International Labour Organization

European Commission

Background paper n°14

Old-age labour market transition and poverty in Korea

▸ Seungho Lee (Korea Labor Institute)

▸ Wonjin Lee (Korea Institute for Health and Social Affairs)

Background Paper Series of the Joint EU-ILO Project
"Building Partnerships on the Future of Work"

Abstract

This study makes use of KLIPS (Korea Labour Income and Panel Study) data from 2001 to 2019 to categorise changes in the labour market status of the elderly in their 50s and 60s in Korea, and compares trends and changes in demographic characteristics, income, and poverty by type (of labour market participation). Results of such a labour trajectory classification suggest that there are various paths other than the traditional path of retaining a primary job until retirement age and then retiring in time for the old-age pension. Only a fraction of the elderly maintained their main job in the form of full-time wage work until retirement, and a significant proportion underwent an unstable labour trajectory and experienced some form of job loss in their 50s. In the case of those in their 60s, many maintained their employed status in the labour market beyond the public pension age. Some older people re-entered the labour market after an initial exit. In the types belonging to a stable labour trajectory, the proportion of men, married couples, and highly educated persons was high, and there was little change in family structure.

Over the course of life of the elderly, earned income peaks in the mid-50s and then declines rapidly until the late 60s because the decrease in earned income is much greater than the increase in non-earned income, such as public transfers. As a result of the analysis, maintaining a job in the process of transitioning to old age played a very important role in preventing both the decrease in income and the increased risk of poverty. Regular or self-employed jobs, as well as non-regular jobs, significantly reduced the decline in income and the rising poverty rate in old age. Retirement is the most important factor contributing to the increase in poverty in old age. For those retiring a decrease in income and an increase in poverty were observed without exception. This shows that Korea's public and private old-age income security systems are not sufficiently equipped to cope with the decrease in earned income due to retirement.

Keywords: labour market transitions, life course perspective, panel data, old-age workers, work-retirement transitions

JEL: C23, C33, J11, J14, J62, H55

1. Introduction[1]

The severe level of poverty among the elderly is one of the most serious problems facing Korean society. Poverty among the elderly in Korea in 2020 was 39%, down slightly from 45% in the 2010s, but still the highest among OECD countries. However, the working-age poverty rate remains stable at less than 10%, but not much is known about how people, who are not poor in working age, enter poverty in their old age. The same goes for those who find themselves in poverty in their old age and participate in the labour market to maintain their livelihood. This study categorises changes in the labour market status of the elderly in Korea since the 2000s, and compares changes in poverty by type. Through this, we examine the reason why the highest level of elderly poverty rate in the developed world persists despite the highest level of elderly labour force participation rate among OECD countries.

In Korea, the family has long been responsible for supporting the elderly, but in recent years both the proportion of elderly parents living with their children and the transfer of private income from children to their parents have conspicuously declined. Considering changes in values, including the spread of individualism, an increase in average life expectancy, and a decrease in the number of children, the declining trend in the share of family responsibility in supporting elderly parents is expected to continue for the foreseeable future (Lee SH, 2019). Although the national pension system introduced in 1988 is gradually entering maturity, it is clear that the old-age pension alone cannot cope with the current poverty of the elderly considering the characteristics of the system in which the level of benefits is determined by past work experience. As the government's financial burden grows due to the ageing population, it is not easy to bring up the expansion of other old-age income security systems. According to the “Economically Active Population Survey” and specifically the supplementary survey of the elderly, the proportion of the elderly (55-79 years old) who have to work in the near future increased from 61.2% in 2015 to 68.5% in 2022. According to the results of the “Social Survey”, the proportion of the elderly (aged 60 or older) who said that they and/or their spouses were responsible for living expenses showed a steep increase from 51.6% in 2011 to 72.5% in 2021. The proportion of the elderly dependent on the labour market is steadily increasing, and is likely to increase further in the future.

Existing studies point to changes in the retirement process (i.e. in the primary job) and the still insufficient old-age income security system as the main causes of the high level of poverty among the elderly. In the past, a large proportion of people worked in their main job from a young age until retirement, but recently, there is an increasing number of people who do not remain at the same job throughout their lives and those who retire early from their primary jobs. The national pension system has matured and the old-age income security system has been expanded (e.g. the introduction of the Basic Pension System), but these are not enough to supplement the reduction in earned income. Since 2013, the eligibility age for old-age pension has been gradually raised from 60 to 65 by 2033, but the statutory retirement age of 60 implemented in 2016 seems difficult to adjust further. Even if one maintains employment at a primary job until retirement, there will still be a period of income interruption until the old-age pension starts being paid out. Some elderly people choose gradual retirement, a sort of bridge with temporary or makeshift jobs, but a high proportion are pushed into low-wage, precarious jobs. On the other hand, there are elderly people who have already retired from the labour market, but wish to find a job (precarious or not) to reduce the economic difficulties of old age.

This study focuses on the 50s and 60s age range when retirement from the labour market is concentrated among the elderly. First, the changes in the labour market status of the elderly are categorized. The 50s is the period when older workers begin to leave the labour market. Through the labour trajectory classification of people in their 50s, differential characteristics of the primary job and time of retirement observed in this age group are confirmed. The 60s is a time when the main source of income for livelihood shifts from labour income to non-labour income (e.g. public transfers). By categorising the labour trajectories of those in their 60s, it is possible to examine the difference in characteristics between the group that continues to participate in the labour market after retirement and the group that re-enters the labour market after retirement. Next, the relationship between the labour trajectories of the elderly and poverty is examined. Although there are many cross-sectional analyses showing that income decreases and poverty increases in old age, there are few studies that have looked at changes in income and poverty as a cohort transitions into old age from a longitudinal perspective. This study expands the discussions of previous studies in that it examines the relationship between changes in economic activity and income as a result of transition into old age and analyses changes in poverty as a result of transition into old age.

[1] This Article is a revised and supplemented part of Lee SH et al. (2020), “Old Labor and Poverty in Korea” published by the Korea Labor Institute (KLI). The responsibility for opinions expressed in this article rests solely with its authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in it.

2. Background

2.1. Institutional Background

Prior to the analysis, previous studies on the factors influencing labour market transition and household income of the elderly are reviewed, and trends in the ageing labour market in Korea since the 2000s are summarised below.

A number of studies, based on mainstream economics, contend that older workers' participation in labour, like workers of any other age group, is a result of voluntary choices taking into account preferences between work and leisure (Moen, Sweet, and Swisher, 2005). Elderly people who can earn high wages in the labour market depending on their human capital and productivity tend to stay in the labour market as long as possible, and those who do not receive the desired level of wages and/or can secure their desired threshold level of wages through other means tend to leave the labour market. Indeed, in the West, older people who are more educated, healthier, and more skilled are more likely to participate in the labour market for a longer period of time (Costa, 1998; Jones, Rice, and Roberts, 2010; Mitchell, Levine, and Pozzebon, 1988; Shultz and Wang, 2007), and it is observed that the majority of the elderly participating in the labour market tend to retire at the time they receive the old-age pension (Gruber and Wise, 1999). According to this point of view, a decrease in the earned income of the elderly is not a big problem in countries with sufficient old-age income security systems. The state guarantees the elderly a minimum income to maintain their quality of life, and if more income is needed, the individual can acquire it by participating in the labour market.

However, not all elderly people who want to work get the job they want in the labour market. Compared to other age groups, older workers are known to be the first group to lose their jobs when the economy is in trouble, and to be hired last after the economy recovers (Gratton, 1996). In recent years, industries with a relatively high preference for older workers, such as agriculture and manufacturing, have been in decline (Lee SH, 2019). Under the conditions of limited labour market demand for older workers, an economic downturn or changes in industrial structure may result in older workers being pushed out of the labour market. For the elderly who are either unable to receive public transfers because they do not meet the eligibility requirements or unable to sustain their livelihood with income received from public transfers, exit from the labour market is highly likely to lead to immediate poverty. If the phenomena observed in the labour market are viewed only as the result of individual choices without considering structural constraints, there is a risk of interpreting a distorted reality (Hong BE and Kim HY, 2010).

According to labour market fragmentation theory, an individual's labour participation is influenced by the labour history accumulated in the past in addition to the current human capital and productivity (McDonald and Solow, 1985). In a fragmented labour market, there are significant differences in working conditions between the internal and external labour markets, and mobility between individual markets is severely restricted. The elderly are considered to be one of the main outsiders in the labour market, and under these conditions, even workers with a similar level of productivity will have different job choices depending on the characteristics of the labour market they have experienced before. Seniors who have experienced the internal labour market have earned more labour income during their working lives and can enjoy a sufficient level of public transfer based on their work experience even in their old age, and can use their assets or find a decent job when additional income is needed. On the other hand, the elderly who have spent most of their careers in the external labour market have earned relatively less labour income, expect lower levels of public transfer benefits, do not have enough accumulated wealth, and have fewer reemployment opportunities in the labour market. If they do find work, they are often limited to low-wage, precarious jobs (Chang JY, 2007).

Changes in social institutions also affect changes in the labour force participation and income of the elderly. Seniors participate in the labour market when the level of income they can expect from the labour market is higher than the social benefit they would receive if they left the market. However, as the demand for old-age labour decreases and the size of the elderly workforce increases due to social structural changes, the level of wages that the elderly can expect from the market is decreasing. As the proportion of older people who choose to retire early and seek social security benefits increases, Western countries are responding with institutional reforms aimed at delaying old-age pension receipts and lowering the net pension replacement rate (Coile, 2015). These changes may induce higher labour supply from seniors, but may also result in reductions in their pre- and post-retirement incomes.

The ageing labour market in Korea is similar to that of the West, but it has its own unique characteristics. Similar to Western countries, the elderly employment rate of men was higher than that of women, and the younger and healthier the elderly, the more they participated in the labour market (Kwon MI, 1996; Park KS, 2003; Hong B and Kim H, 2010). However, both positive (+) relationships (Kwon S and Hwang KS, 2004) and negative (-) relationships (Sung J and Ahn J, 2006; Chang JY, 2003; Lee SH, 2019) have been reported for the effect of education level. Differential results based on geographic region or timing of employment (Cheon BY, 2003; Lee CH, 2006) differed from those in the West. These results show a two-sided relationship between education level and elderly labour market participation. Senior citizens with higher education can

receive higher wages, so they are highly motivated to participate in the labour market, but they may have less desire to participate in the labour market as a result of better preparation for retirement with income from their lifetime. In Korea, the level of education has improved rapidly over the past decades, and the large variation in the level of education within the elderly group may have also affected it. In the case of elderly females, discriminatory treatment in the labour market and lack of systematic care services acted as additional causes. Female workers often receive lower wages than male workers even in their working age (Kim EH, 2009), and after experiencing a career break due to marriage, childbirth, and childcare, they are more likely to be re-employed in temporary or part-time jobs (Kim JY, 2010:50).

The legal retirement age system introduced from 2016 to 2017 had a great influence on the elderly labour market. Until the introduction of a mandatory retirement age, companies could autonomously set the retirement age according to the labour-management agreement, and many companies defined 55 or 58 as retirement age. Since 2016, only retirement ages over 60 have been allowed by law, and the employment period of elderly workers has been extended. (Lee SH et al., 2022). However, the controversy continues over the effect of introducing a legal retirement age, with other studies reporting negative effects of a decrease in employment in their early 50s and 60s (Nam JR, 2018; Han, 2019).

