal that marital status, changes in living arrangements, an

individual's educational level, transitions into retirement, and social security income and family transfers (particularly in the Korean case) all play an important role in income mobility in later life.

From the bivariate results, no differences were found between men's and women's income trajectories in both countries. However, considering the marital status, the widowed group had a disproportionately higher probability of experiencing "flat" or "rising" trajectories, with low levels of "falling" income in England. By contrast, older people in Korea who were single (and had never married) had a higher probability of experiencing "flat with blips" and "falling" income trajectories than other groups. All of the other marital groups (married, divorced and widowed) had similar levels of both upward and downward income mobility.

Interestingly, the breakdown with respect to living arrangements showed that those who were single in England, experienced stable and positive upward income trajectory, while couples living with their children experienced negative "falling" income trajectory. This may partly be due to children moving in and out of the household of their parents. However, a completely opposite outcome was observed in the Korean case, with couples living with children being likely to experience a stable and positive upward income trajectory, while single respondents experienced a higher likelihood of a "falling" income trajectory.

In both countries, as can be expected, leaving the labour force and the transition into retirement caused a significant income change with a negative downward income trajectory. Those who were already retired experienced stable and positive upward income trajectory in England, while people who remained engaged in employment in Korea showed a more stable and positive upward income trajectory. This could be explained by looking the pension systems of each country; especially for the fact that England has a strong public transfers system compared with Korea.

In general, in the examination of the age subgroups, elderly people in England experienced more stable and rising income trajectories as they aged, while Korean elderly people had a substantially higher probability of experiencing a downward income mobility compared to the younger age group. This is a very different result for the two countries; one possible explanation for this difference can also be found in the differences in the pension systems. Korea has a considerably weaker pension system for current older people, which results in less income from state benefits in old age, whereas England's pension system is more

mature and has a number of additional benefits in old age, such as age-related benefits and disability benefits.

In both countries, people who had advanced educational qualifications experienced a significantly higher occurrence of upward income mobility compared with those who had low educational qualifications. This can be explained by the fact that people with higher educational levels are generally better off and have much more likely to earn more or maintain in their income position throughout leading to the pension age than those people with lower educational levels (Seok, 2009).

For the univariate results on income mobility of older people in England and Korea, this chapter carried out both absolute and relative income mobility analysis. Income mobility using absolute income mobility concept RQ1, it used Fields and Ok's mobility index and an income trajectory analysis. Exploring the Fields and Ok mobility index revealed there to be considerably more income mobility in old age in Korea than in England. Moreover, from further analysis using income trajectories with six categories, it appears that older people in England show much more income stability (43.4% showed "flat" trajectories) than Korean older people. Older people in Korea showed a much higher percentage of occurrences of both "rising" and "falling" income mobility than England.

The analysis on how strong the association is between individuals' demographic characteristics and income trajectories revealed that the different demographic situation is associated with particular income trajectories. In the case of England, among "flat" trajectories, the largest group was the "singles" but in Korea, the most downward income mobility group was "single over 65 with no children" with nearly half of this group experience a falling income trajectory. The pattern shown in this analysis confirms the evidence about how changes in family circumstances are likely to affect people's income in different demographic situations.

The evidence emerging from the relative income mobility analysis, using both the rank-mobility index and the transition matrix, shows that the rank-mobility (S) value for older people in both countries was between 0 and 1, and the correlation Γ^{21} for rank-mobility between the measured years and the base year was not negative. This means that older people in both countries experienced a change of their position in the income distribution over the measured period. In addition, the rank-mobility (S) of older people in Korea rose more than that of older people in England during the 2008–2012 period; its value was

larger and the correlation Γ^{21} between the income ranks of the base year and the measured years was likewise less than for older people in England.

From the analysis conducted using the transition matrix, first, a large proportion of the people in the first and fifth quintiles in the base year, 2006, remained in the same category from 2008 to 2012 in both countries. Specifically, for older people in England in the first quintile, the persistence rate was from 60% (in 2010) to 66% (2008) at its highest point; the next highest was the fifth quintile, which showed a minimum of 57% (2012) and 65% (2008) at the highest. By contrast, the Korean data show that, in the first quintile, the persistence rate was slightly less than England, with 38 (2012) at the lowest and 47% (2008) at the highest, while the fifth quintile behaved similarly to England, with 51% (2012) at the lowest and 61% at the highest. The rates for the third quintile showed the lowest persistence rate of all the quintiles for both countries. This means that elderly people in both countries in the middle class had the most mobility and could be considered to be in an unstable position.

Finally, the results of tracing those people who did not maintain the same quintile from the base year to the measured years were considered. In the case of older people in England, older people who had been in the first quintile in 2006 generally moved to the second quintile, those in the third to the first and second, and those in the fifth quintile generally moved to the fourth quintile, with very little mobility to quintiles 1–3. However, elderly people in Korea who were in the first quintile moved not only to the second but also to the third, fourth and fifth quintile, showing considerably more mobility than their English counterparts. Many of those in the third quintile moved to the first and second quintiles, as well as to the fourth and fifth, and those in the fifth quintile moved to the fourth and the first quintiles. In other words, elderly people from the low-income class in Korea had a higher probability than elderly people in England of an upward mobility. There was also more downward mobility from the middle- and upper-income classes to low-income classes.

Although this chapter has shown, from a macroscopic level, a great deal of income mobility experienced by older people in the two countries, further analysis required to understand, from a microscopic level, what the associations are and what affects income mobility in old age in the two countries – e.g. how various personal attributes are associated with income mobility of older people. This analysis will be carried out in Chapter 6, using a multivariate analysis (multinomial regression analysis) to build upon the

understandings of the macroscopic level of income mobility experienced by older people in England and Korea.

Chapter 5

Chapter 6: Empirical Results: Multivariate modelling

6.1 Introduction

The previous chapter, using a number of income mobility indexes, has examined how much absolute and relative income mobility exists for older people in England and Korea between 2006 and 2012. In addition, the descriptive analyses helped identify factors that are associated with income mobility of older people in later life. From the descriptive analyses, it is clear that there is considerable income mobility for older people in both countries. However, those methods that had been used in the previous chapter were focused on analysing the macroscopic level of income mobility and had their strengths and limitations with respect to their ability to discover the factors affecting income mobility in old age.

Therefore, after having shown the income mobility experienced by older people in England and Korea, where the institutional set-up differs considerably in terms of the labour markets, welfare systems and so on, the rest of this chapter examines the determinants of income mobility in old age. First, what lies behind income mobility and the differences in the determinants of income mobility between the two countries, using various techniques to deconstruct income mobility (exchange, structural and growth). In the second part of this chapter will discuss the findings of the multivariate analysis from a microscopic level using a multinomial logistic regression analysis. In this chapter, it attempts to examine two of the research questions set out in this thesis (RQ3. What determines aggregate income mobility differences between England and Korea? – RQ4. What are the factors affecting income mobility of older people in England and Korea?).

This chapter is organised as follows:

- Before providing the multivariate results, this chapter will examine what determines the differences in income mobility between the two countries (RQ3) (section 6.2). Adapting (Ayala and Mercedes, 2007)'s method, this chapter examines the determinants of income mobility using the decomposition of axiomatic and welfare measurements of mobility suggested by Fields and Ok (1996) and Chakravarty, Dutta and Weymark (CDW) (1985), and subsequently developed further by Ruiz-Castillo (2000) (as noted in Chapter 3, section 3.7.4.3). It will analyse the extent to which the exchange, structural and growth components are

associated with income mobility in the two selected countries. The different types of family composition and age groups will also be taken into account when analysing what determines differences in income mobility.

- This will be followed by providing a brief descriptive analysis, adapting Zaidi and De Vos (2002)'s method which uses five-outcome income mobility variables different to the one used in Chapter 5 (absolute mobility analysis, 5.7.2), of the income mobility experienced by older people in the two countries, using five sets of attributes as potential explanatory variables: demographics, education, health, employment and income (welfare) (section 6.3).

- At the end, the chapter will present the multivariate results, using multinomial logistic modelling of income mobility (section 6.4) and conclude by providing a discussion of the key results found in the chapter (section 6.5).

6.2 What determines aggregate income mobility differences between England and Korea (RQ3)

As discussed in the literature review chapter, there are various approximations for the study of income mobility. Research may focus on the mobility of low-income dynamics, or relative and absolute mobility, or exchange and structural mobility. In addition, the normative content of the concept of mobility itself allows very different results to be arrived at. Although there has been a growing number of studies on income mobility in recent years, little research has analysed the causes of income mobility together with the institutional differences of income mobility across countries (Ayala and Mercedes, 2007). It is evident that there is a cross-national difference in welfare systems and labour markets. Therefore, it is very important to consider these diverse mechanisms when analysing income mobility from a cross-national perspective. Various studies have shown notable differences in the degree of income mobility among different age groups with particular demographic characteristics (Jarvis and Jenkins, 1998; Zaidi et al., 2001). Older people's income mobility in later life may be influenced by the generosity of their country's welfare and pension systems. Therefore it is important to understand and assess the differences in the structures of income mobility between the two countries.

6.2.1 The structure of mobility

Using Fields and Ok's index (1996), Table 67 shows that income growth is less important for England, contributing only 10% (short-term), 16% (medium-term) to individuals'

income fluctuation, but income transfer between individuals accounts for nearly 90% (short-term) and 84% (medium-term) of their totals. By contrast, aggregate income growth is crucial for mobility in Korea; it accounts for more than half of total income fluctuation throughout the study periods.

Table 67 Fields and Ok (1996) mobility index

	Short Term			Medium Term		
	Mobility	K(%)	T(%)	Mobility	K(%)	T(%)
England	0.313	10.3%	89.7%	0.400	16.4%	83.7%
Korea	0.386	63.4%	36.6%	0.475	54.1%	45.9%

Source: author's own analysis of ELSA and KLoSA four waves from 2006 to 2012.
Note: balanced panel was used, K= income growth, T= income transfer

The association between a country's welfare system and income mobility within that country can be analysed using Chakravaty, Dutta and Weymark's (1985) approach (CDW). They state that mobility can be defined as the result of comparing the welfare of two observed countries' income structures, hypothetically immobile, in which the income positions of individuals in the initial distribution are held constant. Using the two countries' datasets and the CDW method, Table 68 shows the differences in the determinants of income mobility between the two countries. It shows that there is more income mobility in Korea than in England. As was shown in the above Fields and Ok analysis, income growth has no effect on aggregate mobility in England. However, the most important determinant is that of the rerankings of individuals in the respective distributions (exchange mobility). By contrast, the Korean data suggest that the contribution of structural mobility accounts for approximately 45% of the total, while England shows a lesser influence in its structural component, with approximately 28% of the total.

Table 68 Decomposition of Chakravaty-Dutta-Weymark Mobility Index

		Mobility	Strc Mob	Exch Mob	Grwt Mob
		M(x,y)	SM(x,u) (%)	EM(x,u) (%)	GRM (%)
GE(0)	England	0.035	35.8%	91.5%	-27.3%
	Korea	0.219	49.7%	47.6%	2.6%
GE(1)	England	0.026	28.7%	93.2%	-21.9%
	Korea	0.089	38.0%	59.1%	2.8%
GE(2)	England	0.028	26.3%	92.1%	-18.4%
	Korea	0.220	40.7%	56.3%	2.9%
GINI	England	0.038	44.0%	76.0%	-20.0%
	Korea	0.057	35.5%	61.3%	3.2%
ATK(1)	England	0.022	5.8%	118.8%	-24.7%
	Korea	0.118	48.3%	48.9%	2.8%

Source: author's own analysis of ELSA and KLoSA four waves from 2006 to 2012.
Note: balanced panel and trimming lower and upper 1% were used.

Until now we have looked at the decomposition of axiomatic measurements of mobility in the exchange, structural and growth components using the CDW index and the breakdown of the Fields and Ok index. In both countries, the most important determinant of income mobility is the reranking of individuals on the income scale. However, Korea also shows a strong contribution of structural mobility. Now different demographic groups will be taken into account, in order to analyse mobility levels, so that factors specific to each country can be determined.

6.2.2   The decomposition of mobility by age-groups

The analysis uses Fields and Ok's (1999) mobility index, and the selected variables are different age groups, household type and household size. This analysis provides a useful information in relation to the differences in mobility observed in the different age groups and family size. The results in Table 69 show that the greatest mobility was shown in the "single, under 65" age category in England, while couples aged over 65 with no children experienced the greatest income mobility in Korea. In addition, couples aged under 65 with more than one child also showed a large income mobility in England, while people aged 65 or above who lived alone experienced a greater variation in income over time in Korea. When the relationship was observed between household size and income mobility, in England, as household size increased, so did the degree of income fluctuation. In Korea, in contrast to England, income mobility formed a U-shape, in which income mobility decreased as household size increased up until four people but increased again from a household size of five or more.

A large part of the income of collectives aged over 65 comes from state pension and benefits in England (as shown in Chapter 1 and 4) which, as they are updated for inflation, experience fewer variations in real terms. However, as the country's state pension system is still immature and benefits volume is a lot lower in Korea (see Chapter 4) compared to England, older people are likely to experience greater income volatility.

Table 69[34] Decomposition of Fields and Ok Mobility Index

Decomposition of Fields and Ok Mobility Index

	England				Korea			
	Pi	Mi	Ci	Ci/Pi	Pi	Mi	Ci	Ci/Pi
1 person aged >= 65	15.26%	0.388	13.37%	0.876	0.36%	1.134	0.43%	1.178
1 person aged < 65	9.53%	0.593	12.76%	1.339	1.06%	0.890	0.98%	0.924
Single parent	4.76%	0.509	5.47%	1.149	14.19%	1.094	16.12%	1.136
aged >= 65, couple, no kids	28.39%	0.508	32.55%	1.147	0.16%	1.380	0.22%	1.433
aged < 65, couple, no kids	23.96%	0.357	19.31%	0.806	1.22%	0.762	0.96%	0.791
couple, 1 kid	11.35%	0.447	11.45%	1.009	5.75%	0.812	4.84%	0.843
aged >= 65, couple, more than one kid	0.35%	0.363	0.29%	0.819	16.85%	0.969	16.95%	1.006
aged < 65, couple, more than one kid	6.40%	0.546	7.89%	1.233	60.42%	0.827	51.89%	0.859
Household size at Wave 3								
1	24.79%	0.438	23.71%	0.956	1.42%	1.047	1.64%	1.157
2	56.07%	0.453	55.45%	0.989	2.90%	1.043	3.35%	1.152
3	12.26%	0.467	12.50%	1.020	9.12%	0.888	8.95%	0.981
4	5.19%	0.507	5.74%	1.107	39.20%	0.813	35.22%	0.898
5	1.36%	0.630	1.88%	1.376	24.95%	0.929	25.62%	1.027
6	0.28%	0.521	0.32%	1.138	11.92%	0.954	12.57%	1.054
7 or more	0.06%	1.088	0.14%	2.376	13.64%	1.040	15.68%	1.149
Age group at wave 3								
45-49					20.72%	0.81	18.58%	0.897
50-54	13.66%	0.539	17.05%	1.248	17.42%	0.80	15.45%	0.887
55-59	24.05%	0.549	30.57%	1.271	16.66%	0.88	16.35%	0.981
60-64	18.92%	0.471	20.62%	1.090	16.67%	0.90	16.63%	0.998
65-69	15.19%	0.359	12.63%	0.831	10.38%	1.00	11.50%	1.108
70-74	12.17%	0.336	9.46%	0.778	7.95%	1.00	8.88%	1.117
75-79	8.45%	0.357	6.98%	0.826	5.69%	1.13	7.16%	1.257
80-84	5.18%	0.485	5.81%	1.123	2.86%	0.94	3.00%	1.050
85+	2.38%	0.499	2.75%	1.155	1.64%	1.02	1.86%	1.135

Note: Pi, % of sample in group i; Mi, group i mobility; Ci, group i contribution to mobility.