Insufficient social benefits are also pointed out as a reason for the increase in the proportion of low-wage workers (Lee SH, 2019). Unemployment insurance has a wide blind spot, strict qualification requirements, and a short period of benefit pay-out (Kim DH, 2010).[2] Those who are employed after the age of 65 are not eligible for unemployment benefits. Despite continuous expansion of the public pension, both the beneficiary rate and the level of benefits are still low.[3] A more important issue is the gap between the legal retirement age and the age of receiving old-age pensions. The age of receiving old-age pensions has been raised by one year every five years since 2013, and will be adjusted to 65 by 2033. The age of receiving the old-age pension in 2023 is 63 years old, and there is an institutional income cut-off period for three years after the legal retirement age (60 years old). Elderly people who have retired at the retirement age have no choice but to apply for an early old-age pension or participate in the labour market until they receive an old-age pension. Complementing the public pension, the basic pension is only for low-income seniors aged 65 and over.[4] Elderly people, who have been pushed out of the labour market, find it difficult to find enough time for job hunting and have no choice but to accept inferior jobs, as they often require additional income even if they receive welfare benefits such as pensions.

In addition, the ageing labour market in Korea is strongly segmented. Chang JY(2007) pointed out that the elderly labour market in Korea forms a tripartite structure with the addition of small business owners to an already dual wage labour market, and Ko HJ(2019) also showed the degree of segmentation between the wage and non-wage labour markets. Other empirical analyses found that workers in low-wage, unstable jobs are more likely to be under perpetual working poverty (Yoon YG and Seong JM, 2011; Lee BH, 2008; Choi OK, 2008, etc.). This segmentation acts as a factor limiting the labour market choices of the elderly.

In summary, more elderly people participate in the labour market and stay in the labour market for a longer period in Korea than in the West. A large number of older workers are suffering from low wages and job insecurity, and working poverty among the elderly is at a critical level despite their increasing numbers. A small number of highly educated seniors work in stable, high-wage jobs, retire around the age of retirement, and are eligible for relatively high levels of old-age pensions. On the other hand, many older people are engaged in low-wage, precarious jobs, and often continue to work to supplement insufficient social benefits even in their old age. This classification tends to be determined early in the life process (due to low labour market mobility, etc.), and elderly females face greater difficulties than older males due to discrimination in the labour market and the burden of childrearing.

2.2. Characteristics of the ageing labour market

Figure 1 shows the difference in employment rates by age group for males and females in Korea as of 2018. In the case of men, the employment rate rises steeply from their 20s to their early 30s, and peaks from their late 30s to their late 40s. After that, the employment rate gradually decreases from the age of 50, and decreases sharply after passing through the age of 60. The trend of changes in the female employment rate is quite different. The employment rate increases to 70% until the late 20s, but then decreases to below 60% until the late 30s, and then increases again, showing an M-shaped change. It almost recovers to the 70% level in the late 40s, but regresses again from the early 50s. As a result, for both men and women, the age of 50 is when the employment rate starts to decline, and the employment rate tends to decrease

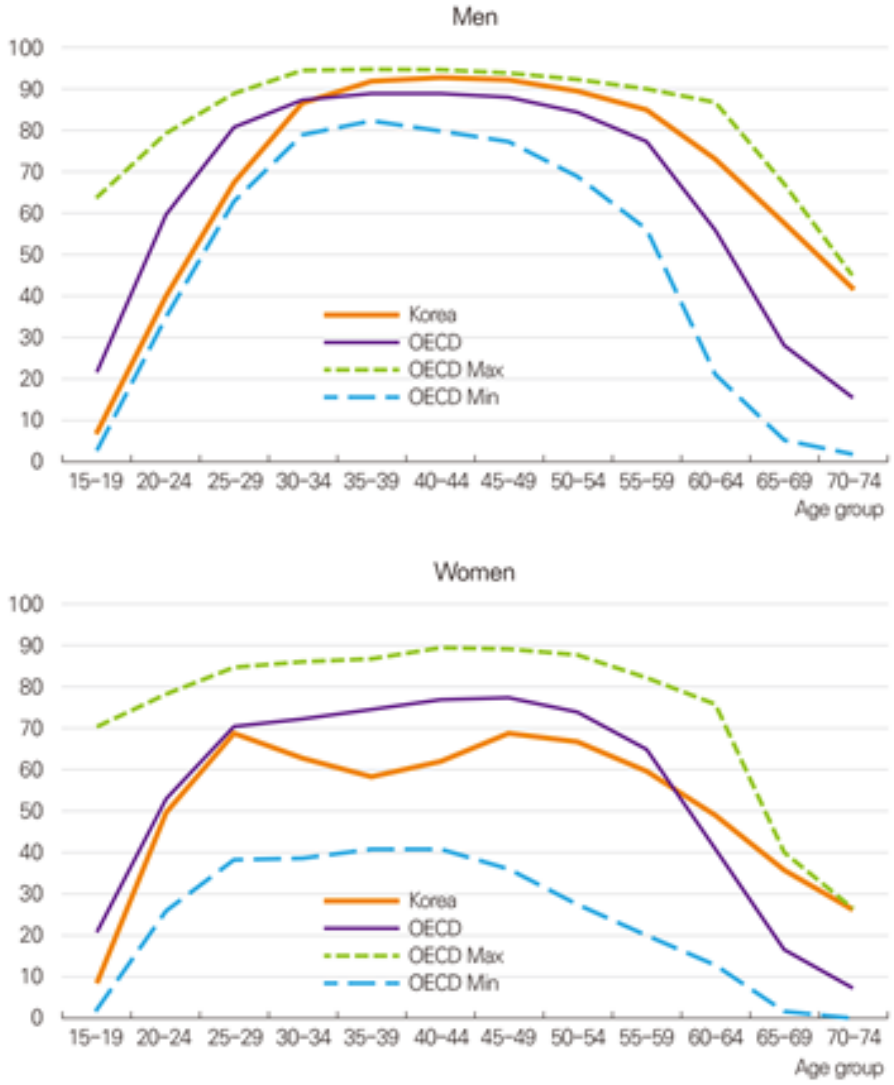
[2] As of 2020, unemployment insurance subscribers are about half of the employed. Unemployment benefits are paid only if they are involuntarily unemployed, and the period of receiving unemployment benefits is 4-8 months.

[3] As of 2020, the number of elderly pension recipients was 4.47 million, and the rate of receipt compared to the 65-year-old population was 54.9%. The average salary level is 541,000 won per month, and the real income replacement rate is only 22.8%.

[4] The recipients of the basic pension are the bottom 70% of the income distribution, and the benefit level is about 300,000 KW per month.

as age increases. However, compared to other OECD countries, the degree of decline in the employment rate by age is very gradual, and the employment rate in the late 60s and early 70s is the highest among OECD members.

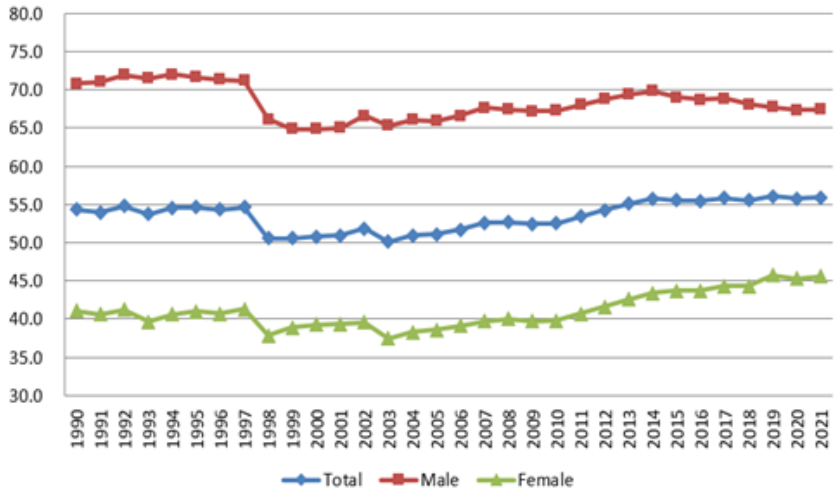
Figure 1. Comparison of employment rates by age group (2018) (%)



Source: OECD (2020)

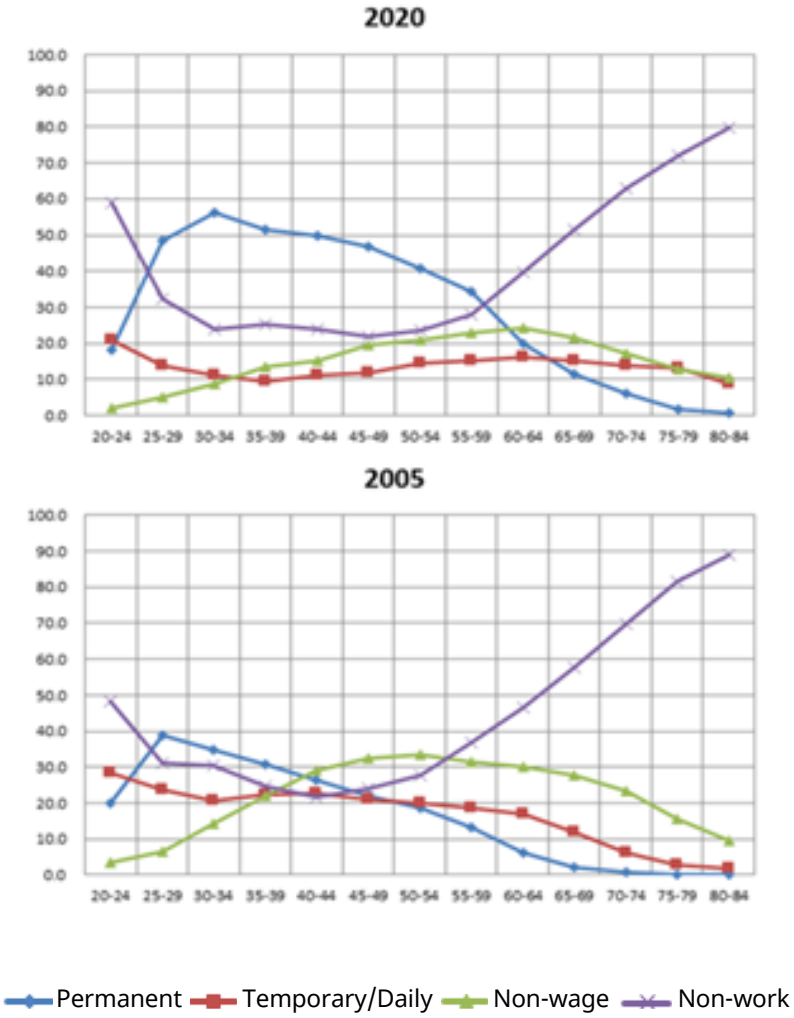
Figure 2 shows the change in the employment rate of the elderly group aged 50 or older since the 1990s using the Economically Active Population Survey. The most striking feature of the trend over time is that different trends are observed before and after the financial crisis. During the Asian economic crisis of 1997-1998, the elderly employment rate decreased by 4.2 percentage points, and it gradually recovered from 2001 until 2013, when it recovered to the pre-crisis level. The employment rate in 2021 is 55.9%, maintaining a constant level despite the spread of Covid-19. However, a different trend is observed by gender. Since 2014, the employment rate of elderly males has shown a gradual decline, while the employment rate of elderly females has continued to increase during the same period. The recent stable employment rate is the result of a decrease in the employment rate of older males being offset by an increase in the employment rate of older females.

Figure 2. Changes in the employment rate of seniors aged 50 and over (%)



Source: Statistics Korea, Economically Active Population Survey; Complemented by Lee et al. (2020)

Figure 3. Changes in the composition of elderly occupational status (2005, 2020) (%)



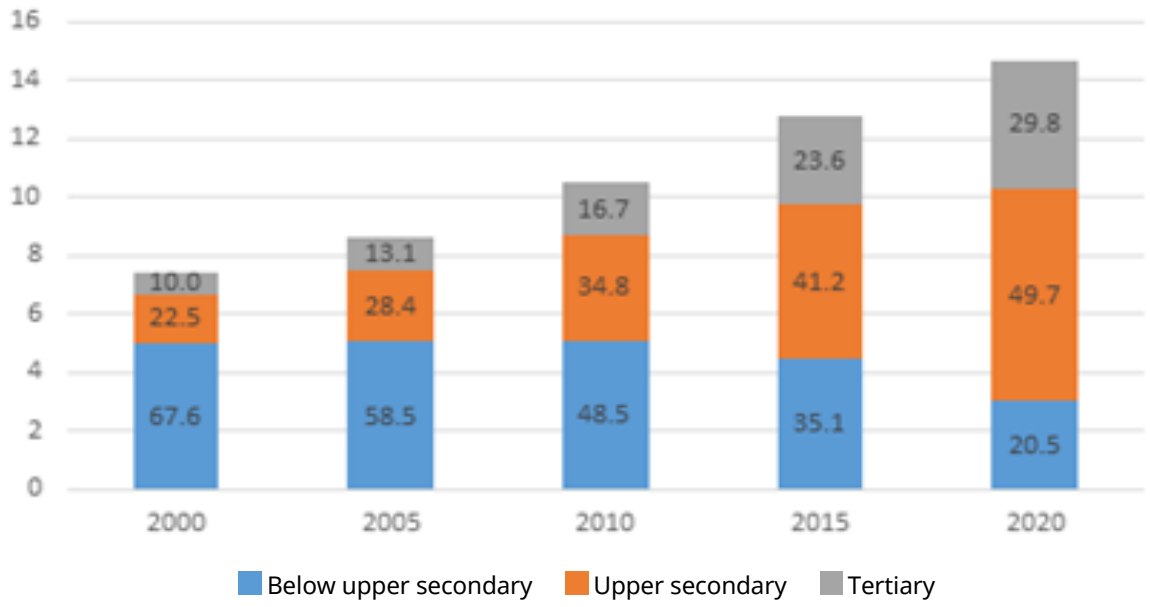
Source: Statistics Korea, Economically Active Population Survey; Modified from Lee et al. (2020)

Figure 3 shows the composition of occupational status by age group in 2005 and 2020. As of 2020, the proportion of full-time wage workers is significantly higher in the working age group, but it begins to decrease rapidly after the age of 50.

Moreover, the proportion of non-wage workers, including self-employed workers, increases from the age of 60. It shows that the decline in the employment rate in the elderly is mainly the result of full-time wage workers shifting to non-employment. In 2005, the proportion of full-time wage workers was lower than it is now, while the proportion of temporary/daily wage workers and non-wage workers was higher. In terms of job status for those in their 50s, the proportion of non-wage workers was the highest, and the proportion of regular wage workers was lower than that of temporary and daily wage workers. This change in occupational status composition shows that it is more difficult for older workers to decide when to retire on their own than in the past, and that the impacts of labour market policies, including the statutory retirement age mainly targeted at wage earners, are increasing.

Finally, yet importantly, we examine the changes in the characteristics of the elderly. Figure 4 shows the trend of changes in the share of the elderly aged 50-69 by population size and educational level from 2000 to 2020. The size of the 50-69 age group has nearly doubled from 7.5 million in 2000 to 14.8 million in 2020. The proportion of seniors with a high school diploma or higher increased significantly from 32.5% in 2000 to 79.5% in 2020, while the percentage of seniors with a middle school education or lower decreased from 67.6% in 2000 to 20.5% in 2020. In addition, according to the life table of Statistics Korea, life expectancy at the age of 60 increased from 23.3 years in 2010 to 25.9 years in 2020. This means that older workers who reach the statutory retirement age of 60 in 2020 will live to about 86 years of age. Larger changes are observed in overall life expectancy, which was 67.4 years in 2000, but has increased by 5.7 years to 73.1 years as of 2019.

Figure 4. Changes in population size and educational level of the elderly (50-69 years old) (%)



Source: Statistics Korea, Census 2% sample; Re-quoted from Lee et al. (2022)

3. Methods

3.1. Data

The subjects of this study are elderly people in their 50s and 60s. However, it is difficult to secure a sufficient number of cases for analysis using generic panel data over a specific 10-year period. In this study, the 4th (2001) to 22nd (2019) editions of KLIPS (Korea Labour Income and Panel Study), arguably the most comprehensive labour data sets in Korea, were used. The 1st to 3rd data sets were excluded from the analysis considering that the sample loss was large at the beginning of the survey and that it was the period in which the impact of the Asian economic crisis could potentially skew overall analysis. KLIPS has conducted an annual survey of 5,000 households and household members living in cities since 1998. In order to include rural residents and compensate for the decrease in the representativeness of the sample due to

panel attrition, the number of households surveyed in the 12th (2009) and 21st (2018) surveys was expanded to 1,415 and 5,044 households, respectively.[5]

The analysis includes individuals who responded to the survey over the 10-year period, either 50 to 59 years old or 60 to 69 years old in that period. For each individual, only information for the decade in their 50s or 60s was included, but more waves of survey data were used as the basis for analysis data. The composition of the cohort by age of the subjects is shown in Table 1 below. The youngest cohort was 50/60 years old in 2010 (Wave 13), and the oldest cohort was 50/60 years old in 2001 (Wave 4). Age-specific data are arranged in the order of survey collection (see shaded region), and the diagonal represents the same birth cohort. Finally, 1,419 elderly people in their 50s and 1,117 elderly people in their 60s were included in the analysis. For all analyses, the longitudinal weight of the 2009 combined sample at the time of the individual's highest age (59 or 69 years) was applied.

Table 1 – Data Composition

Age / Wave	50/60	51/61	52/62	53/63	54/64	55/65	56/66	57/67	58/68	59/69
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										

Source: Author's own.

3.2. Typology of Labour Trajectory

Sequence analysis was applied for the purposes of labour trajectory typology.[6] Sequencing refers to the combination of certain states or events in order, and more specifically for this study, refers to the combination of the order of changes in the labour market occupational status experienced by individuals in their 50s and 60s in each age range. As for the labour market status of the elderly, as shown in Table 2 below, wage workers, non-wage workers, and the unemployed are classified, and the wage worker group is further divided into regular and non-regular wage workers.

After defining the sequence of individual labour trajectories, the distance between them was measured using the optimal matching method, widely used in previous studies. The distance between arrays implies the cost required to render two arrays identical, and is measured by appropriately combining methods of insertion/deletion (indel) and substitution.

[5] The 24th survey conducted in 2021 was conducted by 11,639 households and 22,958 people (KLIPS, 2022).

[6] Please refer to Vaccaro et al. (2022) for the labour market transition analysis applied with array analysis.

Depending on the costs imposed on either method, the calculated value of distance varies. In this study, different substitution costs were applied between the four labour market categorisations, referring to the results of previous studies that the elderly labour market in Korea is segmented (Jang JY, 2007). Specifically, the substitution cost between the employed and non-employed status is assigned the highest value, and the transition cost within the employed status is the substitution cost between the internal labour market (regular wage work) and the external labour market was assigned higher than such a cost within the external labour market (Table 2). The indel cost was set to twice the substitution cost between employment and non-employment, such that the distance between arrays was measured mainly by the substitution method.[7]

Table 2 – Classification and definition of occupational status in the labour market, alternative cost

	Definition	Alternative cost setting when applying the best match method
(1) Regular wage labour	In the case of a full-time wage worker whose job status is considered a full-time worker	Non-regular 2, Non-wage 2, Non-employed 5
(2) Non-regular wage labour	Includes full-time wage workers falling outside of (1) and temporary/daily wage workers	Regular 2, Non-wage 1, Non-employed 5
(3) Non-wage work	Employers, self-employed, unpaid family workers	Regular 2, Non-regular 1, Non-employed 5
(4) Non-employed	Unemployed, economically inactive population	Regular, Non-regular, Non-wage 5

Source: Author's own.

Next, cluster analysis was performed to merge similar sequences based on the distance values between sequences measured by the best fit method. The range of the appropriate number of types was set by referring to the results of previous studies that categorised the labour trajectory of the elderly, and within that range, the results of hierarchical cluster analysis exceeding the minimum number of cases for the second stage analysis were selected.

3.3. Measuring Income

In this study, income was constructed as shown in Table 3 using the elements of the previous year of KLIPS. Since the Korea Labour Panel Survey examines after-tax income, it can be assessed that the gross income in this study is tantamount to the general disposable income. Age in this study was measured at the end of the year at the time of survey, and income was measured at the time of the previous year at the time of survey, and thus in the results below, income and poverty at age t were measured based on age $t-1$. All income was equivalised by dividing by the square root of the number of household members, and converted into real prices as of 2019 for analysis.

To construct a poverty indicator, it is necessary to define a poverty line. This study uses relative poverty lines defined as 30% and 50% of the median gross income of the entire population.[8] However, since the population of the Korea Labour Panel Survey expanded from urban households to nationwide households by adding a sample in the 12th wave, a time series disconnection occurs between the median income of the 4th to 11th and that of the 12th to 22nd waves. Therefore, this study tried to secure the time series stability of the poverty line by calculating the median income for only the original sample households for the 12th to 22nd waves.

[7] Differences in individual conversion costs are bound to be arbitrary. In this study, it was supplemented through previous studies on the elderly labour market and consultations with multiple experts, but the results of categorisation may vary slightly depending on the costs imposed.

[8] 50% of the median income is a widely used poverty line in research and policy analysis. However, elderly poverty rate in Korea is so high that poverty line set at 50% does not fully summarise the economic hardship among elderly poor people. Therefore, both 30% and 50% of the median income are used as poverty lines in this analysis.

Table 3 – Income composition and definition

	Details	Note
(1) Earned income	Wages received from work or jobs, income of self-employed persons, etc. * Topcoding at 10x the median	Equivalised with square root of the number of household members, real price conversion as of 2019 (10,000 KRW/year)
(2) Property income	Interest and investment income from financial and non-financial institutions, dividends, rent, tenant land fees	
(3) Private transfer income	Subsidies from social institutions, transfers from relatives, parents, children, etc.	
(4) Social insurance income	National pension, special job pensions, industrial accident compensation insurance, employment insurance, etc.	
(5) Other public transfer income	National Basic Livelihood Security System benefits, earned income tax credit, child tax credit, other government subsidies	
Gross Income	(1)+(2)+(3)+(4)+(5)	

Source: Author's own.