6.2.3   The decomposition of mobility by income sources

As evident in the case of inequality analysis, breakdown mobility using income sources is hampered by both empirical and theoretical limitations that are bigger than those for breaking down mobility using population segments. Hence, there is a lack of development in methodology. Jenkins (1999)'s proposal is the only exceptional methodology that is used to quantify the contribution of other sources of income to the variation of the total income of the reference unit.

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[34] To understand Table 69, for each country, Pi is the percentage of the sample in each group, and Mi represents group i mobility, while Ci (Ci = (Mi / M) × Pi) is group i relative contribution to mobility with M representing overall mobility, and $\sum_i C^i = 100$.

Explaining how individual sources contribute to a variation in individual incomes over time, Jenkins (1999) indicates that the analysis of mobility uses the rule of breakdown of the family of generalised entropy indices. This rule is applied when interpreting income mobility as a collection of personal contribution from different sources of variation as time changes for individual income elements together with its association with diverse contributors of total income.

An application of this approach to income data from England and Korea leads to a disclosure of crucial diversity in the determinants of income mobility. Despite the fact that the same income sources are the single largest contributors to the total income share in the two countries, table 70 below reveals how that contribution to total mobility is varied. There are two reasons that may lead to variations: first, the contribution of wages to the total income may differ, and secondly, the differences in wage mobility between Korea and England.

Putting the first aspect into consideration, the relatively large weight of wages in Korea capped at 49% is clear and is 6% percentages larger than that of England which is capped at 43%. However, the contribution to the mobility of that income source in Korea with 45% is slightly less than that of England with 46%. In England, self-employment income does not have a major impact on mobility, however, in Korea self-employment income has a considerable effect on mobility. Korea has 26 more points than England when such income from self-employment is considered. As explained in Chapter 4, the variation above is partially contributed by people who apparently left their lifetime jobs early in Korea, as according to Higo and Klassen (2015), people leave their job between ages 53-55. However, these people become self-employed and even work continuously beyond the SPA.

For both countries, the most unpredictable income source is property income. Due to its relative sensitivity to economic changes, it undoubtedly introduces an evolutionary component that is more volatile. Finally, in relation to social transfer that has a compensatory effect in income distribution where this income sources normally has a limited effect on the drastic increase or decrease in the incomes of households, however, there is some difference between the two countries. Korea is the country where this compensatory effect is small with less weight in total income (12%) and little contribution (12%) to mobility compared to England with 34% income share and 26% contribution to mobility.

Table 70 Income sources contributions to longitudinal income variability

		Wage	Self-employment	Social Transfer *	Property Income **	TOTAL
England	% Contribution	45.5	8.6	26.0	14.2	100.00
	Income share	43.3	9.9	34.4	7.4	100.00
	Ratio ***	0.94	0.87	0.75	1.92	1.00
Korea	% Contribution	44.7	34.7	11.7	8.8	100.00
	Income share	48.5	35.3	12.0	4.1	100.00
	Ratio ***	0.92	0.98	0.98	2.13	1.00

Source: Author's own analysis using ELSA and KLoSA 4 waves balanced panel. Trimming, for each wave, top and bottom 1% dropped using the "modified OECD equivalence scale".
* Social transfers include all state benefits and state pension.
** Property income includes capital income from rental and asset income
*** Ratio: % Contribution / Income Share

6.3 What are the factors affecting income mobility of older people in England and Korea? (RQ4)

Having shown the determinants of income mobility in the two countries using the decomposition of axiomatic and welfare measurements of mobility, this section, from a microscopic level, examines the following research question:

RQ4. What are the different factors affecting income mobility of older people in England and Korea? How are various personal attributes – for example, sex, age, education, employment, life-course transitions, such as becoming a widow, and changes in living arrangements – associated with income mobility in old age?

6.3.1 Comparative perspective on income mobility

In order to analyse the factors that affect absolute income mobility from a microscopic perspective, this chapter employs Zaidi and De Vos's (2002) approach, which uses five-category polychotomous variables as the dependent variables in a multinomial logistic regression (MLR) model. These categories are broadly similar to the ones used in Chapter 5. These five income mobility outcome variables are defined below:

1. Fall, more than 15%: Long-range downward income mobility

2. Fall, 6% to 14%: Short-range downward income mobility

3. Less than 5% change: No income mobility

4. Rise, 6% to 14%: Short-range upward income mobility

5. Rise, more than 15%: Long-range upward income mobility

The MLR model was chosen because it has the advantage of analysing unordered categorical data and more than two possible outcomes for discrete values. The MLR model can also handle five-category polychotomous variables and allows an estimated relative risk ratio of upward or downward income mobility incidence. The five income mobility outcome variables can be quantified on the basis of different bands of income changes. Further, because this analysis focused on changes in individuals' own incomes, the "absolute concept of mobility" was applied for the regression analysis. To explore the associations between attributes of individuals and income mobility, five sets of attributes, both individual and household, were created: 1) demographic, 2) education, 3) health, 4) employment, and 5) income attributes. These explanatory variables were selected as the previous literature (Chapter 2) has demonstrated that these are the most influential factors associated with income mobility in later life, encompassing factors such as age, gender, marital status, living arrangements, health, employment status, education and welfare.

Table 71 presents the cross-national comparative analysis results on the relationship between income mobility and the above-mentioned individuals' attributes, using the five income mobility outcome variables (Rise +15%, Rise 6–14%, No Sig (5% or less), Fall 6–14%, and Fall -15%). The results in Table 71 show that there is a considerable extent of income mobility amongst older people in the two countries and that it is slightly higher in Korea than in England. In particular, the rate of no significant income mobility (less than 5% change) is nearly twice as high in England (14%) than it is in Korea (7.6%). Other notable income mobility differentials were found in the "Fall 6–14%" category, in that about 18.6% of older people in Korea observed short-range downward income mobility, compared with only 9.7% observed in England. The rest of the income mobility categories show similar figures, with 34.5% experiencing long-range upward income mobility and 33.3% long-range downward income mobility in England, while the figures were 36.5% and 30.3% respectively in Korea.

The statistics are presented below, and a brief analysis of each of the variables follows.

Table 71 Cross-national comparison of a relationship between income mobility and various attributes

England	Rise 15% +	Rise 6-14%	No sig. Chng.	Fall 6-14%	Fall 15%+		**Korea**	Rise 15% +	Rise 6-14%	No sig. Chng.	Fall 6-14%	Fall 15%+	
Total	**34.5%**	**8.4%**	**14.1%**	**9.7%**	**33.3%**			**36.5%**	**6.9%**	**7.6%**	**18.6%**	**30.3%**	
Gender													
Male	31.9%	8.3%	14.1%	10.0%	35.7%	chi2(4): 110.8		35.1%	7.3%	8.5%	18.4%	30.7%	chi2(4): 42.49
Female	36.7%	8.5%	14.0%	9.4%	31.4%	Pr = 0.000		37.6%	6.6%	7.0%	18.7%	30.1%	Pr = 0.000
Age groups													
45/50 to 54	32.4%	8.0%	13.1%	11.7%	34.9%			33.3%	8.2%	8.6%	19.2%	30.6%	
55 to 59	35.4%	8.2%	11.1%	10.0%	35.3%			35.6%	7.1%	6.4%	18.6%	32.3%	
60 to 64	33.6%	7.7%	12.6%	8.8%	37.3%			35.8%	6.7%	8.1%	18.8%	30.6%	
65 to 69	30.6%	9.4%	15.3%	10.4%	34.4%	chi2(24): 447.89		39.4%	5.9%	7.0%	18.0%	29.7%	chi2(24): 168.16
70 to 74	32.1%	9.5%	18.1%	10.7%	29.7%	Pr = 0.000		40.3%	5.3%	7.5%	18.2%	28.7%	Pr = 0.000
75 to 79	36.2%	8.5%	16.7%	9.4%	29.2%			38.9%	6.8%	6.7%	18.5%	29.2%	
80+	42.8%	7.3%	12.6%	7.4%	29.9%			40.6%	5.8%	7.5%	17.1%	29.0%	
Marital Status													
Remained a couple	31.5%	8.5%	13.4%	10.0%	36.7%			35.9%	7.2%	8.1%	18.5%	30.3%	
Remained widow(er)	43.6%	8.5%	15.5%	8.3%	24.0%			39.4%	5.7%	5.5%	18.5%	30.9%	
Remained divorced/separated	39.6%	7.6%	14.7%	9.8%	28.3%	chi2(16): 567.82		40.4%	5.6%	6.9%	14.1%	32.9%	chi2(16): 136.68
Remained never married	39.2%	8.6%	14.3%	9.0%	28.9%	Pr = 0.000		40.2%	6.9%	7.3%	19.1%	26.4%	Pr = 0.000
Became widow(er)	27.4%	8.5%	15.8%	10.6%	37.7%			31.1%	8.1%	9.2%	22.9%	28.7%	
Living arrangements													
Remaining living independent	34.0%	8.4%	14.0%	9.8%	33.7%			35.2%	5.9%	7.3%	19.5%	32.2%	
Remaining living with others	34.2%	8.5%	13.1%	9.9%	34.4%	chi2(8): 34.26		37.3%	8.0%	8.1%	18.4%	28.2%	chi2(8): 151.88
Living arrangements changed	33.9%	6.9%	10.7%	7.6%	40.9%	Pr = 0.000		40.4%	6.2%	7.0%	13.9%	32.6%	Pr = 0.000
Education													
High	37.5%	8.3%	14.6%	9.2%	30.4%			38.4%	6.4%	7.0%	18.0%	30.3%	
Middle	31.9%	8.5%	13.7%	10.2%	35.6%	chi2(8): 330.33		34.5%	7.8%	8.2%	19.3%	30.3%	chi2(8): 164.04
Low	27.9%	8.5%	12.7%	10.4%	40.5%	Pr = 0.000		29.7%	8.0%	10.9%	20.8%	30.6%	Pr = 0.000

Table (continued)	Rise 15% +	Rise 6-14%	No sig. Chng.	Fall 6-14%	Fall 15%+		Rise 15% +	Rise 6-14%	No sig. Chng.	Fall 6-14%	Fall 15%+	
Health												
Remained healthy	32.1%	8.6%	13.9%	10.3%	35.1%		35.7%	7.3%	8.1%	18.1%	30.8%	
Remained ill	38.6%	8.0%	14.9%	8.5%	30.0%	chi2(8): 294.4	41.4%	5.9%	6.6%	15.1%	31.0%	chi2(8): 541.68
Became ill	28.8%	8.5%	17.5%	12.0%	33.2%	Pr = 0.000	28.0%	7.9%	8.0%	29.7%	26.4%	Pr = 0.000
Job status												
Economically active	28.6%	7.9%	11.0%	10.6%	41.9%		33.9%	7.8%	8.3%	17.7%	32.3%	
Remained retired	42.6%	8.1%	15.7%	8.7%	24.8%	chi2(8): 1.2e+03	39.6%	6.1%	7.3%	15.9%	31.1%	chi2(8): 391.96
Changed to retirement	34.3%	9.5%	17.0%	9.4%	29.8%	Pr = 0.000	27.8%	7.8%	7.9%	29.7%	26.8%	Pr = 0.000
Share of benefit income												
1.5+ Times Benefit Inc. Avrg.	40.7%	6.4%	11.2%	7.9%	33.7%	chi2(4): 56.01	38.7%	7.0%	10.1%	18.1%	26.1%	chi2(4): 2.97
1.5- Times Benefit Inc. Avrg.	34.1%	8.5%	14.2%	9.8%	33.3%	Pr = 0.000	36.5%	6.9%	7.6%	18.6%	30.4%	Pr = 0.562
Share of state pension income												
1.5+ Times State Pension Inc. Avrg.	28.3%	9.1%	16.6%	10.4%	35.6%	chi2(4): 52.21	34.3%	6.2%	10.1%	20.1%	29.4%	chi2(4): 4.41
1.5- Times State Pension Inc. Avrg.	35.0%	8.3%	13.8%	9.6%	33.2%	Pr = 0.000	36.5%	6.9%	7.6%	18.6%	30.3%	Pr = 0.354
Share of private pension income												
1.5+ Times Private Pension Inc. Avr	23.5%	9.9%	14.8%	11.3%	40.4%	chi2(4): 306.69	44.2%	9.6%	13.5%	9.6%	23.1%	chi2(4): 6.87
1.5- Times Private Pension Inc. Avrg	36.2%	8.2%	13.9%	9.4%	32.2%	Pr = 0.000	36.5%	6.9%	7.6%	18.6%	30.3%	Pr = 0.143
Share of investment income												
1.5+ Times Investment Inc. Avrg.	27.7%	7.5%	9.9%	9.9%	45.0%	chi2(4): 430.36	37.3%	4.5%	9.0%	17.8%	31.3%	chi2(4): 3.94
1.5- Times Investment Inc. Avrg.	35.8%	8.6%	14.8%	9.6%	31.2%	Pr = 0.000	36.5%	6.9%	7.6%	18.6%	30.3%	Pr = 0.414
Income attributes												
Bottom one-fifth	63.3%	7.3%	13.8%	5.9%	9.7%		64.6%	3.8%	4.1%	11.4%	16.2%	
Second one-fifth	43.3%	9.5%	16.1%	9.4%	21.7%		44.9%	6.2%	6.7%	16.3%	25.8%	
Middle one-fifth	32.3%	8.8%	15.3%	10.4%	33.3%		34.1%	8.0%	8.0%	19.6%	30.4%	
Fourth one-fifth	22.2%	9.3%	13.7%	11.4%	43.3%	chi2(16): 6.6e+0	24.4%	8.6%	9.2%	22.7%	35.1%	chi2(16): 4.4e+03
Top one-fifth	11.6%	7.0%	11.4%	11.3%	58.7%	Pr = 0.000	13.7%	8.1%	10.3%	23.2%	44.8%	Pr = 0.000
Home ownership												
Owned	34.0%	9.7%	14.3%	8.7%	33.3%	chi2(4): 43.09	35.6%	6.9%	7.7%	18.9%	30.8%	chi2(4): 45.62
Not owned	36.7%	7.9%	13.6%	9.6%	32.2%	Pr = 0.000	40.0%	6.9%	7.7%	17.1%	28.5%	Pr = 0.000
Time period												
Wave1-2	31.5%	9.6%	17.2%	11.2%	30.9%	chi2(4): 510.14	39.9%	7.3%	8.1%	21.6%	23.2%	chi2(4): 979.2
Wave3-4	37.6%	7.2%	11.2%	8.2%	35.9%	Pr = 0.000	32.6%	6.5%	7.1%	15.1%	38.7%	Pr = 0.000
Sample attribute												
Unbalanced panel	42.6%	8.5%	7.5%	5.6%	35.8%	chi2(4): 439.47	36.1%	7.2%	7.3%	19.8%	29.7%	chi2(4): 160.06
Balanced panel	26.4%	4.9%	7.3%	7.3%	23.8%	Pr = 0.000	38.0%	6.0%	9.1%	13.9%	32.9%	Pr = 0.000

6.3.2   Demographic attributes

The Chi-square statistic shown in Table 71 confirms that, in relation to gender, there is a difference between the income mobility experiences of men and women in both countries. In addition, the Chi-square statistics indicate that income mobility differs significantly among the individuals belonging to different age groups in both countries. Older people aged over 80 (the oldest group) show higher proportions of long-range upward income mobility, with 42.8% in England and 40.6% in Korea. In both countries, there is health- and disability-related cash benefits in old age (which are more generous in England, see Chapter 4, section 4.5) which may have affected the income increase as people aged.