4. Results

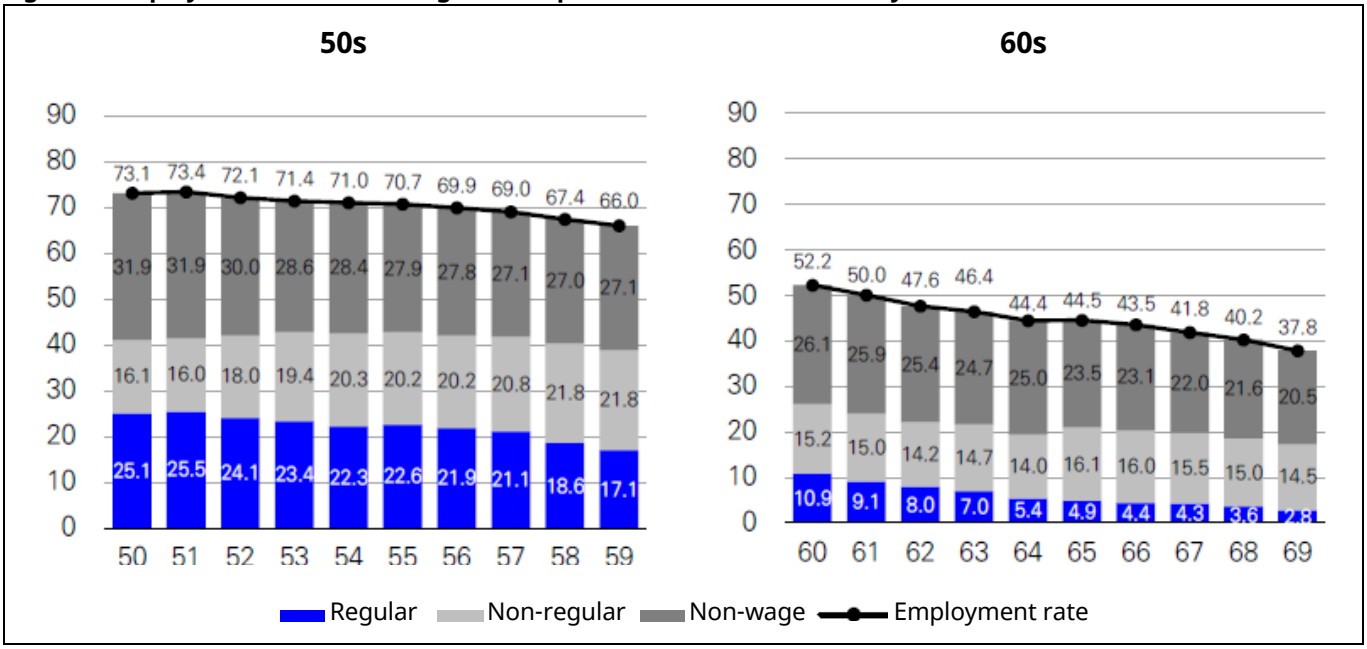
4.1. Labour Trajectories of the elderly

Figure 5 shows changes in the employment rate and occupational status composition according to the age increase of the elderly included in the analysis. Considering the fact that the analysis data of this study differs according to age, the trend of change by age group was examined. For those in their 50s, a decrease in the employment rate (-7.1%p) was observed with increasing age, and such a change was mainly due to a decrease in the proportion of regular wage workers (-8.0%p), while the proportion of non-regular wage workers increased (+5.7%p). For those in their 60s, the decline in the employment rate by age was more rapid (-14.4%p), and the decrease in the proportion of regular wage workers (-8.1%p) was the largest, but the proportion of non-wage workers also decreased significantly (-5.6%p).

Figure 6 summarises the results of classifying the labour trajectory of the elderly who experienced their 50s between 2001 and 2019 into ten types. This breakdown shows the distribution of the four labour market categories of the elderly in each age group. For example, most of the seniors in the regular job retention type (A1) experienced regular wage work at the age of 50. The characteristics of the labour trajectory of the elderly in their 50s can be summarised as follows.

First, there was a very high percentage of people who maintained their occupational status throughout their 50s. Among the 10 types, the top 4 types with the most elderly people are all in their early 50s, with regular wage employment (A1), non-regular wage employment (A3), non-wage employment (A4), and non-employment (A10) lasting into the late 50s. Among the total seniors, only a limited percentage remained in full-time wage work until retirement. Even if a person maintains a certain labour market status in their 50s, they may experience different income changes depending on the nature of the job. Seniors who maintain regular wage work may see a gradual increase in earned income under the seniority-based wage system, but those in non-regular wage work often experience a decrease in wages while working a number of low-wage jobs. In the case of non-wage workers, their labour market status was stable, but their income level was not.

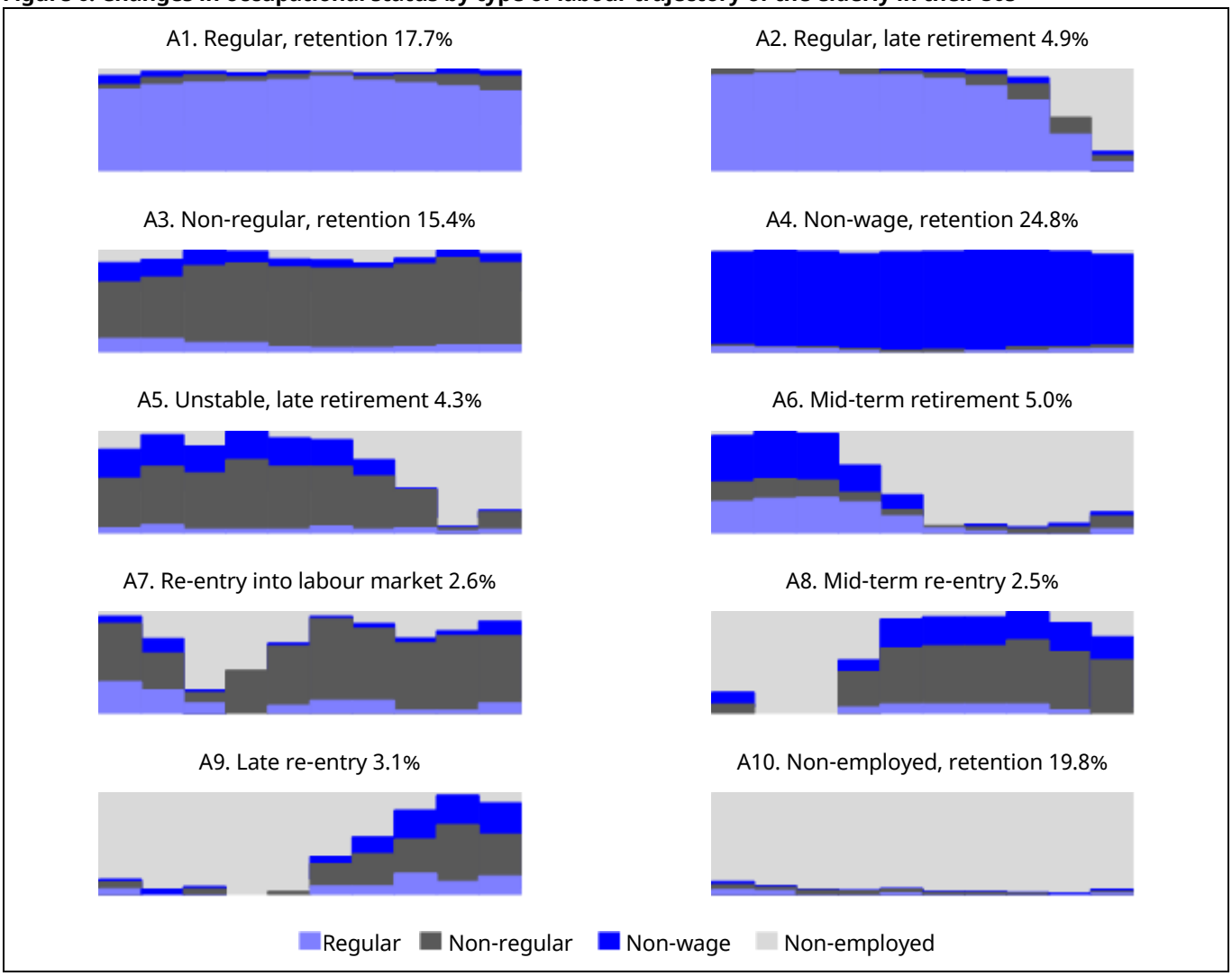
Figure 5. Employment rate and change in occupational status of the elderly in their 50s and 60s



Source: Korea Labor Institute: KLIPS.

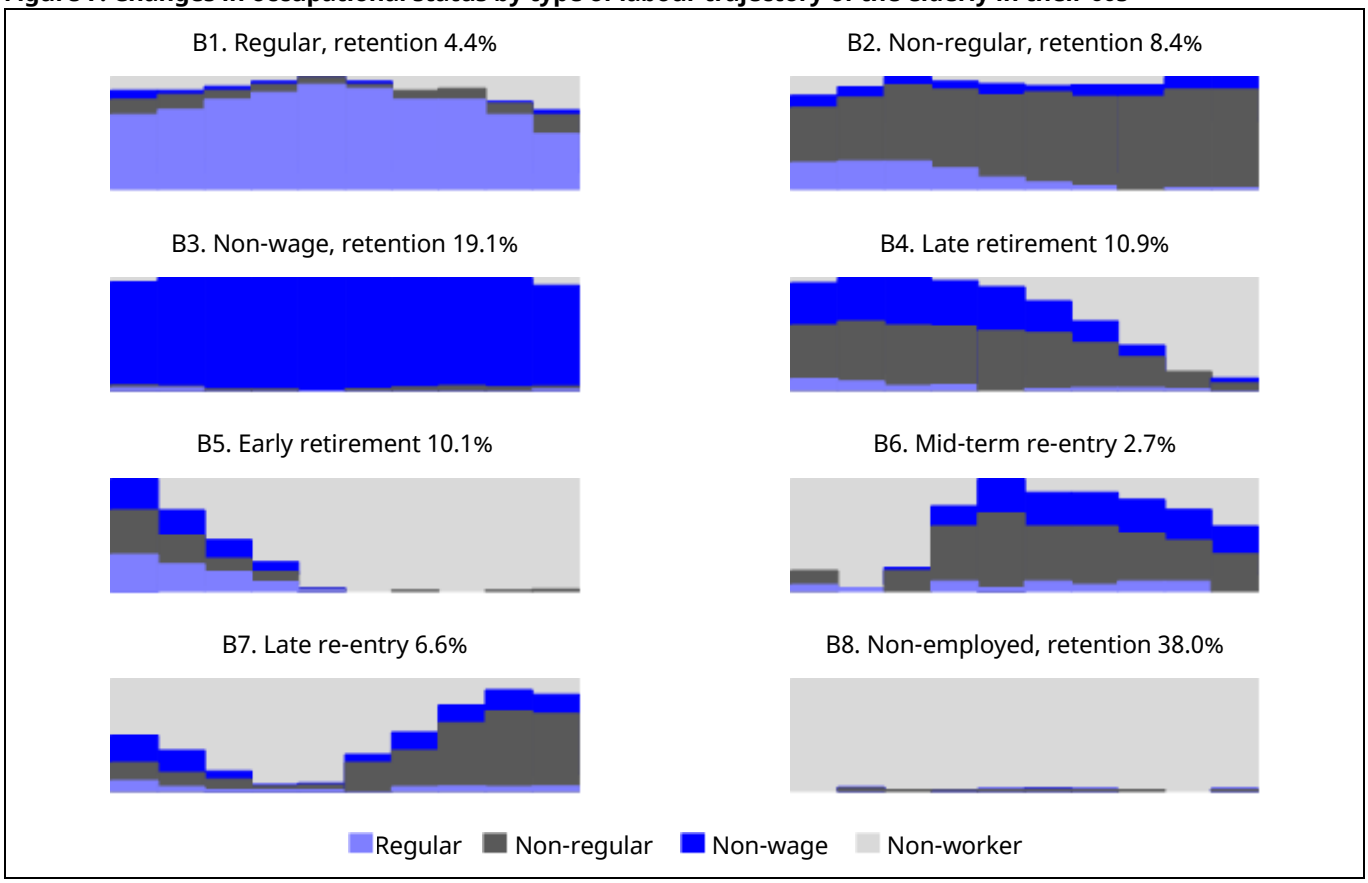
Second, it was confirmed that there is quite a variety of retirement paths other than the one of maintaining a primary job until retirement and then retiring according to the old-age pension payment period. Paths for retiring from regular jobs (A2) or non-regular/non-wage work (A5) in the late 50s were identified, and there was also a type of early retirement in the mid-50s (A6). It was found that some elderly people re-enter the labour market after having left initially (A7, A8, A9). These six types account for 22.4% of the total subjects, which shows that a significant number of seniors in their 50s experience unemployment for at least a certain threshold period. Considering that this study measures changes in labour market status on an annual basis (at the time of the survey), there are probably more groups who experience unstable labour trajectories in actuality. A period of unemployment prior to receiving an old-age pension often leads to income cuts. The risk of poverty among the elderly in their 50s is more likely to be observed in groups experiencing unstable labour trajectories.

Figure 6. Changes in occupational status by type of labour trajectory of the elderly in their 50s



Source: Korea Labor Institute: KLIPS.

Figure 7. Changes in occupational status by type of labour trajectory of the elderly in their 60s



Source: Korea Labor Institute: KLIPS.

In Figure 7, the results of categorising the labour trajectory of the elderly who experienced their 60s from 2001 to 2019 are reported into eight categories. The labour trajectory of seniors in their 60s showed a very high percentage of non-employment status (B8) compared to seniors in their 50s, but a significant number of seniors were still employed in regular wage work (B1), non-regular wage work (B2), and non-wage work (B3). The share of the three types of workers who continued to maintain their status as employed until their late 60s reached 31.9% of the total. Such a high figure implies that the public pension system in Korea, unlike in the West, is not working well enough to induce older people to retire.

In addition, various retirement paths were identified in the labour trajectory of the elderly in their 60s. Types of people who leave the labour market after their 60s are largely divided into two groups according to the time of departure. It seems highly likely that the exit route in the early 60s (B5) is related to the old-age pension, and the exit route after the mid-60s (B4) is related to the Basic Pension. Conversely, re-entry routes (B6, B7) were also observed after the 60s. Most of the re-entry cases tended to maintain their non-regular wage labour status. The re-entry of these groups into the labour market may be the result of an unavoidable choice to alleviate poverty in old age.

4.2. Labour Trajectory Characteristics by Type

Table 4 summarises the distribution of gender and educational level by labour trajectory type for the elderly in their 50s and 60s. Among those in their 50s, the more stable the labour market participation was, the higher the share of elderly males was, and the higher the share of elderly women in those who had been out of work for a long time. For example, in the regular job retention type (A1), 77.0% were male, but in the non-employment retention type (A10), the proportion of women was 87.4%. The distribution of education levels showed a similar pattern. In the stable labour trajectory, the proportion of those with a high school diploma or higher was high, and in the other trajectory, the proportion of those with an educational attainment of middle school or lower was high. As an interesting result, the educational level of the two case-types who re-entered the labour market in their early and mid-fifties (A7, A8) was relatively higher than that of other case-types of unstable labour trajectories. It shows the possibility that an individual's human capital has a significant influence on re-entry into the labour market in the elderly.

Table 4 - Individual characteristics of the elderly in their 50s and 60s by type of labour trajectory

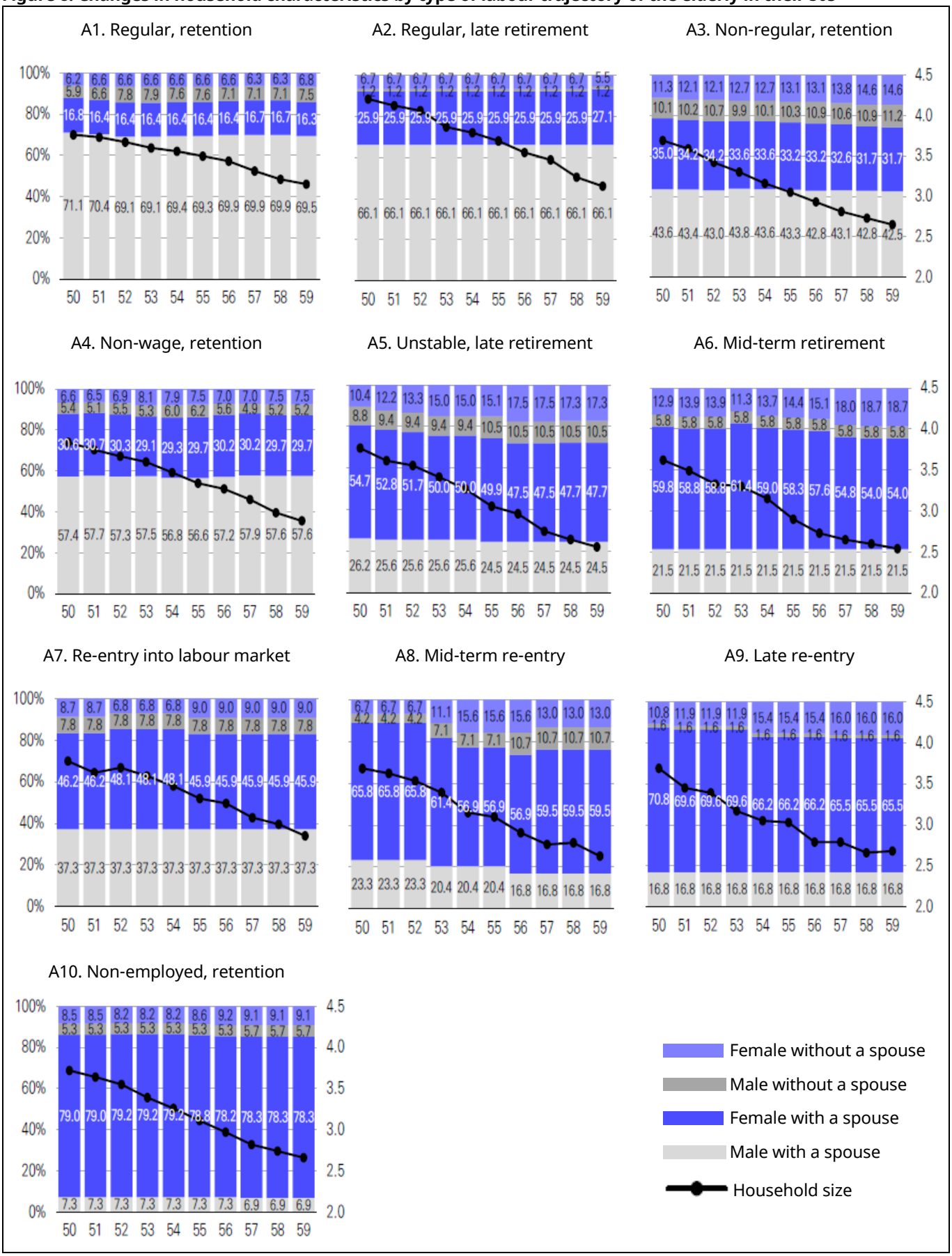
50s		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Sex	Male	77.0	67.4	53.7	62.8	35.0	27.3	45.1	27.5	18.5	12.6
	Female	23.0	32.7	46.3	37.2	65.0	72.7	54.9	72.5	81.6	87.4
Education level	Primary	11.0	8.3	27.3	21.5	27.4	23.6	21.6	17.1	24.0	23.1
	Secondary	17.0	17.3	31.4	23.9	32.7	29.6	31.2	19.2	24.1	29.4
	Upper Secondary	37.4	47.8	35.0	39.0	31.2	35.1	43.9	53.8	24.0	37.7
	Tertiary	34.6	26.7	6.3	15.5	8.6	11.7	3.4	9.9	27.9	9.8
60s		B1	B2	B3	B4	B5	B6	B7	B8		
Sex	Male	82.2	59.3	63.4	54.8	68.8	56.1	43.2	25.4		
	Female	17.8	40.7	36.6	45.2	31.2	43.9	56.8	74.6		
Education level	Primary	28.5	47.1	47.4	50.5	36.9	43.8	55.0	44.9		
	Secondary	21.4	19.7	24.0	14.7	25.3	3.5	16.7	21.3		
	Upper Secondary	36.7	29.1	22.6	25.6	18.5	38.8	22.9	23.3		
	Tertiary	13.4	4.1	6.0	9.2	19.4	13.9	5.4	10.5		

Source: Korea Labor Institute: KLIPS.

In the gender distribution of seniors in their 60s, the proportion of males was higher in most types. The percentage of males who maintained full-time jobs (B1) was 82.2%, which was higher than that of those in their 50s who maintained regular jobs (A1). The labour trajectory in which the female elderly accounted for a larger share was limited to the late re-entry type (B7) and non-employment retention type (B8). In the distribution by education level, the level of education of the regular job retention type (B1) and the early retirement type (B5) was higher than that of other types. This result holds for professionals as well. There was no significant difference in educational level in the types of continuous non-regular or non-wage work (B2, B3). Even in their 60s, the education level of the type re-entering the labour market (B6) was relatively high.