In relation to marital status, the Chi-square statistic reveals that marital status is significantly correlated with income mobility. The most notable difference between the two countries is that the category of "remained widow(er)" was relatively more associated with long-range upward income mobility in England (44%) compared with Korea (39%). However, elderly English people are more likely to experience long-range downward income mobility in the event of widowhood; this happened in 38% of cases in this category, compared with 29% in Korea. This result is in accordance with the results found in the study by Zaidi and De Vos (2002). Namely, older people who remained in widowhood are more likely to experience long-range upward income mobility but the event of widowhood itself is likely to cause long-range downward income mobility. In the case of Korea, those who remained in a couple were relatively more often associated with long-range upward income mobility.

The categories of living arrangements show that income mobility is associated with individuals' living arrangements. The statistics show that in the event of changes in living arrangements, older people in England are more likely to have observed long-range downward income mobility: 41% in England compared with 33% in Korea. Interestingly, Korean elderly people are significantly more likely to have long-range upward income mobility: 40% compared with 34% in England. This difference can be explained by the fact that when a person moves to his or her children's or parents' house, this will affect the level of household income. In the Korean case, when an elderly person moves to his or her children's house (traditionally they move to their first son's), that person is likely to experience a positive income change.

6.3.3 Educational level attributes

In both countries, as the Chi-square statistic shows, income mobility differed significantly depending on the level of education. Not surprisingly, those who had a low level of education were more likely to observe long-range downward income mobility (41% in England and 31% in Korea) whilst those who had a higher education experienced long-range upward income mobility: 38% in England and 38% in Korea.

6.3.4 Health attributes

In both countries, income mobility differed significantly among older people with different health statuses. The result shows similar patterns of income mobility between the two countries. Interestingly, in both countries, those who remained ill were more likely to have observed long-range upward income mobility (39% in England and 41% in Korea), which may help to understand the results found in the upward income mobility patterns amongst the oldest age group. When health status changes (where a person becomes ill), especially in the short term, that person is likely to experience downward income mobility. This may be caused by exiting from the labour market due to illness.

6.3.5 Employment status attributes

In both countries, the patterns of income mobility differ significantly depending on individuals' employment status. Persons experiencing changes in job status, from being economically active to becoming retired, are likely to have observed long-range downward income mobility in both countries (30% in England and 27% in Korea). Interestingly, in England, those who were economically active experienced long-range downward income mobility (42%) whereas the corresponding figure for Korea was 32%. This may be partly influenced by the financial crisis in 2008, which impacted more heavily on the English labour market than on Korea. In both countries, those who remained retired were more likely to have observed long-range upward income mobility (43% in England and 40% in Korea).

6.3.6 Income attributes

Income is grouped into the five quintile groups on the basis of reference-year income. In both countries, the Chi-square statistic shows that there is a correlation between income mobility and income rankings. It is interesting that among the "income attributes" the

lowest income quintile has a higher percentage in the "rising" categories in both countries than the higher income quintile, and indeed it is the other way around for the highest income quintile.

Considering the welfare system factor, the Chi-square statistic reveals that the income mobility of various compositions of income differs significantly only in England. This is partially caused by the fact that the state pension is still weak and immature and the volume of cash benefits is a lot lower compared to England. Those individuals who had a high proportion of income from state benefits were more likely to experience long-range upward income mobility whereas those who had a high proportion of income from private pensions and investment were likely to have observed long-range downward income mobility.

Finally, in relation to home ownership, for both countries, the Chi-square statistic illustrates a significant association between income mobility and home ownership. In both countries, older people who do not live in their own house were slightly more likely to observe long-range upward income mobility than those who live in their own house. However, interestingly, older people who do not own their home in Korea are less likely to observe long-range downward income mobility compared to England. The result is the opposite when combining the both long-range and short-range downward income mobility; Korean elderly persons are more likely to observe downward income mobility compared to older people in England.

6.4   Multivariate analysis using multinomial logistic regression

Until now this analysis has looked at the descriptive results on patterns of income mobility and factors that may be associated with the income mobility of older people in the two countries. It now extends that analysis on the basis of a multivariate analysis which can handle more than two variables simultaneously. It will use the multinomial logistic regression method (see Appendix I for the description MLR model details), as it has a dependent variable with more than two outcomes. The category of "No Significant Change (less than 5%)" mobility is used as the reference group in the dependent variable. There are five sets of explanatory variables: demographic, education, health, employment and welfare (income compositions). Section 3.8 provides a more detailed discussion on the choice of these explanatory variables. The empirical output, the dependent variable in this

study, is based on the same five categories of the income mobility outcome variables that were used in the previous Section 6.3.

The MLR results were presented using a *forward step-wise* method, in which additional sets of independent variables were included in five steps. These steps were taken in the following order: demographic, education, health, employment and welfare (income compositions). This analysis employs Zaidi and De Vos's (2002) approach, which uses five-category polychotomous variables as the dependent variables in a MLR model. MLR is appropriate for examining the impact of various personal attributes such as sex, age, education, employment, and life-course transitions on the income trajectories. This approach helps us to analyse the factors that influence the upward or downward mobility in the individual actual income of older people in both countries. However, in selecting this MLR model, because the errors that arise in the panel data must be verified, the estimate of the MLR model chosen for this study can be trusted. How well MLR model fits depends on the difference between the model and the observed data. One approach commonly used to examine whether the model fits well is to implement a Hosmer and Lemeshow (1980) goodness of fit test. Using the multinomial goodness-of-fit test proposed by a Fagerland et al. (2008) which is identical to Hosmer-Lemeshow test, the analysis examined whether the chosen MLR model in this study is appropriate to measure the factors affecting income mobility of older people in England and Korea.

Table 72 Goodness-of-fit tests for a multinomial logistic regression model

Number of observations	ELSA	KLoSA
	5408	6951
Number of outcome values	5	5
Base outcome value	1	1
Number of groups	10	10
Chi-squared statistic	33.621	34.504
Degrees of freedom	32	32
Prob > chi-squared	0.389	0.377

Source: Author's own analysis

Overall, as shown in table 72, the goodness-of-fit test shows that the model fits reasonably well. Under the null hypothesis, the fitted model is the correct model because we have no significant difference between the model and the observed data as the p-value is above 0.05.

Table 74 (page 198 and 199) provides the MLR results on income mobility associated with demographics, education, health, employment and welfare (income attributes), as well as

with the base year and the panel length in England and Korea. Table 73, on the other hand, shows the final specification only, and the summary results, which include only the long-range upward and downward income mobility of Table 74 with the coefficient sign and significance of all independent variables included in the final specification.

Focusing only on the long-range upward and downward income mobility as shown in Table 73, in both countries, demographic attributes were significantly associated with income mobility in later life. In particular, in both countries, the coefficient for age is significant for the outcomes, with the chance to experience both long-range upward and downward income mobility, which is in line with the descriptive results. By contrast, the coefficient for age squared is significant but has a negligible value in both countries.

Individuals who were remained living with others experience only significant and positive long-range upward income mobility in Korea; it is negative and significant for long-range downward income mobility whereas it is not significant for both long-range upward and downward income mobility in England, which is in accordance with the descriptive results. However, those who remained a widow(er) are only significant and have a positive coefficient in the long-range upward income mobility in England, whereas it is not significant for both of the income mobility outcomes in Korea.

When changes in living arrangements occurred, they showed a significant coefficient for both long-range upward (negative) and downward (positive) income mobility in England, whereas in Korea it is only significant and positive for long-range upward income mobility. Thus, as was shown in the descriptive result, it can be said that moving into children's homes has a positive income change for older people in Korea, while it is less favourable and incurs a negative income change for older people in England.

For both countries, the coefficient that captures the effect of educational level shows that it is significantly associated with income mobility for those who had a middle or higher educational qualification. Having middle or higher education has a negative and significant coefficient for long-range downward income mobility but also a positive and significant coefficient for long-range upward income mobility. These results illustrate that those individuals who had a middle or higher educational level decreased their chance of experiencing long-range downward income mobility, while they were more likely to experience long-range upward income mobility than those individuals with lower education. Again, this result is in line with the descriptive results.

The coefficient for those who remained ill is significant and positive for long-range downward income mobility, and negative for long-range upward income mobility only in Korea; the same category is not significant in England. Changes in health status ("became ill") are significant and positively associated with long-range upward income mobility only in England, whereas such changes are associated with long-range downward income mobility (negative) and long-range upward income mobility (negative) in Korea. These results may be influenced by the fact that older people in England may start to claim additional cash benefits related to their health and disability needs (Zaidi, 2008).

Table 73 Cross-national comparison of significance and signs of coefficients

Attributes	Long-range downward Income mobility		Long-range upward Income mobility	
	Eng	**Kor**	**Eng**	**Kor**
Female	++	X	--	X
Age	+	+	--	--
Age squared	X	X	++	++
Remained widow(er)	X	X	--	X
Became widow(er)	++	X	--	X
Remained living with others	X	--	X	++
Living arrangement changed	++	X	--	++
Edu middle	--	--	++	++
Edu high	--	--	++	++
Remained ill	X	++	X	--
Became ill	X	--	++	--
Changed: working to retirement	++	--	--	--
Second income quintile group	++	++	--	--
Third income quintile group	++	++	--	--
Fourth income quintile group	++	++	--	--
Fifth income quintile group	++	++	--	--
Share of benefit income	++	--	X	+
Share of state pensions income	--	X	X	X
Share of private pension income	--	X	++	+
Share of investment income	++	X	++	++
Home owner	X	-	+	++
Base year = 2006	--	--	--	++
Balanced panel	--	--	--	+

+ = significant p < 0.05, with positive sign
++ = significant p < 0.01, with positive sign
-- = significant p < 0.01, with negative sign
X = non-significant coefficient

Source: Author's own analysis

In both countries, changes in employment status are, as expected, significantly associated with income mobility. In England, a change in employment status from economically

active to retired had a significant coefficient (positive) for long-range downward income mobility and a negative coefficient for long-range upward income mobility. Compared with England, the Korean statistics show a significant coefficient (negative) for long-range downward income mobility but the same long-range upward (negative) income mobility.

In relation to the income groups, these are defined as quintile income groups and the first (lowest) income group was used as the reference group. In both countries, the coefficients for all four income groups were significant and the statistics show that the coefficients for long-range upward income mobility are negative, which indicates that individuals in these income groups are less likely to observe upward income mobility than individuals in the lowest income group. By contrast, the positive coefficients for all four income groups in both countries indicate that those individuals who belonged to any of the four income groups were more likely to observe long-range downward income mobility than the lowest income group.

The significance of the income composition attributes is analysed by using the income shares of these income components as continuous variables. In Korea, the coefficient for the share of state benefits indicates that a higher proportion of state benefits in the total income decreases the chance of experiencing long-range downward income mobility but increases the chances of long-range upward income mobility. By contrast, for England, a higher proportion of state benefits increases the chance of long-range downward income mobility.

Interestingly, for England, the coefficient for the share of state pension indicates that a higher proportion of state pension in total income decreases the chances of long-range downward income mobility, but this income component was not significant for Korea. This is partly due to a relatively immature state pension system in Korea, which only started in 1998. In each country, the share of private pensions had a positive and significant coefficient for long-range upward income mobility. However, it had a negative and significant coefficient for long-range downward income mobility for England, while it was not significant for Korea.

The coefficient for investment income indicates that a higher proportion of this in total income increases the chance of experiencing either long-range downward and long-range upward income mobility in England, while it showed only as being positive and significant for upward income mobility in Korea. This result indicates that a greater dependence on

investment income in later life is likely to increase the chance of experiencing volatile income changes in both directions.

In order to capture whether there is a difference between the base year period (2006–08) and the later period (2010–12), the base year variable was included in the model. The coefficient is significant and negative for long-range downward income mobility for both countries, which indicates that older people in both countries were less likely to have observed long-range downward income mobility in the first period (2006–08). This was also observed for long-range upward income mobility in England, but older people in Korea were more likely to have observed long-range upward income mobility in the first period.

For both countries, the coefficient that captures the effect of homeownership reveals that it is significantly associated with income mobility for those who live in their own house. Having owned home has a positive and significant coefficient for long-range upward income mobility in both countries but a negative and significant coefficient for long-range downward income mobility in Korea only. These results illustrate that those individuals who owned a home were more likely to experience long-range upward income mobility than those individuals who do not own home.

Finally, the last variable that was included in the model is an analysis of the difference between those who were presented in all measured years (2006–12) and those who were not. The coefficient is significant and negative for long-range downward and upward income mobility in England, which shows that those who were presented in all measured years were less likely to have observed either long-range downward or upward income mobility. By contrast, for Korea, it had a negative and significant coefficient for long-range downward income mobility but a positive and significant coefficient for upward income mobility.