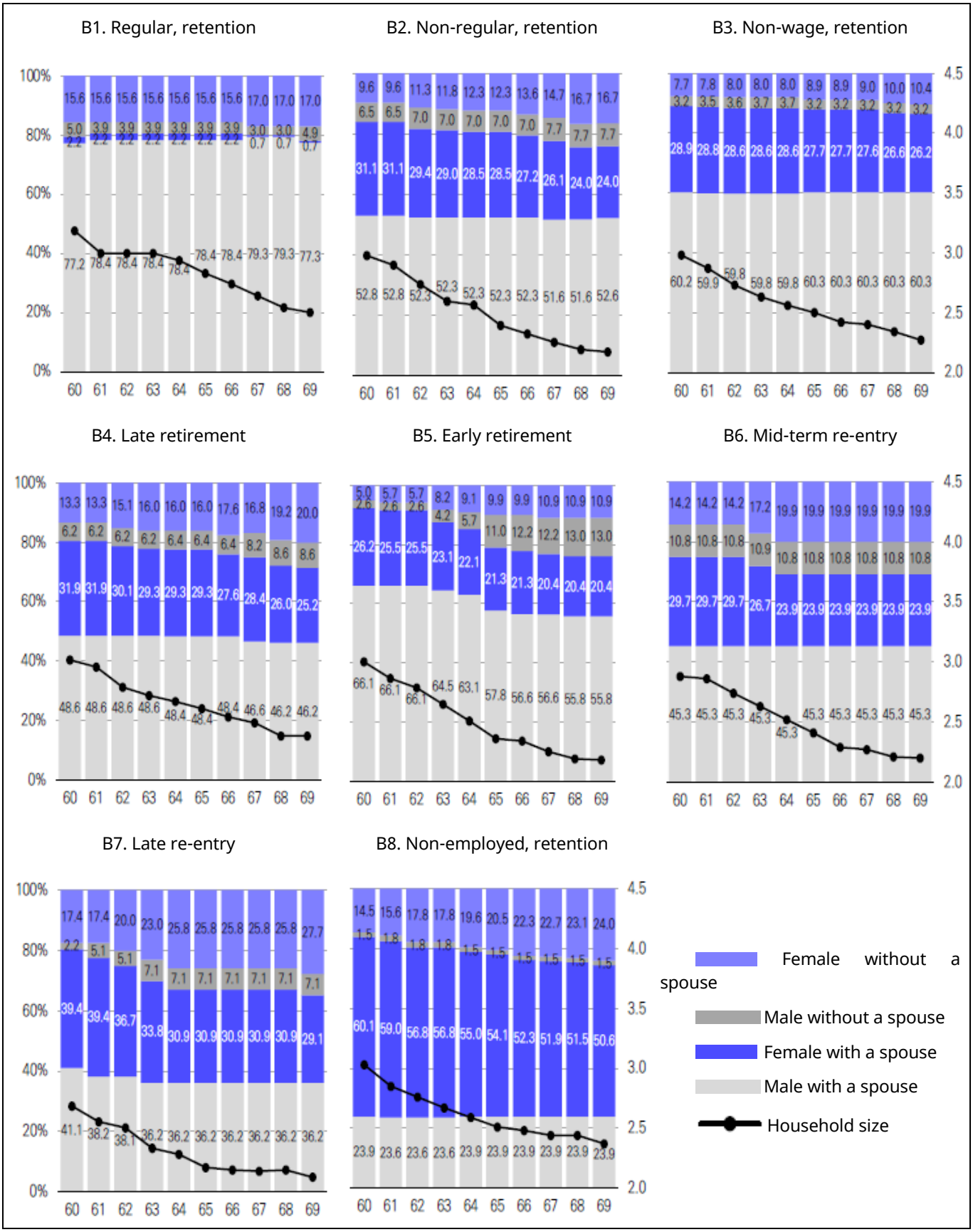
In Figure 8 and Figure 9, changes in household characteristics by type of labour trajectory of the elderly in their 50s and 60s are summarised, respectively. Changes in the labour trajectory and household characteristics were similar in the two groups. First, in the types of stable labour market status (50s A1, A2, A4/60s B1, B3), the proportion of men with spouses was high and the proportion of women without spouses was small. During that period, changes in family structure were also relatively small. On the other hand, in the types who experienced job loss or labour market transition, changes in household characteristics were observed at around the same time. For example, in the 50s mid-term retirement type (A6), the household size decreased at the time of leaving the labour market, and in the types that re-entered the labour market (A8, A9), the change in the proportion of women without spouses was significant. In the case of those in their 60s, the proportion of women without spouses increased at the time of re-entry into the labour market (B6), and the proportions of both women and men without spouses increased in the early retirement type (B5). Although it is difficult to establish a causal relationship from this analysis alone, it is possible that changes in household type or size may affect the labour force participation of the elderly.

Figure 8. Changes in household characteristics by type of labour trajectory of the elderly in their 50s



Source: Korea Labor Institute: KLIPS.

Figure 9. Changes in household characteristics by type of labour trajectory of the elderly in their 60s



Source: Korea Labor Institute: KLIPS.

4.3. Changes in income and poverty by labour trajectory type

4.3.1. Change in relative income

Figure 10 examines changes in income sources by type of labour trajectory for those in their 50s. The regular job retention type (A1) is a group that has been engaged in regular wage work for most of the period between the ages of 50 and 59. Their relative average gross income increased from 138% at the age of 50 to 151% at the age of 59. It is possible that the seniority-based nature of the wage structure of regular workers is reflected in the high income level of the group with stable regular jobs in their 50s (and the pattern of increasing over time). Regular late retirement type (A2) is a group that retired from the age of 58-59 after engaging in regular wage work until their mid-to-late 50s. Overall, it shows the highest gross income level among all labour trajectory types at the age of 50-58. However, the relative average of gross income at the age of 59, when many retire, was 141%, slightly lower than the 151% of those who maintained regular jobs.

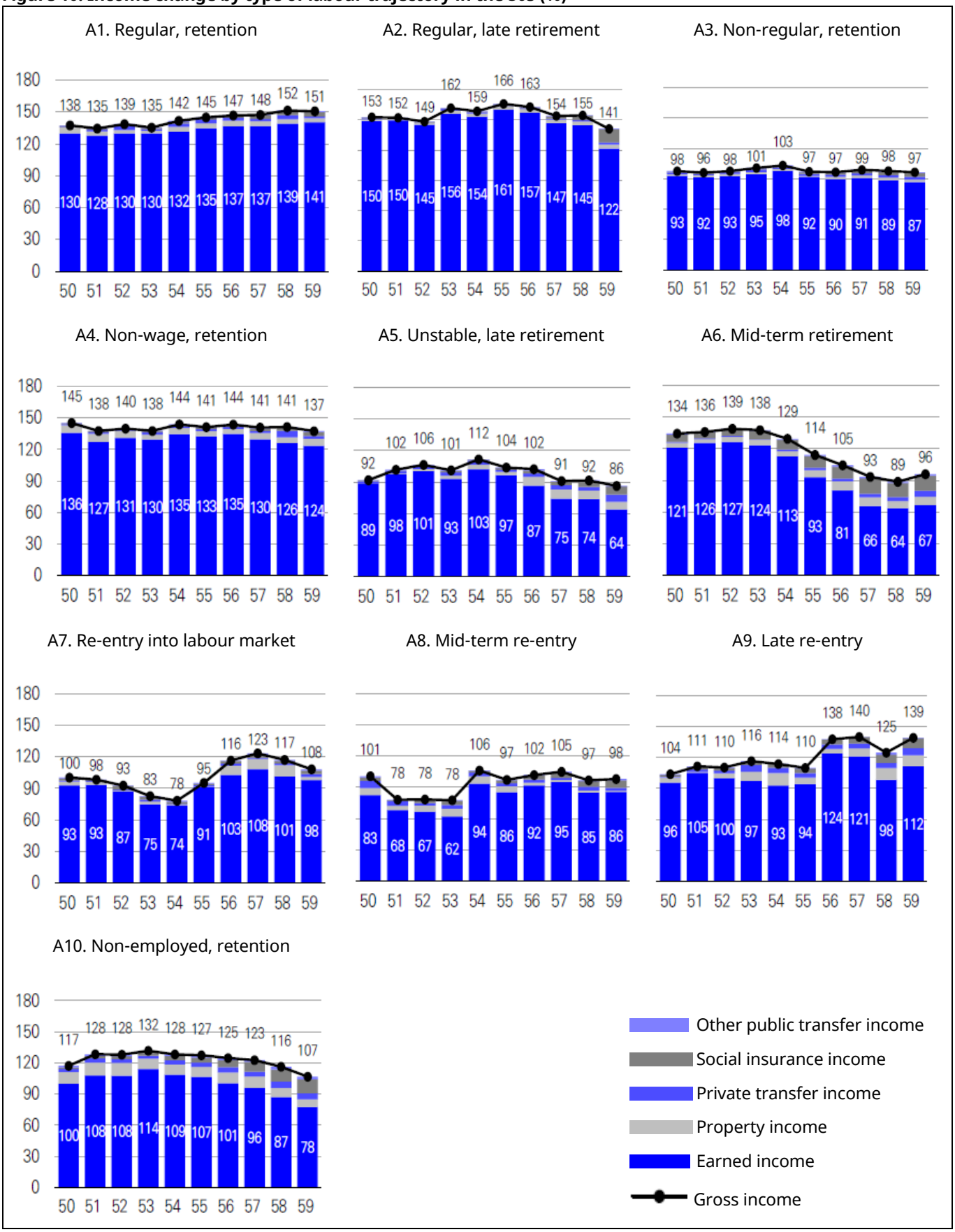
The non-regular job retention type (A3) is a group that has been engaged in non-regular jobs for most of the period between the ages of 50 and 59. The income level is relatively low compared to type A1 and A2, reflecting the reality of the quality of such jobs in Korea. The non-wage retention type (A4), which spent most of the period between the ages of 50 and 59 as self-employed or unpaid family workers, shows an income level comparable to that of the regular job retention type (A1). Although there are some fluctuations by age, the relative average of gross income was 137-145%.

The unstable late retirement type (A5) is a group who experienced retirement in their late 50s after engaging in non-wage and non-regular wage work until their mid-50s. The relative average of gross income at the age of 59 was the smallest among all labour trajectory types, indicating that elderly people in their late 50s, who experience retirement from precarious jobs, are economically very vulnerable. The mid-term retirement type (A6), who participated in the labour market until their early and mid-50s and retired after their mid-50s, is the group with the largest decrease in earned and gross income in their 50s, showing a pattern of reduced income following the cessation of economic activity.

The early unemployment and re-entry type (A7) is a group who experienced some form of job loss in their early 50s and returned to the labour market mainly through non-regular wage work. Their relative average earned income increased considerably in their mid-to-late 50s, implying that re-employment of the elderly helps improve their income level, even in precarious jobs. The mid-term re-entry type (A8) is a group that hardly participated in economic activities in their early 50s, but found employment in non-wage and non-regular jobs after their mid-50s. Elderly people belonging to this type were mostly unemployed in their early 50s and had a long career break before re-employment, or are likely to be newly employed women. The relative average of gross income generally rose from 78% of those aged 51-53 to 97-106% of those aged 54-59. The late re-entry type (A9) is a group that did not participate in economic activities between the ages of 50 and 54, but entered the labour market after their mid-50s. In the 50-55 age range for this group, i.e. when the participation rate in economic activity was low, they were found to have a high relative average of earned income of 93-105%, which may suggest that the female elderly are highly dependent on earned income of spouses and/or children prior to labour market entry.[9] The non-employment retention type (A10) is a group that did not participate in economic activities for most of the period between the ages of 50 and 59. Their relative average earned income exceeds 100% until their mid-50s, mainly due to the economic activities of their spouses and/or children, but gradually declines over time due to reasons such as the retirement of their spouses.

[9] As shown in the Table 4, 81.6% of this group are females.

Figure 10. Income change by type of labour trajectory in the 50s (%)



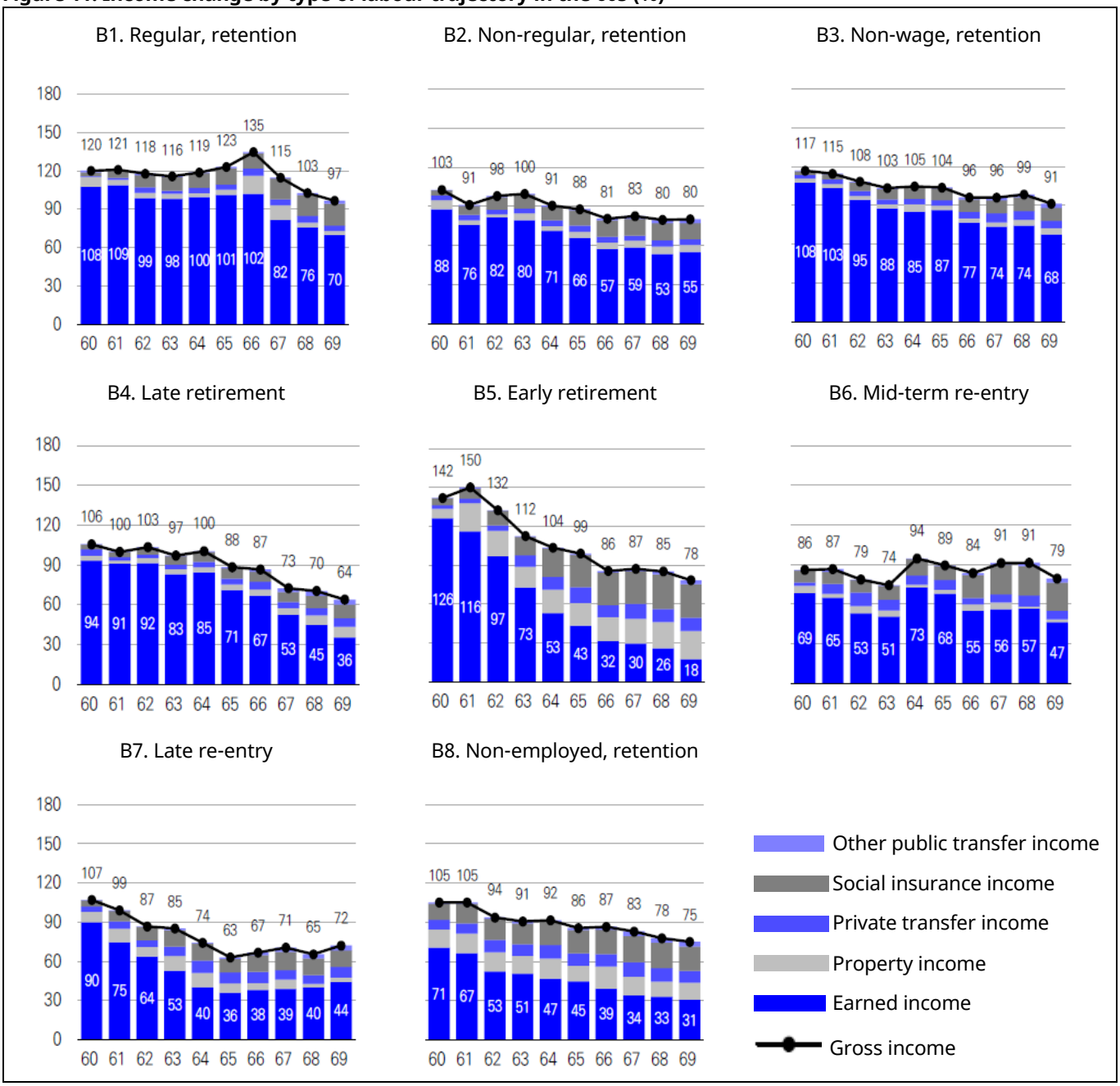
Note: Figures are averages of income components divided by the median gross income of total population for each year.
Source: Korea Labor Institute: KLIPS.

Figure 11 analyses the change in income source by type of labour trajectory of the elderly in their 60s. The regular job retention type (B1) is a group that has been engaged in regular wage work for most of the period between the ages of 60 and 69. Although gross income decreased in the late 60s mainly due to a decrease in earned income, the relative average of gross income at the age of 69 was 97%, still the highest among all labour trajectory types. This means that as people transition into old age, staying in decent work for as long as possible plays an important role in preventing declines in income levels. The non-regular job retention type (B2) is a group that mostly maintained non-regular wage jobs between the ages of 60 and 69. Their relative average gross income decreased from 103% at the age of 60 to 80% at the age of 69, but the relative average of gross income was generally maintained at 80-83% during the period between 66 and 69 years of age, indicating that their income level did not decline in their late 60s. This suggests that retention of non-regular jobs contributes to preventing a decline in income levels for those in their late 60s.

The non-wage retention type (B3) is a group that has been engaged in non-wage work for most of the period between the ages of 60 and 69. Although their income level decreased over time, it was generally higher for the late 60s compared to other labour trajectory types. The late retirement type (B4) is a group who retired in their mid-to-late 60s after mainly engaging in non-wage and non-regular wage work. Their relative average earned income dropped sharply from 94% at age 60 to 36% at age 69, clearly showing the effect of labour market exit in the 60s age group. The early retirement type (B5) is a group that retired in their early 60s, and their earned income decreased the most over time among all labour trajectory types. Instead, property income and private transfer income, especially social insurance income, have increased over time, and as a result, the relative average of gross income at the age of 69 was maintained at 78%.

The mid-term re-entry type (B6) is a group who transitioned from being unemployed to self-employment or non-regular work, mainly in their mid-60s. Gross income in the early 60s did not reach the average level of the elderly, but after the mid-60s, due to increases in both earned and social insurance income, the gross income was similar to the average. The late re-entry type (B7) is a group who were not employed until their mid-60s, and then returned to employment in their late 60s, mainly in non-regular jobs and to a lesser degree in self-employment. Their relative average earned income declined rapidly until their mid-60s (as they had transitioned to non-employment status prior to age 60), but increased again until the age of 69 as they re-entered the labour market. The change in income over time for the mid-term re-entry (B6) and late re-entry (B7) types shows that re-employment after the age of 60 plays a role in mitigating the decline in income levels. Lastly, the non-employment retention type (B8) is a group that remained unemployed for most of the period in their 60s. Although they did not participate in economic activities, the average was still higher than that of their age group due to varying permutations of property income, private transfer income, and social insurance income.

Figure 11. Income change by type of labour trajectory in the 60s (%)



Note: Figures are averages of income components divided by the median gross income of total population for each year.
Source: Korea Labor Institute: KLIPS.

4.3.2. Change in poverty level

Figure 12 and Figure 13 show changes in the poverty rate by type of labour trajectory of the elderly in their 50s and 60s, respectively. Referring back to the results of Figure 10, it can be seen that the level and change in gross income are closely related to the level and change in the poverty rate. In the case of the regular job retention type (A1), the poverty rate based on 50% of the median income decreased as earned income and gross income gradually increased throughout the 50s. Regular workers who retired late (A2) showed significantly lower poverty rates throughout their 50s. The non-wage retention type (A4), who continued to engage in self-employment, also maintained a stable low level of poverty. On the other hand, the poverty rate of non-regular workers (A3) was found to be at a similar level to the average of the elderly in their 50s.

Groups that retired in their 50s, such as unstable late retirement (A5) and mid-term retirement (A6), showed a significant increase in poverty rates in their mid-to-late 50s. In the unstable late retirement type (A5), where retirement is concentrated mainly in the late 50s, the poverty rate increased significantly from the age of 57. The mid-term retirement

type (A6) is the group with the largest increase in poverty rate in their 50s among all labour trajectory types, and their experience clearly shows the effect of early departure from the labour market. Groups that experienced re-employment in their 50s, such as re-entry after initial labour market exit (A7), mid-term re-entry (A8), and late re-entry (A9), generally experience a decrease in poverty rate at the time of re-employment. This suggests, on the one hand, the possibility of poor older people re-entering the labour market to earn a living, and on the other hand, the possibility that re-entry may prevent an increase in the poverty rate or even decrease it over time. Lastly, the non-employment retention type (A10) showed that the poverty rate was maintained at a level higher than the average of the elderly in their 50s.

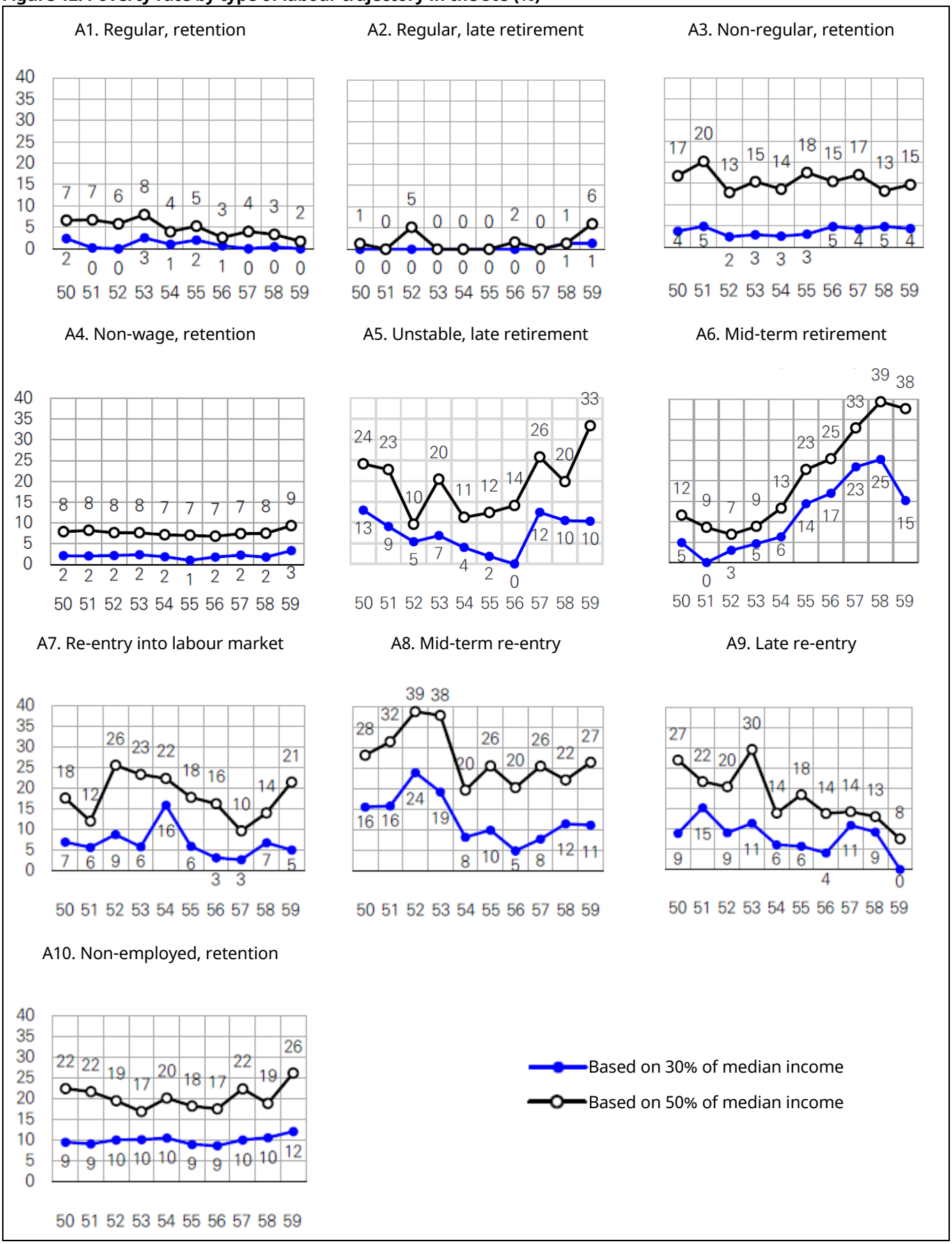
Next, Figure 11 displays changes in the poverty rate by type of labour trajectory of the elderly in their 60s. For the regular job retention type (B1), the poverty rate fluctuated slightly until the mid-60s, but increased slightly between the ages of 67 and 69, when earned and gross income generally decrease. For non-regular workers who retained their jobs (B2), the poverty rate based on 50% of the median income was generally maintained at the low-to-mid 20% level, except for a temporary increase at the age of 66. The poverty rate of the non-wage retention type (B3) was generally maintained at 15-19% from the age of 60 to 68, then slightly increased to 22% at the age of 69. The poverty rate at the age of 69 was 22-23% for the regular job retention type (B1), non-regular job retention type (B2), and non-wage retention (B3) types, which was much lower than that of other labour trajectory types. This suggests that in the late 60s, maintaining a job (regardless of job quality) may play an important role in reducing the poverty rate.