To summarise the results shown in Table 73 (focusing on long-range income mobility only), first one can see the similar patterns between the two countries that age has a significant association with income mobility in both countries with chances of experiencing downward income mobility increase as people get older. This is in line with other studies (Johnson and Stears, 1998, Zaidi, 2008, Jenkins, 2011, and Nam, 2015) and proves the difficulty of raising income after a certain age which is because of income stagnation due to the wage peak system and retirement (Jenkins, 2011). In addition, in both countries, having middle or higher education has a significant association with long-range

upward income mobility. This illustrates that those individuals who had a middle or higher educational level decreased their chances of experiencing long-range downward income mobility, while they were more likely to experience long-range upward income mobility than those individuals with lower education. Likewise, in both countries, those who own house are also likely to experience long-range upward income mobility than those who do not own house. Furthermore, in both countries, both a higher share of private pension income and a higher share of investment income increase the chances of long-range upward income mobility. Moreover, changes in employment status, as expected, is significantly associated with income mobility in both countries with chances of experiencing downward income mobility increase for those who are retiring from their work. Likewise, all those who are in any of the second to fifth income quintile groups are more likely to experience long-range downward income mobility than the bottom income quintile group in both countries.

Focusing on the differences found between the two countries, we can see that a high share of benefit income increase the chances of experiencing long-range downward income mobility in England, while the same attribute decreases the likelihood of experiencing long-range downward income mobility but increases the chances of long-range upward income mobility in Korea. For England, the event of becoming widow(er) is significantly associated with both long-range downward and upward income mobility, whereas in Korea, this event is not significant. Likewise, a higher share of state pension income decreases the chances of experiencing long-range downward income mobility in England, but this income component was not significant for Korea. Furthermore, those who were remained living with others likely to experience long-range upward income mobility in Korea, whereas it is not significant for England. Moreover, interestingly, the event of changing in living arrangement is associated with long-range downward income mobility in England, whereas this event is associated with long-range upward income mobility in Korea. Finally, those who remained ill is significantly associated with long-range downward income mobility in Korea, but the same attribute is significant for England. However, changes in health status (becoming ill) are associated with long-range upward income mobility in England, whereas the same event decreases the chances of experiencing long-range upward income mobility in Korea.

Chapter 6

Table 74 Income mobility associated with demographics, education, health, labour market and income attributes, as well as with base year and the panel length. Multinomial logistic regression results for England and Korea

	England						Korea					
		Robust						Robust				
	Coef.	Std. Err.	z	P>|z|	95% Conf. Interval		Coef.	Std. Err.	z	P>|z|	95% Conf. Interval	
Fall 15%+												
Female	0.22	0.03	8.26	0.00	0.17	0.27	-0.02	0.03	-0.75	0.45	-0.08	0.04
Age	0.04	0.02	2.26	0.02	0.01	0.07	0.04	0.02	2.51	0.01	0.01	0.08
Age squared	0.00	0.00	-1.29	0.20	0.00	0.00	0.00	0.00	-1.80	0.07	0.00	0.00
Remained widow(er)	0.08	0.04	1.90	0.06	0.00	0.17	0.01	0.04	0.26	0.79	-0.07	0.09
Became widow(er)	0.18	0.06	3.21	0.00	0.07	0.29	-0.02	0.07	-0.36	0.72	-0.16	0.11
Remained living with others	0.09	0.05	1.57	0.12	-0.02	0.19	-0.36	0.03	-11.99	0.00	-0.42	-0.30
Living arrangements changed	0.81	0.07	11.57	0.00	0.68	0.95	-0.07	0.06	-1.21	0.23	-0.18	0.04
Edu middle	-0.14	0.03	-4.34	0.00	-0.20	-0.07	-0.16	0.03	-4.62	0.00	-0.23	-0.09
Edu high	-0.23	0.04	-6.31	0.00	-0.30	-0.16	-0.36	0.05	-6.66	0.00	-0.47	-0.26
Remained ill	0.03	0.03	1.04	0.30	-0.03	0.09	0.20	0.03	6.22	0.00	0.14	0.26
Became ill	-0.07	0.04	-1.63	0.10	-0.15	0.01	-0.31	0.05	-6.37	0.00	-0.40	-0.21
Changed: working to retirement	0.11	0.03	3.39	0.00	0.05	0.17	-0.27	0.05	-5.53	0.00	-0.37	-0.18
Second income quintile group	1.03	0.05	19.83	0.00	0.93	1.13	0.77	0.05	16.90	0.00	0.68	0.85
Third income quintile group	1.77	0.05	34.14	0.00	1.67	1.87	1.17	0.05	25.19	0.00	1.08	1.26
Fourth income quintile group	2.38	0.05	44.23	0.00	2.28	2.49	1.50	0.05	31.16	0.00	1.41	1.60
Fifth income quintile group	3.16	0.06	55.05	0.00	3.05	3.28	2.05	0.05	40.03	0.00	1.95	2.15
1.5 + Benef Income	0.37	0.05	6.80	0.00	0.26	0.48	-0.52	0.17	-3.08	0.00	-0.85	-0.19
1.5 + State Pension Income	-0.17	0.05	-3.56	0.00	-0.26	-0.07	-0.12	0.12	-1.04	0.30	-0.36	0.11
1.5 + Private Pension income	-0.51	0.04	-13.40	0.00	-0.58	-0.43	-0.54	0.32	-1.68	0.09	-1.18	0.09
1.5 + Investment Income	0.17	0.03	5.10	0.00	0.11	0.24	-0.08	0.13	-0.58	0.56	-0.34	0.18
Home owner	-0.04	0.03	-1.39	0.17	-0.10	0.02	-0.09	0.03	-2.66	0.01	-0.16	-0.02
Base year = 2006	-0.29	0.03	-9.30	0.00	-0.36	-0.23	-0.81	0.03	-23.86	0.00	-0.88	-0.74
Balanced Panel	-0.17	0.03	-6.47	0.00	-0.22	-0.12	-0.26	0.03	-7.60	0.00	-0.33	-0.19
Constant	-4.27	0.59	-7.28	0.00	-5.43	-3.12	-3.02	0.59	-5.13	0.00	-4.17	-1.86
Fall 5% to 15%												
Female	0.01	0.04	0.32	0.75	-0.06	0.09	0.03	0.04	0.81	0.42	-0.04	0.10
Age	0.02	0.03	0.68	0.49	-0.03	0.07	0.01	0.02	0.42	0.67	-0.03	0.05
Age squared	0.00	0.00	-0.93	0.35	0.00	0.00	0.00	0.00	-0.27	0.79	0.00	0.00
Remained widow(er)	0.11	0.06	1.75	0.08	-0.01	0.23	0.20	0.05	4.26	0.00	0.11	0.29
Became widow(er)	0.06	0.08	0.78	0.43	-0.10	0.22	-0.09	0.07	-1.16	0.25	-0.23	0.06
Remained living with others	0.00	0.08	0.01	1.00	-0.16	0.16	-0.27	0.03	-8.01	0.00	-0.34	-0.21
Living arrangements changed	-0.18	0.12	-1.50	0.13	-0.42	0.05	-0.40	0.07	-5.57	0.00	-0.54	-0.26
Edu middle	-0.02	0.05	-0.50	0.61	-0.11	0.07	-0.08	0.04	-2.02	0.04	-0.16	0.00
Edu high	-0.06	0.05	-1.04	0.30	-0.16	0.05	0.06	0.06	1.05	0.30	-0.05	0.18
Remained ill	-0.10	0.05	-2.21	0.03	-0.19	-0.01	-0.08	0.04	-2.00	0.05	-0.15	0.00
Became ill	0.33	0.06	5.88	0.00	0.22	0.44	0.54	0.05	10.23	0.00	0.44	0.64
Changed: working to retirement	0.05	0.05	0.98	0.33	-0.05	0.14	0.52	0.05	9.82	0.00	0.42	0.63
Second income quintile group	0.51	0.07	7.73	0.00	0.38	0.64	0.48	0.05	9.14	0.00	0.38	0.58
Third income quintile group	0.63	0.07	9.36	0.00	0.50	0.76	0.75	0.05	14.16	0.00	0.64	0.85
Fourth income quintile group	0.72	0.07	10.63	0.00	0.59	0.85	0.98	0.05	18.09	0.00	0.87	1.08
Fifth income quintile group	0.71	0.07	9.92	0.00	0.57	0.85	0.94	0.06	16.48	0.00	0.83	1.05
1.5 + Benef Income	-0.15	0.08	-1.73	0.08	-0.31	0.02	-0.06	0.19	-0.32	0.75	-0.43	0.31
1.5 + State Pension Income	0.10	0.07	1.49	0.14	-0.03	0.24	0.10	0.13	0.73	0.46	-0.16	0.35
1.5 + Private Pension income	0.07	0.06	1.31	0.19	-0.04	0.18	-0.84	0.47	-1.79	0.07	-1.75	0.08
1.5 + Investment Income	-0.10	0.05	-1.86	0.06	-0.20	0.01	-0.26	0.17	-1.54	0.13	-0.59	0.07
Home owner	-0.05	0.04	-1.13	0.26	-0.13	0.03	-0.06	0.04	-1.41	0.16	-0.14	0.02
Base year = 2006	0.21	0.04	4.73	0.00	0.12	0.30	-0.10	0.04	-2.54	0.01	-0.18	-0.02
Balanced Panel	0.30	0.04	7.71	0.00	0.22	0.38	0.40	0.04	9.23	0.00	0.32	0.48
Constant	-3.42	0.90	-3.80	0.00	-5.19	-1.65	-2.79	0.71	-3.96	0.00	-4.18	-1.41

Table (continued)

	England						*Korea*					
Rise 5% to 15%	Coef.	Robust Std. Err.	z	P>|z|	95% Conf. Interval		Coef.	Robust Std. Err.	z	P>|z|	95% Conf. Interval	
Female	0.01	0.04	0.17	0.86	-0.07	0.09	-0.09	0.05	-1.73	0.08	-0.19	0.01
Age	0.04	0.03	1.42	0.16	-0.02	0.09	-0.06	0.03	-1.85	0.06	-0.12	0.00
Age squared	0.00	0.00	-1.67	0.10	0.00	0.00	0.00	0.00	1.74	0.08	0.00	0.00
Remained widow(er)	0.11	0.06	1.76	0.08	-0.01	0.23	-0.06	0.07	-0.87	0.38	-0.21	0.08
Became widow(er)	0.09	0.09	1.03	0.30	-0.08	0.27	0.12	0.11	1.12	0.26	-0.09	0.34
Remained living with others	0.01	0.09	0.08	0.94	-0.16	0.17	0.16	0.05	3.03	0.00	0.05	0.26
Living arrangements changed	-0.30	0.13	-2.40	0.02	-0.55	-0.05	0.05	0.10	0.44	0.66	-0.16	0.25
Edu middle	0.00	0.05	0.03	0.98	-0.10	0.10	0.00	0.06	0.04	0.97	-0.11	0.12
Edu high	0.06	0.06	0.99	0.32	-0.06	0.17	0.03	0.09	0.29	0.77	-0.15	0.20
Remained ill	-0.09	0.05	-1.86	0.06	-0.18	0.00	-0.03	0.06	-0.50	0.62	-0.14	0.09
Became ill	0.08	0.06	1.23	0.22	-0.05	0.21	0.08	0.08	0.92	0.36	-0.09	0.24
Changed: working to retirement	0.14	0.05	2.96	0.00	0.05	0.24	0.15	0.09	1.74	0.08	-0.02	0.32
Second income quintile group	0.29	0.06	4.58	0.00	0.16	0.41	0.46	0.08	5.47	0.00	0.29	0.62
Third income quintile group	0.18	0.07	2.72	0.01	0.05	0.31	0.65	0.08	7.91	0.00	0.49	0.82
Fourth income quintile group	0.20	0.07	2.92	0.00	0.06	0.33	0.69	0.08	8.22	0.00	0.53	0.86
Fifth income quintile group	-0.13	0.08	-1.72	0.09	-0.28	0.02	0.62	0.09	6.97	0.00	0.44	0.79
1.5 + Benef Income	-0.27	0.09	-2.88	0.00	-0.45	-0.09	0.09	0.28	0.33	0.74	-0.46	0.65
1.5 + State Pension Income	0.09	0.07	1.17	0.24	-0.06	0.23	-0.07	0.22	-0.35	0.73	-0.50	0.35
1.5 + Private Pension income	0.27	0.06	4.52	0.00	0.15	0.39	0.32	0.48	0.68	0.50	-0.61	1.26
1.5 + Investment Income	-0.19	0.06	-3.29	0.00	-0.31	-0.08	-0.55	0.30	-1.85	0.06	-1.14	0.03
Home owner	0.04	0.04	0.89	0.37	-0.05	0.13	-0.08	0.06	-1.30	0.19	-0.20	0.04
Base year = 2006	0.31	0.05	6.79	0.00	0.22	0.40	-0.04	0.06	-0.71	0.48	-0.16	0.07
Balanced Panel	0.24	0.04	5.75	0.00	0.16	0.32	0.12	0.06	1.93	0.05	0.00	0.25
Constant	-3.93	0.96	-4.12	0.00	-5.81	-2.06	-1.20	1.04	-1.16	0.25	-3.24	0.83
Rise 15% +												
Female	-0.18	0.03	-6.87	0.00	-0.23	-0.13	0.05	0.03	1.49	0.14	-0.01	0.11
Age	-0.11	0.02	-7.01	0.00	-0.15	-0.08	-0.07	0.02	-3.68	0.00	-0.10	-0.03
Age squared	0.00	0.00	6.61	0.00	0.00	0.00	0.00	0.00	2.72	0.01	0.00	0.00
Remained widow(er)	-0.18	0.04	-4.72	0.00	-0.26	-0.11	-0.04	0.04	-1.02	0.31	-0.12	0.04
Became widow(er)	-0.32	0.06	-5.46	0.00	-0.44	-0.21	0.02	0.07	0.32	0.75	-0.11	0.15
Remained living with others	-0.06	0.06	-1.01	0.31	-0.16	0.05	0.56	0.03	17.66	0.00	0.50	0.62
Living arrangements changed	-0.30	0.07	-4.29	0.00	-0.44	-0.16	0.38	0.06	6.51	0.00	0.26	0.49
Edu middle	0.16	0.03	5.00	0.00	0.10	0.22	0.24	0.04	6.69	0.00	0.17	0.32
Edu high	0.29	0.04	7.41	0.00	0.21	0.36	0.29	0.06	4.94	0.00	0.18	0.41
Remained ill	-0.01	0.03	-0.45	0.66	-0.07	0.04	-0.12	0.03	-3.77	0.00	-0.19	-0.06
Became ill	-0.41	0.04	-9.66	0.00	-0.49	-0.33	-0.23	0.05	-4.66	0.00	-0.33	-0.13
Changed: working to retirement	-0.30	0.03	-9.71	0.00	-0.37	-0.24	-0.26	0.05	-5.05	0.00	-0.35	-0.16
Second income quintile group	-0.89	0.04	-24.61	0.00	-0.96	-0.82	-1.05	0.04	-27.39	0.00	-1.13	-0.98
Third income quintile group	-1.51	0.04	-38.60	0.00	-1.59	-1.44	-1.74	0.04	-40.82	0.00	-1.82	-1.65
Fourth income quintile group	-2.20	0.04	-49.61	0.00	-2.29	-2.12	-2.39	0.05	-49.11	0.00	-2.49	-2.30
Fifth income quintile group	-3.18	0.05	-57.91	0.00	-3.29	-3.07	-3.20	0.06	-54.00	0.00	-3.32	-3.09
1.5 + Benef Income	-0.03	0.05	-0.65	0.52	-0.14	0.07	0.39	0.17	2.33	0.02	0.06	0.73
1.5 + State Pension Income	-0.06	0.05	-1.24	0.21	-0.16	0.04	-0.05	0.13	-0.43	0.67	-0.30	0.19
1.5 + Private Pension income	0.31	0.04	7.18	0.00	0.23	0.39	0.63	0.29	2.14	0.03	0.05	1.21
1.5 + Investment Income	0.19	0.04	5.01	0.00	0.12	0.26	0.40	0.14	2.84	0.01	0.12	0.67
Home owner	0.06	0.03	2.05	0.04	0.00	0.11	0.17	0.03	4.89	0.00	0.10	0.23
Base year = 2006	-0.11	0.03	-3.48	0.00	-0.17	-0.05	0.79	0.03	25.40	0.00	0.73	0.86
Balanced Panel	-0.35	0.03	-13.65	0.00	-0.40	-0.30	0.06	0.04	1.73	0.08	-0.01	0.13
Constant	5.28	0.57	9.33	0.00	4.17	6.39	3.00	0.61	4.89	0.00	1.80	4.21

Note: (1) the base outcome of the dependent variable is "No significant change (less than 5%)"
Source: author's calculations from ELSA and KLoSA, 2006–2012

Until now this thesis has provided the significance of individual attributes on income mobility. In order to analyse the relative importance of the various attributes that affect income mobility in later life in England and Korea, it now uses the regression results to calculate the predicted probabilities of the five outcome variables for various subgroups of older people in the two countries. Table 75 below shows the results and its summary is as below:

- First, for almost all subgroups, the probability of experiencing long-range downward income mobility is slightly higher in Korea than in England. There are two exceptions: females and males who live independently have a slightly higher chance in England than in Korea, which is in line with the difference observed in the descriptive results (see Section 5.9.1).

- Secondly, all subgroups show that the probability of observing short-range downward income mobility is much higher in Korea than in England.

- Thirdly, the likelihood of observing no income mobility is significantly higher in England than in Korea. This is also in line with the difference observed in the income trajectory analysis (section 5.7.2) and the descriptive results (section 5.9.1).

- Fourthly, the probability of experiencing short-range upward income mobility is slightly higher in England in all subgroups than in Korea.

- Finally, for long-range upward income mobility, the difference between the two countries is small. The most notable difference is that those females whose living arrangements changed were more likely to experience long-range upward income mobility in England than in Korea.

Table 75[35] Predicted probabilities of the incidence of income mobility associated with various combinations of attributes, England and Korea

Row No	Age	Gender	Marital Status	Education Level	Living Arrange.	Remained ill	Remained Retired	Income Group	Eng Fall 15%+	Kor Fall 15%+	Eng Fall 15-5%	Kor Fall 15-5%	Eng No sig. Chg.	Kor No sig. Chg.	Eng Rise 15-5%	Kor Rise 15-5%	Eng Rise 15%+	Kor Rise 15%+
1	65-69	Female	Couple	Low	Indep.	No	Yes	1st	18.9	26.1	8.7	13.7	15.1	6.5	9	4.5	47.6	50.4
2	70-74	..	..	..	..	..	..	..	16.2	24.3	7	13.4	13.7	6	7.7	4.3	54.4	49.8
3	75+	..	..	All	..	..	..	..	19.4	23.2	6.1	14.3	11.6	5.9	6.7	4.3	55.6	50.6
4	..	Male	..	..	..	..	..	..	16.6	22.8	7.2	13.7	14.1	7.3	7.8	5	55.7	52.3
5	65+	Female	..	Low	..	..	..	..	17.7	25.3	6.9	13.9	12.9	6.2	7.5	4.4	53.9	49.3
6	..	Male	..	..	..	..	..	..	18.7	20.7	7.5	11.6	14.4	6.2	7.9	4.2	53.1	58
7	80+	Female	Widow	..	..	Became ill	..	..	16.4	X	8.3	X	16.9	X	7.2	X	47.3	X
8	..	..	..	..	..	..	..	2nd +	23.9	X	9.4	X	16.2	X	7.5	X	39.2	X
9	65+	..	Widowed	All	..	Yes	..	All	22.4	29.6	6.7	12.5	13.7	6.5	7.1	4.9	49.3	44.9
10	..	Male	..	..	..	..	..	..	25.3	33.8	7.5	9.3	14.3	8.4	7.4	4.9	46.5	44.1
11	..	Female	Non Couple	..	Changed	No	..	..	15.8	36.9	6.1	19.7	12.2	5.8	6.9	5.9	55.5	32.3
12	..	Male	..	..	..	Yes	..	..	23.4	29.9	7.2	13.5	14.1	5.5	7.2	5.1	48.9	45.3
13	..	Female	Couple	..	Indep	..	..	..	32.3	29.8	7.9	13.3	13.3	6.2	7.4	4.5	38.5	45.4
14	..	Male	..	..	..	..	..	..	35.7	29.9	8.5	13	14	7.2	7.3	5	34.1	44.2
15	..	Female	N. Mar./Div	..	..	..	..	..	23.3	27.7	6.7	13.8	12.9	4.4	6.9	4.2	49.8	48.6
16	..	Male	..	..	..	..	..	..	21.1	30.4	6.8	13.7	13.8	5.5	7.1	5.1	52.1	44.5
17	..	Female	Non Couple	..	w. others	..	..	..	23.2	38.1	4.7	15.8	11.1	6.3	5.9	6.3	52.9	34.6
18	..	..	Widow	..	Indep	..	..	1st	26.9	X	6.2	X	14.3	X	7.1	X	44.1	X
19	..	..	..	..	..	..	..	All	22.4	29.6	6.7	12.6	13.7	6.5	7.1	4.9	49.3	44.9
20	..	Male	..	..	..	..	..	..	25.3	33.8	7.5	9.3	14.4	8.4	7.4	4.9	46.5	44.1

Notes: "X" means no observations for that set of predicted probabilities; ".." means the same as row above

6.5   Conclusion

This chapter first examined what lies behind income mobility and what the similarities and dissimilarities are in the determinants of income mobility in England and Korea (RQ3). The results from the Fields and Ok (1996) breakdown mobility index show that income growth has very little impact on aggregate mobility in England, while it is crucial for the determination of mobility levels in Korea as it accounted for more than half of total income fluctuation over the studied periods. In addition to this, the CDW decomposition shows that, in England, as was found in Fields and Ok's (1996) breakdown mobility analysis, the structural component contributes little – and growth mobility contributes negatively – but

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[35] To read this table: Row number 1 shows predicted probabilities averages of the incidence of income mobility for elderly female aged between 65-69 who are married, live couple only, lowest income group, and the job status remained as retired over the measured period.

the component which contributes the most to income mobility was the re-ranking of individuals on the income scale. In other words, exchange mobility was the most important determinant of income mobility. By contrast, Korea shows that both the re-rankings and structural mobility (which accounts for approximately 45% of the total) contribute greatly to income mobility.

Furthermore, analysing the data using various decomposition exercises by population group has permitted this thesis to investigate both the differences between the countries and the possible determining factors specific to each country. The results show that there is a great deal of mobility among single people under the age of 65 in England, while older couples aged 65 or over with no children experience a greater income mobility in Korea. In addition, older people who are aged 65 or above and live alone experienced a greater variation in their income over time in Korea. From exploring the relationship between household size and income mobility, it is clear that income mobility is generally higher for larger households, the degree of income fluctuation also increased in England. However, in Korea, this relationship displays a tendency a U-shape, such that income mobility decreased as the household size increased up to four people but increased again with a household size of five or more.

Moreover, in the case of breakdown of income mobility by income sources, it appears that labour income is the most important determinant of mobility in both countries and income from self-employment for Korea and income from social transfers in England also plays an important contribution to income mobility. In both countries, the largest longitudinal income volatility was from property income.

This chapter also analysed the experience of income mobility of older people in England and Korea at the individual level using the five sets of explanatory variables based on socio-demographic attributes, health and education attribute, and income attributes. These variables were used to identify different factors may affecting income mobility in the two countries.

The results can summarise as follows:

- There is a considerable income mobility among older people in both countries, however, older people in Korea experience slightly higher long-range upward income mobility compared to England, except in the case of the oldest group over 80, among whom long-range upward income mobility was higher in England.

- Multinomial logistic regression analysis reveals that several socio-demographic attributes along with other life course events of later life are associated with income mobility among older people in the two countries. In line with the research found in the literature review, female elderly persons experience higher long-range downward mobility compared to their male counterparts in England only (Zaidi 2008, Kemp et al., 2004) but there is no difference in Korea which contradicts research found by Lim (2011) and Kim et al., (2012). In both countries, as expected, ageing is associated negatively with upward income mobility but positively with downward income mobility, and this is in line with studies by Jenkins (2011) and Johnson and Stears (1998). Several other events such as becoming a widow(er) are significantly associated with downward income mobility in England as found in Zaidi's study (2008), however, this latter event has no influence on the income mobility of older people in Korea. One possible explanation for this is that when older people become widowed they usually move to the first son's house or relative's house and received financial support from them. This trend is changing so the younger cohort may experience such turning point in their life differently. In Korea, living together has long been a cultural tradition, however, there is a continued increase in the proportion of older people living alone over the last half-century (Park and Choi, 2015). In Park and Choi (2015)'s study, they stated that widowed (especially females) elderly persons with lower educational level (less than high school) have a higher probability of living alone than their counterparts. The difference can also be caused by the fact that the English sample of people who were or became widowed is considerably larger than in Korea.

- Another notable difference between the two countries can be found in the changes in living arrangements. When this event occurs (for example, older people move to their son's or daughter's house or adult children move back to live with their parents), older people in England are likely to experience long-range downward income mobility, however, in Korea, the same event is associated with long-range upward income mobility.

- In line with many previous studies (e.g. Henretta and Campbell, 1976; Seok, 2009; Nam 2015), in both countries, older people who had a higher education are more likely associated with long-range upward income mobility than that of people with lower education.

- There is also a difference between two countries in the relationship between income mobility and one's health status. In Korea, people who remained ill or became ill

during the measured years were linked with long-range downward income mobility but this relationship is not significant in England. In fact, older people who became ill are only linked to upward income mobility in England. This result is in line with Zaidi's (2008) study and one possible explanation is the fact that older people in England become entitled to receive cash benefits once they become ill or disabled.

- In line with Zaidi et al. (2005)'s study but not with Nam (2015)'s study in Korean case, the likelihood of long-range upward income mobility in later life was positively associated with home-ownership in both countries.

- Finally, a notable difference between the two countries can be found in the relationship between income mobility and income attribute. In England, a higher share of state benefits is linked with long-range downward income mobility while in Korea it appears to be positively linked with long-range upward income mobility. In contrast, a higher share of state and private pension is associated with a greater likelihood to experience less downward income mobility only in England but this relationship is not significant in Korea. However, in both countries, a higher share of private pensions is linked with upward income mobility. These differences confirm that how the different state pension system, generosity of cash benefits, and occupational pension system affect the income mobility experienced by older people in the two countries.

Empirical results provided in this chapter points to the income dynamics in later life and differences and similarities between the two countries. The results provide important lesson towards how the different context, welfare system, and labour market affect the income mobility of older people.

Chapter 7:   Discussion and Conclusion

7.1   Introduction

The primary objective of this study was to measure and examine the income mobility of older people in England and Korea. The methodology of such an attempt consisted in using longitudinal data from the English Longitudinal Study of Ageing and the Korean Longitudinal Study of Ageing. The study highlights the importance of adopting a longitudinal perspective when examining older people's income dynamics in later life and moving beyond cross-sectional indicators such as the mean income, poverty, and inequality. As compared to the conventional cross-sectional perspective, one of the main advantages of longitudinal data in analysing the income mobility of older people is that this method is able to differentiate between persistent and transient poor individuals, as well as between those who experience a stable income stream and those who have fluctuating income flows. This analytical approach has been commonly adopted in numerous income distribution studies (Atkinson and Bourguignon, 2000; Shibuya et al., 2002; and Schofield et al., 2013). These patterns of analysis provide the empirical evidence for clearer insights into policy planning, therefore enabling the design of more effective policies for income security in old age.

Furthermore, this study provides a comparative analysis, which provides insights into the responsibilities of different institutional settings, and what policy reforms can be introduced to mitigate the adverse effects of downward or fluctuating income mobility on the wellbeing of older people. The year 2006 was used as a base and starting year to examine the period between 2006–2012 from a macroscopic perspective. Throughout this time frame, the income mobility of older people was measured by using the concepts of relative income mobility (rank mobility, transition matrixes) and absolute income mobility (Fields and Ok index, Income trajectory). Also, the factors that determine the variations in income mobility difference between England and Korea have been examined. Finally, in order to understand the factors associated with a rise or decrease in the actual income of older people in the two countries, factors that influence the absolute income mobility of elderly individuals from a microscopic perspective have been analysed.

The chapter is organised in the following way:

- It starts by revisiting the research goals and motivation (section 7.2).

- This section is followed by providing the main findings (section 7.3).

- It follows with a discussion of broad policy implications (section 7.4).

- Finally, it concludes the chapter by providing the limitations of the study and future research directions (section 7.5 and 7.6)

7.2   Revisiting the motivation and research aims

Due to major social, economic, and technological changes, the world's old-age population has grown dramatically during the last century (UN, 2015). Although some considerable regional differences still exist, it is predicted that virtually all countries in the world are expected to experience a substantial increase in the size of the old age-population between 2015 and 2030. Furthermore, the rate of this increase is predicted to be faster in the developing than in the developed countries (UN, 2015). Since ageing is accompanied by life events, the transitions between different stages of the course of life have both direct and indirect effects on various aspects of one's life, such as lifestyle, income and capabilities.

Such a turbulent environment entails more theoretical insights about the levels, dynamics and determinants of personal resources of older people. This knowledge could help policy-makers to construct more effective policies and thereby avoid unprecedented rises in public social expenditures. Moreover, such policies could mitigate the moral hazard of financial insecurity in old age. However, not enough research has been dedicated to examining the dynamics of income mobility of older people in countries other than a few Western countries (examples can be found in Zaidi and De Vos, 2002 and Zaidi et al., 2005). This is largely due to a lack of available data in Eastern or developing countries. Another reason for this can be found in the fact that much research has been focusing on income forecasting at the time of retirement, rather than on the changes of economic wellbeing of older people after retirement (e.g., Oswald (1999) investigated early retirement patterns of workers in Germany and Great Britain). In addition, most existing studies that have used a longitudinal panel data are largely focused on mobility during working life (Buchinsky and Hunt, 1999; Jarvis and Jenkins, 1995; Jenkins, 2011; Kopczuk et al., 2010). Moreover, many researches on pensioners' incomes are based on the cross-sectional data (e.g., DWP, 2014; Belfield et al., 2014), which could create a misleading picture of changes in the economic wellbeing of older people and cannot be used for dynamic analysis. Using the longitudinal data that has recently become available through countries' improved survey systems, this thesis compares and contrasts income mobility patterns in two selected

countries. Despite the fact that the institutional settings, cultural context (East and West), living arrangements and pension system are different in these countries, they face a similar economic and demographic challenges (see more justification for the selection of the two countries in Chapter 1.1). A comparative study can reveal what lessons can be learned from other countries' experience and what policies or system changes would be beneficial and adaptable for the country being compared. This is one of the main reasons for using the cross-country comparison in this study.

The thesis examines the income mobility among older people in England and Korea by addressing the following research questions:

RQ1: How much absolute income mobility is observed for older people in Korea between 2006 and 2012 and how did this compare with mobility in England?

RQ2: How much relative income mobility is observed for older people in Korea between 2006 and 2012 and how did this compare with the income mobility in England?

RQ3: What determines aggregate income mobility differences between England and Korea?

RQ4: What are the different factors affecting income mobility of older people in England and Korea? How are various personal attributes – for example, sex, age, education, employment, life-course transitions, such as becoming a widow, and changes in living arrangements – associated with the income mobility during old age?

The first two chapters of this study open up by setting the context for the empirical research and reviewing the important analytical tools typically used for examining the income mobility among older people. Chapter 1 also discusses the strong motivation and importance of the study with regard to the income mobility of older people in the current demographic conditions of increasing longevity and ageing population. It argues that such a context requires new insights about dynamics of income change in later life. Chapter 2 reviews the relevant literature on income mobility in later life. It highlights the concept of income mobility and various measures used to date, including those of relative and absolute mobility. Furthermore, the chapter elaborates upon diversity in income mobility measurements that reflect the variety of the types of mobility that one wishes to observe. Considerable conceptual and methodological challenges of analysing income mobility in old age are also discussed in this chapter. While researchers are bound to choose one methodology over another, it is vital that the justification and implications of such choices are clarified.

Judging from the analysis of the scholarly literature, as well as the relevant empirical evidence, it is apparent that factors affecting income mobility in later life are varied and complex (Zaidi, 2008). In addition, the findings also provided mixed evidence regarding the quantity in which older people experience income mobility. This, in part, depends on the methodologies, concepts, and data used in the analysis, each of which has their limitations (see Section 3.10). In general, older people in both countries experience less income change in comparison to the younger working age group. However, one inescapable fact clearly emerges from the relevant literature: ***old age income mobility is significant and not negligible.***

Scholarly literature has also indicated that older people can be exposed to specific life events common to older life, such as retiring or widowing. These events can trigger large income changes, with other factors such as education, health, employment and the country's welfare system being the main influences on the income mobility in old age.

After the research context (Chapter 1) and review of the most recent literature on income mobility (Chapter 2) is provided, Chapter 3 introduces conceptual and methodological approaches that were used in the research. The chapter explains the identification and definition of the sample group under analysis and the choice of conceptual approaches for analysing the economic wellbeing of older people by using income data. In addition, it discusses the empirical methods necessary to operationalise the income mobility measure.

After mapping out both conceptual and methodological approaches for this study (Chapter 3), Chapter 4 provides a description of the English and Korean social security system. It reviews the countries' pension systems and social benefits that are available to older people. The English pension mechanism is known as a liberal (Beveridgean-model) pension system which enables private personal pension schemes to operate in a major way alongside occupational and state pensions. A significant part of the social security system involves contributory benefits, but means-tested benefits serve an important role in supporting the income level of older people. By contrast, the Korean pension mechanism takes a more Bismarckian model, while the state pensions system was only introduced in 1988. Thus, a family's welfare role is still more important in Korea when compared with that of England (see Section 4.2).

The value of the basic state pension in both countries has increased only marginally over the past decade, thus impacting the income change to a lesser extent. However, in England, means-tested social benefits may have a greater impact on income change in later life. In

recent decades, England has developed a private pension system that has provided strength to that system in general (Spicker, 2011). The Korean private pension system, on the other hand, is still in its initial stages as most Korean households do not have a systematic saving pattern, thus putting the additional financial burden on the government. Occupational pension plays an important role in increasing income level of older people more so in England than Korea.

Finally, the two result chapters (Chapter 5 and 6) are motivated by specific research questions which have attracted a lot of interest among policymakers but have been given little attention in empirical research due to limited panel data needed to carry out such type of research.

7.3   Main findings

7.3.1   Older people in Korea experienced significantly more absolute income mobility than older people in England.

The results from the absolute mobility analysis using Fields and Ok's mobility index indicated that there was considerably more income mobility in old age in Korea than in England. Moreover, based on further analysis using income trajectories with six categories, it appears that older people in England show much more income stability than their counterparts. One possible explanation for such stability in the income amongst older people in England is that one of the numerous main income sources of older people was the state pension (see Figure 1 in Chapter 1 and Table 63 in Chapter 5), and there is also a higher degree of generosity towards entitlements of surviving partners as compared to Korea (Chapter 4).

Older people with particular demographic characteristics and in different age groups are associated with different income trajectories. The results show that older people in Korea who are single and over 65 and have no children, experience downward income mobility, with 46% witnessing a falling trajectory in their income (Table 57 in Chapter 5). This figure was six times higher than for the same group in England (only 7% falling trajectory). In contrast, the highest proportion with a stable income trajectory (flat) was experienced by the elderly groups who are couples and over 65 with no children in England, and couples under and over 65 with children in Korea. The evidence strongly illustrates that different demographic situations are associated with particular income trajectories. Interestingly, older people in Korea who live with their adult children tend to have a stable income over

the measured years which explains why co-residence with an adult child still plays an important role in maintaining the financial wellbeing of older people in Korea. This result is in line with the study by Kim and Cook (2009) and Yang and Klassen (2010) showing that older people in Korea rely heavily on private support from adult children or family members (Section 4.2 in Chapter 4). However, as expected from the Western culture, this trend is opposite to Korea and older people with no children tend to have a more stable income in England.

7.3.2 Older people in Korea also experienced significantly more relative income mobility than older people in England

The rank mobility (S) and transition matrix show that rank mobility for both countries was minimal. The rank-mobility (S) of older people in Korea rose more than that of older people in England during the period between 2008–2012 – its value was larger and the correlation Γ^{21} between the income ranks of the base year and the measured years, and such value was likewise less than for older people in England. This result indicated that the inverse mobility between the poor group and the rich group was quite small, as there were low instances of upward mobility for poor older people and also quite low downward mobility for the rich, and that the current inequality level will most likely be sustained. With regard to these findings, the results of the direction of income mobility with a transition matrix (Table 59) showed that in the case of the bottom 20% (the poorest group), the majority of older people in England stayed in the same quintile as compared to older people in Korea.

In addition, older people in both countries had a small degree of relative mobility (rank mobility), but during the period between 2008 and 2010, when a financial crisis was experienced (Jenkins et al., 2013), the two countries' mobility was shown to increase. These results indicate that with the global financial crisis, the phenomenon of those in the richer classes experiencing relative downward mobility and those in the poorer group experiencing relative upward income mobility became more common. In addition, the third quintile (middle class) showed the lowest persistence rate of all the quintiles for both countries. This implies that older people in the middle-income classes in both countries witnessed the largest degree of mobility and could be considered to be in an unstable position. Due to a drop in the world economy, the financial crisis of 2008 brought about a decline in benefits and employment opportunities for older people (Hossain et al., 2011). This chain of events has, consequently, led to more relative mobility experienced by older

people. Not only was there more downward income mobility from the higher-income classes towards lower-income classes for older people in Korea as compared to England, but there was also a large downward mobility for older people in Korea from the third quintile. One possible explanation is that Korea has a relatively weak income safety net compared to England, and as a result, older people (especially middle- and low-income groups) experience more income fluctuations during the financial crisis. Jenkins et al. (2013) found in their research that countries with greater stability in the income distribution after the global financial crisis in 2008 are the ones that already had relatively strong welfare systems. Another possible explanation for this movement is that numerous older people in Korea still engage in the labour market (mostly under-paid work) (Lee and Lee, 2011; Yang and Klassen, 2010) or heavily rely on financial support from family (Kim and Cook, 2008; Yang and Klassen, 2010) even though they have passed pension age, and this is due to the immature state pension system and a lower level of generosity in the social security system (see Section 4.2.1.2 and 4.5 in Chapter 4), as compared to England.

7.3.3 The decomposition of income mobility analysis shows that income growth has very little impact on aggregate mobility in England, while it is crucial for the determination of mobility levels in Korea.

The results from the Fields and Ok (1996) breakdown mobility index showed that income growth had a minimal impact on aggregate mobility in England, despite the fact that it is the most crucial factor for determining the mobility levels in Korea, as it accounted for more than half of the total income fluctuation over the studied periods (Table 67). In addition to this, the CDW decomposition indicates that in England the structural component contributes to a small extent − and growth mobility contributes negatively − whereas the component which contributed the most to income mobility was the re-ranking of individuals on the income scale. In other words, the exchange mobility was the most important determinant of income mobility. This result is similar to the result found in Ayala and Sastre's (2008) study which found that in the UK the structural component presented a modest contribution to income mobility, compared to the re-rankings. By contrast, Korea shows that both the re-rankings and the structural component contribute greatly to income mobility. The result also displays a relatively clear pattern of the two countries according to the income mobility levels that compare Korea as the country with the higher longitudinal variation in income (results are in line with findings of RQ1 and RQ2) to that of England.

7.3.4   Demographic and Socio-economic factors were strongly associated with income mobility in old age.

The results of measuring the factors that influence the income mobility of older people with a multinomial logistic regression analysis indicated that a relatively high probability of income mobility was particularly associated with widowhood, changes in employment status, and changes in living arrangements. In detail, this indicates that in the event of a divorce or the loss of a partner, more downward income mobility and less upward income mobility was observed within both countries. These results are in accordance with the results of past studies focusing on household income mobility (Jenkins, 2011) and on income mobility of older people in later life (Zaidi, 2008; Bardasi et al., 2002; Sefton et al., 2011; Zaidi and De Vos. 2002). Namely, while remaining in a couple or in widowhood, older people are likely to experience upward income mobility. However, the event of widowhood or losing a partner is likely to cause a downward income mobility. Additionally, in the event of changes in one's living arrangement, e.g., moving to one's children's or partner's house, older people in Korea are likely to experience positive income changes, whereas a person who becomes or remains single is likely to experience negative downward income mobility.

The number of employed persons in the household and changes in employment status (e.g., transition from work to retirement) was also identified as an important explanatory factor of income variation in later life stages. The higher the number of employed persons in the household, the higher the chances of moving into a higher income class. These research results are similar to those of Nam (2015), Jenkins (2011), Kim et al. (2012), Suk (2010), Lim (2011), Sawhill (2000), and Woolard and Klasen (2004). As expected, leaving a job is clearly associated with a substantial income reduction, which is consistent with the results obtained by Zaidi et al. (2001), who also found that the chances of experiencing (absolute) downward mobility were about three times greater for those retiring than for those who had already retired.

In the case of one's educational level, a proxy of human capital, older people with a higher education are likely to experience upward income mobility compared to those who had a poor education. This result is in line with an argument by Birdsall and Graham (2000) and Rycroft (2009), who found that one's educational level affects income mobility or inequality and represents a significant factor in mobility research. Consistent with the previous findings by Zaidi et al. (2005) and Zaidi and De Vos (2002), individuals in the higher income groups in both countries are less likely to experience upward income

mobility than the ones in the lowest income groups, while those individuals who belonged to higher income groups were more likely to witness long-range downward income mobility than the lowest income group.

The most profound difference between the two countries was that only in England, a higher proportion of state benefits increased the chance of long-range downward income mobility, whereas, in Korea, a higher share of income from state benefits had a significant and positive effect on old-age income mobility. Interestingly, for England, a higher proportion of state pension in the total income decreases the chances of long-range downward income mobility, whereas this income component was not significant for Korea. This is partly due to a relatively immature state pension system in Korea, which only started in 1998 (see Chapter 4, section 4.2.1.2).

The higher share of investment income in the total income increases the chance of experiencing either upward or downward long-range income mobility in England, while these factors turned out to be positive and significant for upward income mobility in Korea (Table 73). This is consistent with the work by Zaidi (2008), who also found that a greater dependence on investment income in later life was likely to increase the chance of experiencing volatile income changes in both directions.

Finally, health status plays an important role with regard to income mobility. It is interesting to note that remaining ill in Korea is significantly associated with long-range downward income mobility, while the same category is not that significant in England. This is possibly due to the fact that the main income source of older people in Korea is from employment and many older people continue their work (mostly self-employed or low-wage work) beyond their pension age, therefore, when one cannot continue the work due to illness, it increases the chance of experiencing downward long-range income mobility in Korea. However, as found in Zaidi (2008)'s study, changes in health status (from healthy to ill) are significant and positively associated with long-range upward income mobility only in England. This may be influenced by the fact that older people in England are entitled to claim additional cash benefits related to their health and disability needs (e.g., attendance allowance and disability living allowance).

7.4   Discussion and Policy Implications

The results noted in this thesis underline the requirement for more effective policies that will provide more sustainable benefits in old age poverty reduction and equitable

distribution of socio-economic opportunities created by economic growth. There is no universal strategy that can be implemented to satisfy the requirements of this objective. What are the necessary factors to strengthen the economic wellbeing of older people? In order to address this question, this study has analysed the relevant factors for mobility of the actual incomes of older people, which is one of the numerous aspects which are important for the consideration of older people's wellbeing. Such results indicated that upward income mobility for older people was associated with an increase in the number of employed members of the household with fewer economically dependent persons in the household (in line with the studies by Jenkins, 2011; Kim et al., 2012; Lim, 2011; Nam, 2015; Sawhill, 2000; Suk, 2010; Zaidi, 2008; Woolard and Klasen, 2004), a higher level of education (Birdsall and Graham, 2000; Rycroft, 2009), and a higher share of (universal) state benefits and pensions (Markany, 1984; Craig et al., 2003; Kim et al., 2013; Graham et al., 2012; Zaidi, 2008).

In a country such as Korea, where the state pension system is still immature and where a comprehensive social security system for older people is lacking, the focus should be on finding ways to expand social welfare services and income security policies, even for those individuals who did not work or worked intermittently during their working lives, so that the welfare state can be more responsive to the income risk in old age. Despite the strong influence of the tax system and the social welfare system on the elderly population, the 2008 economic crisis appeared to cause relative income mobility (see rank mobility results in Section 5.8 Chapter 5). This finding points to the problems of Korea's weak social welfare system and income safety net (Chapter 4). Furthermore, in spite of the important role of the social welfare support funds and the social welfare system in supplementing the market income for older people, such arrangements are still insufficient.

In order to achieve a positive upward income mobility for those who are in a low income class (to help them to escape poverty), countries' social security systems need to be examined to ensure that health and disability related benefits (as shown in England case, Table 73 in Chapter 6), as well as old-age-related benefits, can contribute to an adequate level of income for older people. Also, for those who wish to work, the labour market policy and pension income policy should be connected, while systematic support, like age

discrimination laws, incentives to employers for employing mature workers (e.g., Australian's Restart Programme[36]), and training support, must be strengthened.

The results show a closely connected relationship between one's employment situation and their income class mobility. Regarding the low income class individuals with no state pension income but who have work ability, a variety of diverse political efforts are needed to make sure that individuals are in a position to conduct work which pays adequately. Also, for those individuals who do not have the ability to work, realistically there are fewer opportunities to obtain a job; therefore, rather than demand upward income mobility through the acquisition of earned income for them, there is a need to enlarge income security programmes in Korea.

In contrast, as the results of this study indicated (Table 60 in Chapter 5), means-tested income support policy in England should be investigated so as to mitigate the middle-income classes' vulnerability to economic risks. Specifically in the case of older people in the middle or higher income groups, who are more vulnerable to economic risks than low-income groups, emergency support (that can act as a response to sudden crises), and activity support policies should be actively utilised, while a stable income conservation support has to be provided. For instance, the 2008 financial crisis created a decrease in the primary income and wealth of older people (Banks et al., 2012), whereas the collapse of the middle-income class and the downward mobility of the high-income class led to more relative mobility (see Table 60 in Chapter 5). Thus, the somewhat higher relative mobility of older people was not due to a variety of opportunities for income mobility, but the result of an increase in the potential loss of income due to the economic recession (Jenkins et al., 2013).

When transition into old age occurs, the income inequality level rises and individuals are likely to experience income mobility. But what would such an insight indicate? Generally, a larger degree of income mobility is seen to reflect an open opportunity structure of a society reducing concerns of rising income inequality over time. Even if there is a high level of cross-sectional income inequality at each point in time, the income inequality level from the long-term perspective can be low. However, in the case of older people, more than an open opportunity structure, stable income may also be preferred to reduce uncertainty (Zaidi, 2008). It is difficult to see income mobility in old age as absolutely

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[36] The Restart Programme is an Australian Government wage subsidy that encourages businesses to employ mature age workers.

beneficial because there is an insufficient support to deal with the rapid changes in income. Specifically, when it comes to downward income mobility due to adverse, risky life events (like unemployment, widowhood, and divorce), such an occurrence is associated with a negative downward income mobility and the quality of life of older people is directly worsened (Burkhauser et al., 2001; Sefton et al., 2011; Glaser et al., 2009; Zaidi, 2008; Price, 2008; Albuquerque et al., 2006; Ginn, 2003; Bardasi and Jenkins 2002; McLaughlin and Jensen, 1993). However, it is difficult to explain satisfactorily the meaning of upward income mobility. This is because of the existence of a social security system that prevents downward income mobility due to adverse life events. Inversely, the chances of upward income mobility also decrease. For instance, if a pension system for a bereaved family is sufficiently blocking the loss of income because of a death case, the upward income mobility due to remarriage will also suffer. Thus, to a certain degree, upward income mobility and downward income mobility represent two sides of the same coin (Atkinson et al., 1992; Jenkins, 2011).

In this context, this thesis interprets the high income mobility in old age as an increase in the uncertainty of income. The decrease in labour income due to the transition into retirement or unemployment is a considerable shock not only to the low-income class but also the middle class and above. As this study indicated, as much as the decrease in earned income is an offset, the income instability that comes with the transition to old age will be greatly increased if the pension system is not developed. Moreover, income ranks will change, and income inequality will worsen (Jenkins, 2011). Given the fact that access to adequate state pension and social security coverage facilitates effective risk management and their negative consequences for income distribution outcomes, it is important to strengthen the country's welfare systems (Jenkins et al., 2013). However, there are numerous studies which suggest that while the Korean government has a wide range of programmes offering social safety nets to older people (especially to the low-income groups), most of these programmes are fragmented and, thus, do not offer effective protection from socio-economic risks (Jones and Urasawa, 2014; Seok, 2009; Hong and Kim, 2011, Lee et al., 2013). This calls for the re-evaluation of the methodology of existing social protection infrastructure for older people and to offset the reduction in labour income. In order to improve the old-age income of the elderly population, without hindering the results of work incentives, the public old-age income security system must be strengthened in order to guarantee the appropriate income for older people. As one plan to accomplish this, it is commonly asserted that there has been an increase in opportunities

for the reemployment of older people, but in reality, older people are marginalised in the labour market and there is a great deal of instability in their employment along with low wages. Accordingly, in order to put the social re-entry of the elderly workers and their labour power to use, within the scope of guaranteeing employment security for them, legislation related to the employment of older people must be revised in order to be more effective. Furthermore, for older people who have lost their labour power and have a hard time finding a job, a family-centered support system should be reorganised, and requirements for social security payments need to be more realistic so that a basic livelihood is made possible through effective social security.

7.5   Limitations of the study

This thesis has offered a critical perspective on the income mobility of older people. It was conducted using secondary data from the two countries' longitudinal study of ageing. However, as a direct outcome of this particular methodology, the research encountered a number of limitations that require closer consideration. For instance, despite the strengths of the panel data, there is an obstacle with the use of a limited set of variable. In other words, with the view of the dominance of the macroscopic content related to the income mobility of older people in England and Korea, the differences with regard to the characteristics of older people could not be displayed prominently and sufficiently. However, the study showed the clear patterns of older people's income mobility among the low and high-income groups using a transition matrix (relative mobility) and trajectory analysis (absolute mobility).

Secondly, the wellbeing of older people is measured mainly in terms of household income can be seen as another limitation. Since the 1970s, there has been a lot of contention about how financial wellbeing should be measured (Jenkins, 2011). One of the commonly used alternatives regarding income is consumption (expenditure) (Zaidi, 2008) and this may be a more suitable welfare indicator in Korea where until recently pension incomes were received as a lump sum. Chapter 3 has briefly discussed the advantages and disadvantages of using one over the other and identified this study's motivation for using income. Due to data limitation, robustness analysis using consumption data rather than income has not been carried out in this thesis, however, this could constitute a valuable direction of future research in this area.

The third potential limitation of this study is the limited number of time points used in the analyses. Although ELSA provides data over a longer period than KLoSA, this study only used a period of 8 years for both countries in order to provide comparable results. Because this kind of research is limited in its ability to provide information about anything but a certain time period and a certain cohort included in its property analysis (Crystal and Waehrer, 1996), subsequent research on more cohorts and time periods is necessary. Since this study worked with limited time points, there has been a preference to use the descriptive approaches, particularly when estimating the mobility of absolute (trajectory analysis) and relative mobility (transition matrix) in order to show the data 'as they are' as much as possible.

Fourth, some of the results shown in this thesis should be interpreted with caution due to measurement error in the reported income. Measurement errors in income data used in this study are an issue as it happened to many other income-related studies (Cowell and Schluter 1998; Fields, 2008 and see section 2.4 in Chapter 2 and section 3.7 in Chapter 3). While this thesis acknowledged measurement errors in some extent, a comprehensive investigation of the ways in which measurement errors in income affect income mobility measures is beyond the scope of this thesis.

Finally, attrition and non-coverage bias are a concern in longitudinal data analysis and it appears to be more serious in studies about ageing (Fitzgerald et al., 1998, Gardette et al., 2007). The sample used in this thesis may suffer from non-random attrition, as it shown in Chapter 3 (see Table 13), participants who drop out from the survey may differ from those who remain in the survey continuously. In order to minimise the potential effects of attrition, this thesis used longitudinal weighting variables for the data analysis.

7.6   Future Directions

Within this thesis, a compelling evidence has been provided which states that low- and high-income classes of older people in both countries do not remain stuck in their respective income groups year after year. This statement is vital in developing a broader understanding of the entire debate concerning income inequality. With regard to any measure of income inequality, one should not rely merely on comparing the "snapshots" of the income distribution at any two points in time. Such an approach would not be complete because it would fail to recognise that older people's income situations are dynamic. Failure to account for income mobility constructs an incomplete picture with regard to the

wellbeing of older people, and such interpretation could give rise to ineffective policies. Eventually, such interpretation could give rise to poorly developed policies. Thus, the purpose of this research has been to offer an extensive evidence regarding the income mobility of older people in England and Korea, as well as analysing the factors that affect income mobility in old age.

One of the most obvious potential extensions to this work would be to examine the income mobility of older people in additional countries. The fact that multi-period harmonised longitudinal data from the countries where the labour and social welfare systems differ can prove to be insightful regarding the cross-national comparison of income dynamics amongst older people. Cross-national studies involving various countries that face similar economic and demographic pressures can provide new knowledge based on their mutual experiences. For example, what are the underlying forces that propel income mobility among older people differences between the countries?

Another interesting topic related to this study and which deserves more attention and examination is family transfers from adult children to older people and vice versa. Given the fact that incomes from family remain especially important not only for older people but also for their adult children (Jacqueline et al., 2013), attempting to ascertain welfare consequences of income differences, income mobility and income transfers could prove to be of particular importance.

Chapter 7

Appendices

Appendix A   The Markovian Approach to Mobility Measurement

Fields says that as for the unit matrix, in the nth square matrix, all of the components above the diagonal that goes from left to right and downward are 1, and as for all the other components, all of the 0 matrixes are called nth unit matrixes (2000).

Appendix B   Transition Matrix

M x M presents the income parts of the final year in the columns and the income parts of the base year in the rows. Using an inter-temporal transition matrix, a zero hypothesis (there is no time dependence) is verified. If the measured $\aleph^2$ value gets bigger and is significant, the zero hypothesis is rejected. This means it is more dependent on time, and has almost no mobility. In the case of it becoming the unit matrix $P1 = \begin{bmatrix} 100 \\ 010 \\ 001 \end{bmatrix}$, it means absolute positive time dependence; when it is an inverse unit matrix $P2 = \begin{bmatrix} 001 \\ 010 \\ 100 \end{bmatrix}$, it means negative time dependence. Negative time dependence is only possible theoretically. When independent from time $P3 = \begin{bmatrix} 0.2 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.2 \end{bmatrix}$ means the independence of the final year's income from the base year's income; in the case of the quintile mobility matrix, the rows and columns are the same as 0.2. In contrast, when the data is quantitative, through the correlation coefficient, the greater the value of the coefficient, the more there is time dependence. This coefficient value is $-1 < r < 1$, and the closer it is to 1, the more it has positive time dependence, and the closer it is to -1 the more it has negative time dependence. The closer it is to 0, the more it means that it is independent from time (Fields 2000).

Appendix C   Individual and household income by source, Wave 1 along with imputation required

Income type (BU=benefit unit income, partner = partner income)	Zero	Continuous	Closed band	Open band	Missing, >0	Missing completely
Wage and salary income (BU)	49.9	44.1	2.9	0.5	1.8	0.9
Take home pay	68.9	29.0	0.7	0.1	1.1	0.3
Self-employment profit	94.8	3.2	1.2	0.1	0.5	0.2
Self-employment drawings	98.3	1.4	0.1	0.0	0.0	0.2
Income from subsidiary jobs	95.8	3.4	0.4	0.0	0.2	0.2
Private pension income	50.8	43.1	2.7	0.3	2.8	0.4
Annuity income	96.2	2.1	0.1	0.0	0.2	1.4
Annuity income (partner)	97.2	1.4	0.0	0.0	0.1	1.3
State pension income	48.3	48.5	0.7	0.1	1.3	1.1
State pension income (partner)	69.6	28.0	0.4	0.1	0.9	1.1
Incapacity benefit	94.1	4.5	0.1	0.0	0.3	1.1
Incapacity benefit (partner)	96.2	2.9	0.0	0.0	0.1	0.7
Severe disablement allowance	98.1	0.7	0.0	0.0	0.1	1.1
Severe disablement allowance (partner)	98.8	0.4	0.0	0.0	0.0	0.7
Statutory sick pay	98.6	0.2	0.0	0.0	0.1	1.1
Statutory sick pay (partner)	99.1	0.2	0.0	0.0	0.0	0.7
Attendance allowance	95.1	3.4	0.1	0.0	0.3	1.1
Attendance allowance (partner)	97.7	1.6	0.0	0.0	0.1	0.7
Disability living allowance	93.4	4.9	0.1	0.0	0.4	1.1
Disability living allowance (partner)	95.9	3.2	0.0	0.0	0.2	0.7
Industrial injuries benefit	98.0	0.9	0.0	0.0	0.0	1.1
Industrial injuries benefit (partner)	98.6	0.7	0.0	0.0	0.0	0.7
War pension income	98.2	0.6	0.0	0.0	0.1	1.1
War pension income (partner)	98.9	0.4	0.0	0.0	0.0	0.7
Invalid care allowance	98.1	0.7	0.0	0.0	0.0	1.1
Invalid care allowance (partner)	98.7	0.6	0.0	0.0	0.0	0.7
Disabled persons tax credit	98.8	0.0	0.0	0.0	0.0	1.1
Disabled persons tax credit (partner)	99.3	0.0	0.0	0.0	0.0	0.7
Other health benefits	98.6	0.2	0.0	0.0	0.0	1.1
Other health benefits (partner)	99.2	0.1	0.0	0.0	0.0	0.7
Income support	93.1	5.1	0.2	0.0	0.4	1.1
Income support (partner)	97.8	1.4	0.0	0.0	0.1	0.6
Working families tax credit	98.5	0.3	0.0	0.0	0.0	1.1
Working families tax credit (partner)	0.2	0.0	0.0	0.0	0.6	99.1
Job seekers allowance	98.4	0.4	0.0	0.0	0.0	1.1
Job seekers allowance (partner)	99.2	0.2	0.0	0.0	0.0	0.6
Guardian's allowance	98.9	0.0	0.0	0.0	0.0	1.1
Guardian's allowance (partner)	99.4	0.0	0.0	0.0	0.0	0.6
Widow's pension	97.4	1.2	0.1	0.0	0.2	1.1
Widow's pension (partner)	99.3	0.0	0.0	0.0	0.0	0.6
Child benefit	95.8	3.0	0.0	0.0	0.1	1.1
Child benefit (partner)	96.7	2.5	0.0	0.0	0.1	0.6
Other benefits	98.2	0.5	0.1	0.0	0.1	1.1
Other benefits (partner)	99.1	0.2	0.0	0.0	0.0	0.6
Income from savings (BU)	24.3	40.2	20.8	1.6	10.7	2.4

Source: Taylor, et al., 2007, p. Appendix F

Appendix D   Original raw variable of [wpdes] and its assigned values

Variable Name	Label	Values	New Variables created	Additional information
[Wpdes]	Which one of these would you say best describes your current situation?	-9=Refusal -8=Don't know -2=Schedule not applicable -1=Item not applicable 1=Retired 2=Employ 3=Self-employed 4=unemployed 5=permanently sick or disabled 6=looking after home or family 85=other anser 95=other (specify) 96=semi-retired	empst	

Appendix E   Original raw variable of [w01D001] and its assigned values

Variable Name	Label	Values	New Variables created	Additional information
[w01D001] [w02D001] [w03D001] [w04D001]	Currently work?	1=Ues 2=No	empst	

Appendix F   Original raw variable of [w01D010 and w01D006] and its
assigned values

Variable Name	Label	Values	New Variables created	Additional information
[w01D010] [w02D006] [w03D006] [w04D006]	The current retirement status of a respondent	1=Never had ajob before 3=currently retired (no intent to work unless circumstances change) 5=intent to work if the wage and working conditions meet my expectations and circumstances are good 7=intend to work if the wage and working conditions meet my expectations 9=inend to work even if the wage and working conditions are slightly below my expectations	[retires]	

Appendix G   ELSA Health status by age groups, waves, and gender

Age Cat	Health status	Wave 3 Male		Wave 3 Female		Wave 4 Male		Wave 4 Female		Wave 5 Male		Wave 5 Female		Wave 6 Male		Wave 6 Female	
	Gender	Male		Female		Male		Female		Male		Female		Male		Female	
50-54	Excellent	477	77%	555	74%	241	52%	284	52%	57	57%	45	42%	141	52%	45	42%
	Fair	108	17%	143	19%	124	27%	150	27%	25	25%	36	34%	84	31%	36	34%
	Poor	36	6%	53	7%	95	21%	118	21%	18	18%	26	24%	45	17%	26	24%
	Total	621	100%	751	100%	460	100%	552	100%	100	100%	107	100%	270	100%	107	100%
55-59	Excellent	549	74%	671	74%	406	51%	482	47%	391	52%	466	50%	282	46%	466	50%
	Fair	141	19%	186	21%	225	28%	323	32%	207	27%	266	28%	177	29%	266	28%
	Poor	50	7%	50	5%	169	21%	214	21%	157	21%	209	22%	153	25%	209	22%
	Total	740	100%	907	100%	800	100%	1019	100%	755	100%	941	100%	612	100%	941	100%
60-64	Excellent	460	70%	546	72%	396	45%	486	45%	387	45%	512	47%	350	48%	512	48%
	Fair	145	22%	159	21%	285	32%	354	33%	281	33%	351	33%	220	30%	351	33%
	Poor	50	8%	49	7%	208	23%	244	22%	187	22%	212	20%	162	22%	212	20%
	Total	655	100%	754	100%	889	100%	1084	100%	855	100%	1075	100%	732	100%	1075	100%
65-69	Excellent	355	67%	424	67%	281	41%	327	42%	292	43%	324	41%	310	40%	324	41%
	Fair	137	26%	164	26%	223	33%	236	30%	243	36%	265	33%	259	34%	265	33%
	Poor	39	7%	43	7%	177	26%	214	28%	144	21%	210	26%	197	26%	210	26%
	Total	531	100%	631	100%	681	100%	777	100%	679	100%	799	100%	766	100%	799	100%
70-74	Excellent	337	65%	404	68%	252	39%	277	36%	253	40%	269	37%	196	35%	269	37%
	Fair	148	29%	151	26%	210	32%	286	37%	201	32%	232	32%	184	33%	232	32%
	Poor	33	6%	37	6%	193	29%	209	27%	179	28%	219	31%	183	32%	219	31%
	Total	518	100%	592	100%	655	100%	772	100%	633	100%	720	30%	563	100%	720	100%
75-79	Excellent	223	59%	274	53%	128	33%	121	25%	150	34%	160	29%	163	33%	160	29%
	Fair	118	31%	195	38%	139	35%	173	35%	146	33%	208	38%	160	32%	208	38%
	Poor	35	9%	45	9%	124	32%	193	40%	146	33%	179	33%	171	35%	179	33%
	Total	376	100%	514	100%	391	100%	487	100%	442	100%	547	100%	494	100%	547	100%
80-84	Excellent	140	53%	190	56%	74	30%	85	26%	68	28%	92	25%	74	29%	92	25%
	Fair	106	40%	116	34%	76	30%	100	31%	75	30%	122	33%	85	34%	122	33%
	Poor	18	7%	31	9%	100	40%	142	43%	104	42%	154	42%	92	37%	154	42%
	Total	264	100%	337	100%	250	100%	327	100%	247	100%	368	100%	251	100%	368	100%
85 or more	Excellent	82	52%	155	53%	38	24%	75	26%	34	26%	47	23%	30	22%	47	23%
	Fair	62	40%	106	36%	63	41%	101	36%	53	41%	67	32%	40	29%	67	32%
	Poor	12	8%	31	11%	54	35%	109	38%	43	33%	92	45%	68	49%	92	45%
	Total	156	100%	292	100%	155	100%	285	100%	130	100%	206	100%	138	100%	206	100%
Total	Excellent	2623	68%	3219	67%	1816	42%	2137	40%	1623	43%	1915	40%	1546	40%	1915	40%
	Fair	965	25%	1220	26%	1345	32%	1723	33%	1231	32%	1547	33%	1209	32%	1547	33%
	Poor	273	7%	339	7%	1120	26%	1443	27%	978	25%	1301	27%	1071	28%	1301	27%
	Total	3861	100%	4778	100%	4281	100%	5303	100%	3832	100%	4763	100%	3826	100%	4763	100%

Appendix H   KLoSA Health status by age groups, waves, and gender

Age Cat	Health status	Wave 1				Wave 2				Wave 3				Wave 4			
	Gender	Male		Female		Male		Female		Male		Female		Male		Female	
45-49	Excellent	538	69%	578	57%	238	65%	293	57%	67	63%	107	65%				
	Fair	185	24%	340	33%	101	27%	164	32%	22	21%	49	30%				
	Poor	56	7%	99	10%	30	8%	57	11%	17	16%	9	5%				
	Total	**779**	**100%**	**1017**	**100%**	**369**	**100%**	**514**	**100%**	**106**	**100%**	**165**	**100%**				
50-54	Excellent	394	59%	363	43%	351	59%	375	49%	370	67%	400	54%	277	67%	347	58%
	Fair	190	28%	330	39%	201	33%	280	36%	140	25%	259	35%	100	24%	187	32%
	Poor	88	13%	148	18%	47	8%	116	15%	42	8%	81	11%	35	9%	61	10%
	Total	**672**	**100%**	**841**	**100%**	**599**	**100%**	**771**	**100%**	**552**	**100%**	**740**	**100%**	**412**	**100%**	**595**	**100%**
55-59	Excellent	316	49%	241	32%	265	48%	255	38%	283	54%	258	40%	314	60%	292	44%
	Fair	215	34%	326	43%	201	36%	270	41%	175	34%	264	41%	160	31%	258	39%
	Poor	111	17%	191	25%	92	16%	138	21%	63	12%	120	19%	50	9%	116	17%
	Total	**642**	**100%**	**758**	**100%**	**558**	**100%**	**663**	**100%**	**521**	**100%**	**642**	**100%**	**524**	**100%**	**666**	**100%**
60-64	Excellent	251	39%	156	21%	237	42%	126	20%	254	46%	199	31%	247	47%	211	33%
	Fair	226	36%	323	43%	204	37%	269	44%	207	38%	244	39%	201	38%	260	41%
	Poor	160	25%	274	36%	118	21%	224	36%	86	16%	190	30%	76	15%	160	26%
	Total	**637**	**100%**	**753**	**100%**	**559**	**100%**	**619**	**100%**	**547**	**100%**	**633**	**100%**	**524**	**100%**	**631**	**100%**
65-69	Excellent	202	30%	130	16%	165	30%	142	19%	200	38%	131	20%	194	39%	115	20%
	Fair	249	37%	311	37%	242	43%	291	40%	212	41%	274	42%	191	38%	264	45%
	Poor	223	33%	390	47%	152	27%	305	41%	110	21%	247	38%	115	23%	208	35%
	Total	**674**	**100%**	**831**	**100%**	**559**	**100%**	**738**	**100%**	**522**	**100%**	**652**	**100%**	**500**	**100%**	**587**	**100%**
70-74	Excellent	133	25%	68	11%	135	24%	76	12%	128	24%	78	12%	161	31%	97	15%
	Fair	196	37%	205	32%	227	41%	222	34%	223	41%	253	38%	217	42%	258	39%
	Poor	201	38%	368	57%	192	35%	354	54%	187	35%	326	50%	135	26%	310	47%
	Total	**530**	**100%**	**641**	**100%**	**554**	**100%**	**652**	**100%**	**538**	**100%**	**657**	**100%**	**513**	**100%**	**665**	**100%**
75-79	Excellent	48	16%	43	8%	52	17%	51	11%	77	22%	49	11%	109	26%	62	12%
	Fair	109	35%	145	28%	111	35%	152	32%	135	39%	161	34%	158	38%	188	35%
	Poor	152	49%	326	63%	150	48%	277	58%	138	39%	258	55%	147	36%	278	53%
	Total	**309**	**100%**	**514**	**100%**	**313**	**100%**	**480**	**100%**	**350**	**100%**	**468**	**100%**	**414**	**100%**	**528**	**100%**
80-84	Excellent	13	8%	24	9%	24	14%	27	9%	30	14%	28	8%	34	16%	29	9%
	Fair	52	34%	97	36%	64	37%	86	30%	73	35%	99	30%	86	39%	120	37%
	Poor	90	58%	147	55%	83	49%	175	61%	77	51%	208	62%	100	45%	223	54%
	Total	**155**	**100%**	**268**	**100%**	**171**	**100%**	**288**	**100%**	**180**	**100%**	**335**	**100%**	**220**	**100%**	**372**	**100%**
85 or more	Excellent	8	12%	19	12%	10	12%	19	10%	13	14%	23	11%	21	20%	20	9%
	Fair	20	29%	47	28%	27	32%	48	24%	33	35%	66	30%	39	36%	85	37%
	Poor	40	59%	99	60%	47	56%	130	66%	48	51%	129	59%	47	44%	123	54%
	Total	**68**	**100%**	**165**	**100%**	**84**	**100%**	**197**	**100%**	**94**	**100%**	**218**	**100%**	**107**	**100%**	**228**	**100%**
Total	Excellent	1903	43%	1622	28%	1477	39%	1364	28%	1422	42%	1273	28%	1357	42%	1173	27%
	Fair	1442	32%	2124	37%	1378	37%	1782	36%	1220	36%	1669	37%	1152	36%	1620	38%
	Poor	1121	25%	2042	35%	911	24%	1776	36%	768	22%	1568	35%	705	22%	1479	35%
	Total	**4466**	**100%**	**5788**	**100%**	**3766**	**100%**	**4922**	**100%**	**3410**	**100%**	**4510**	**100%**	**3214**	**100%**	**4272**	**100%**

Appendix I   The multinomial logistic regression model

In MLR models, if we consider the outcomes 1, 2, 3 …, m recorded in the outcome variable y_i, and the independent variables given by the tatrix X, we estimate a set of coefficients $\beta^{(1)}$, $\beta^{(2)}$, and $\beta^{(3)}$ corresponding to each outcome category as below (Hosmer et al., 2013):

$$\Pr(y = 1) = \frac{e^{X\beta^{(1)}}}{e^{X\beta^{(1)}} + e^{X\beta^{(2)}} + e^{X\beta^{(3)}}}$$

$$\Pr(y = 2) = \frac{e^{X\beta^{(2)}}}{e^{X\beta^{(1)}} + e^{X\beta^{(2)}} + e^{X\beta^{(3)}}}$$

$$\Pr(y = 3) = \frac{e^{X\beta^{(3)}}}{e^{X\beta^{(1)}} + e^{X\beta^{(2)}} + e^{X\beta^{(3)}}}$$

However, this model is unidentified because the fact that there is more than one solution to $\beta^{(1)}$, $\beta^{(2)}$, and $\beta^{(3)}$ that leads to the same probabilities for $Y=1$, $Y=2$, and $Y=3$. Therefore, in order to identify the model, it needs arbitrarily set one of $\beta^{(1)}$, $\beta^{(2)}$, and $\beta^{(3)}$ to 0. In this way, if we arbitrarily set $\beta^{(1)} = 0$, the remaining coefficients $\beta^{(2)}$, and $\beta^{(3)}$ would measure the change relative to the $Y = 1$ outcome. If we choose set $\beta^{(3)} = 0$, the remaining coefficients $\beta^{(1)}$ and $\beta^{(2)}$ would measure the change relative to the $Y = 3$ outcome. This category is referred to as the 'base outcome' for the outcome variable. It is not important which of the m-categories becomes the base outcome because they will have different interpretations, but the predicted probabilities for $Y=1$, $Y=2$, and $Y=3$ would still remain the same. Therefore, parameterisation of any choice of the base outcome will be a solution to the same underlying model. If we choose $Y=1$ as the base outcome and set $\beta^{(1)} = 0$, the equations discussed above become as below:

$$\Pr(y = 1) = \frac{1}{e^{X\beta^{(1)}} + e^{X\beta^{(2)}} + e^{X\beta^{(3)}}}$$

$$\Pr(y = 2) = \frac{e^{X\beta^{(2)}}}{e^{X\beta^{(1)}} + e^{X\beta^{(2)}} + e^{X\beta^{(3)}}}$$

$$\Pr(y = 3) = \frac{e^{X\beta^{(3)}}}{e^{X\beta^{(1)}} + e^{X\beta^{(2)}} + e^{X\beta^{(3)}}}$$

Then, the relative probability of $Y=2$ to the base outcome $Y=1$ is as below:

$$\frac{\Pr(y = 2)}{\Pr(y = 1)} = e^{X\beta^{(2)}}$$

This ratio is known as the *relative-risk-ratio* and the risk is measured as the risk of the outcome relative to the base outcome.

$$\frac{\Pr(y = 2)}{\Pr(y = 1)} = e^{X\beta^{(2)}}$$

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