Groups that transitioned to non-employment in their 60s, such as the late retirement type (B4) and early retirement type (B5), experienced a rapid increase in the poverty rate. In the case of the late retirement type (B4), the poverty rate starts to increase significantly later, but it nonetheless increases similarly for both types from the age of 60 to 69. This indubitably shows the impact of older people's retirement on increasing poverty rates.

The mid-term re-entry type (B6) and late re-entry type (B7) showed a decrease in poverty rates during the period of labour market re-entry. In particular, the late re-entry type (B7) had a poverty rate of 50% at the age of 65, the highest among all age groups of all labour trajectory types, but decreased rapidly upon re-employment in their late 60s. This clearly shows that re-employment of poor elderly people plays a role in reducing poverty. However, in the case of the mid-term re-entry type (B6), a rapid increase in the poverty rate was observed at ages 68 and 69, which may be attributed to a transition back to non-employment in their late 60s. Lastly, the poverty rate of the non-employed (B8) was found to be slightly higher than the average poverty rate of the elderly in their 60s.

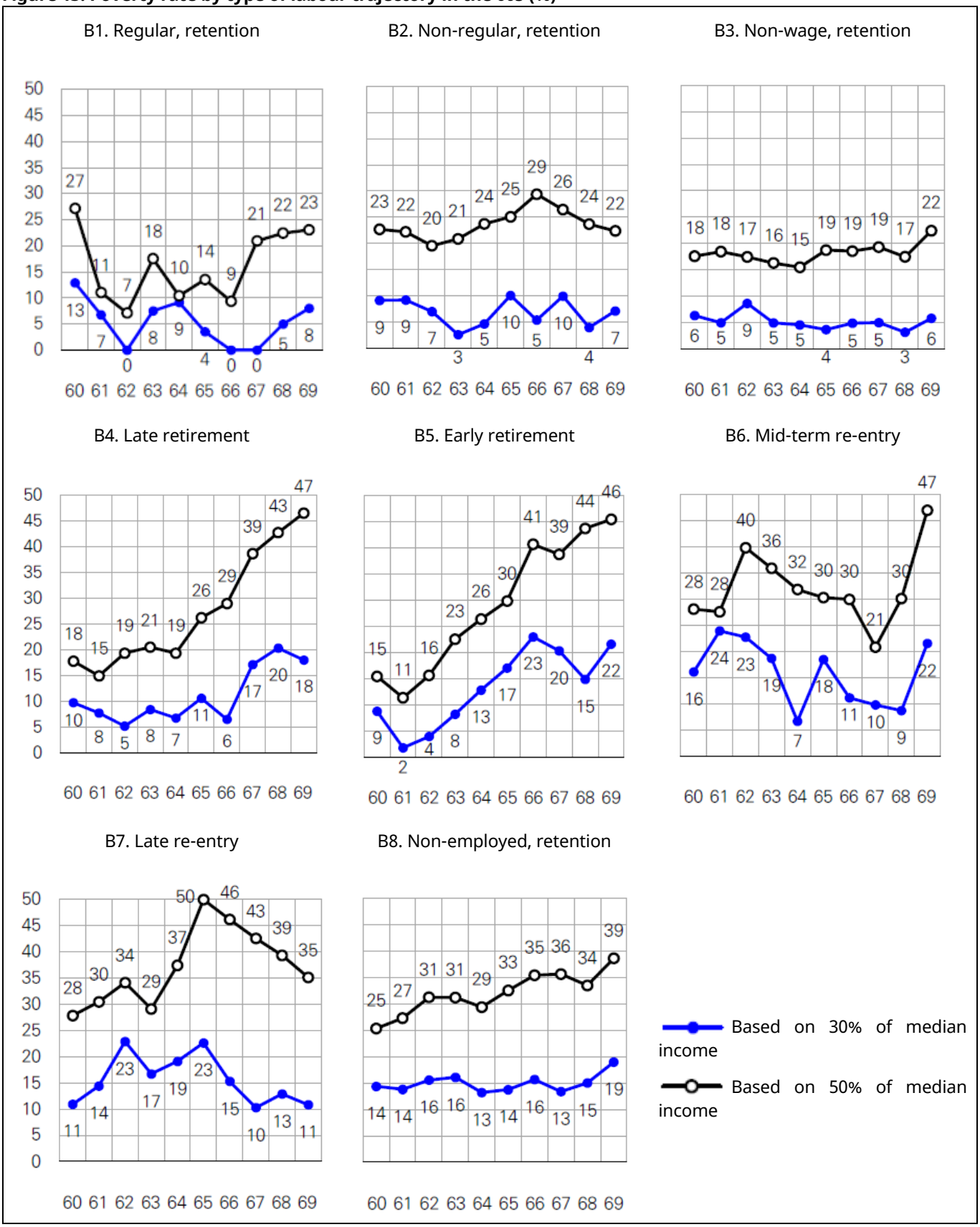
To sum up, the results show that the changes in labour status are highly dependent upon changes in income and poverty among the elderly in their 50s and 60s. Regular workers and self-employed tend to maintain relatively high-income levels and do not much experience poverty. Non-regular workers show lower income levels and higher poverty rate than regular workers and self-employed, but show higher income levels and lower poverty rate than the elderly without jobs. The retirement is the most important factor in explaining the increasing poverty in the 50s and 60s. Labour market exit and re-entry significantly explain changes in income and poverty among the elderly.

Figure 12. Poverty rate by type of labour trajectory in the 50s (%)



Source: Korea Labor Institute: KLIPS.

Figure 13. Poverty rate by type of labour trajectory in the 60s (%)



Source: Korea Labor Institute: KLIPS.

5. Conclusion

This study categorised changes in the labour market status of the elderly in their 50s and 60s using the Korea Labour Panel Survey data (KLIPS), and compares demographic characteristics, income, and poverty changes by labour market participation classification. Results on the labour market trajectories suggest that there are various paths other than the traditional retirement path in Korean society. Over the course of life of the elderly, earned income peaks in the mid-50s and then declines rapidly until the late 60s because the rate of decrease in earned income is much faster than the rate of increase in non-earned income such as public transfers. This drop in income level has a direct impact on the increase in the risk of poverty. The implications of the analysis results are summarised as follows.

First, while discussions on extending the retirement age continue in relation to the extension of the employment period for the elderly, in reality, the percentage of seniors who maintain full-time employment until the legal minimum retirement age of 60 is not high. This is partly due to the small proportion of people already in their early 50s working regular wage jobs, but also the lack of incentives for both older workers and employers to extend their employment period up until retirement age. Under the condition that the current retirement age does not act as a true threshold, the effect of an additional retirement age extension will be limited at best. Such period extension policies will be most effective when the main focus is on policy improvements, such as the government providing partial support for the reduction in income of older workers due to said extension, thereby reducing firms' burden of labour costs, and expanding the post-retirement reemployment system to reduce the negative effects the lack of income whilst waiting for the old-age pension to kick in.

Second, a policy alternative is required to extend the employment period of the elderly who are excluded from the benefits of extending the retirement age. Small and medium-sized enterprises (SMEs) often do not set a retirement age, and employment insecurity among the elderly of SMEs is less directly related to the retirement age.[10] In addition, the employment period of non-regular workers working at large companies is not affected by the retirement age adjustment. The government needs to strengthen services that support the smooth transition of elderly people who have lost their jobs or whose contracts have expired, and support their re-employment so that they can receive vocational training as they see fit.

Third, an increasing number of elderly people re-enter the labour market to maintain their livelihood in old age under conditions where private support is declining and public transfer income is not sufficient. The problem is that many of them are engaged in low-wage, precarious jobs. Apart from the long-term expansion of the old-age income security system, an appropriate level of social protection should be provided to the elderly participating in the labour market. It is time to actively review institutional supplementary measures such as raising the age of unemployment benefits and reducing the number of groups excluded from the protection of the social safety net (such as workplaces with less than five employees, workers with less than 15 hours a week).

Fourth, continuous retention of a job when transitioning into old age plays a very important role in preventing a decline in income level and an increase in the poverty rate over time. Elderly people who maintain full-time or self-employed jobs in their 50s and 60s have relatively high-income levels and low poverty rates, and the trend of decreasing income levels and increasing poverty rates over time is relatively weak for these groups. Meanwhile, non-regular jobs have a dual impact on the income and poverty of the elderly. Elderly people who maintain non-regular jobs have lower income levels and higher poverty rates than those who maintain regular or self-employed jobs. However, maintaining a job in one's 50s and 60s, even non-regular jobs, significantly contribute to prevent from falling into poverty as one transitions into old age.

Fifth, retirement in the 50s and 60s is the most important factor that reduces income levels and increases poverty when transitioning to old age. Regardless of age and point of retirement, the labour trajectory types that experience retirement in the process of transitioning to old age inevitably undergo a decrease in income level and a rise in poverty rate. Currently, Korea's public and private old-age income security system is not sufficiently complementing the decrease in earned income due to retirement. In this backdrop, the retirement of the elderly has no choice but to have a very strong impact on the decrease in income and the increase in poverty over time.

Sixth, a small proportion of elderly people are experiencing exit from and re-entry into the labour market in their 50s and 60s. They generally experience a decrease in income and an increase in poverty when leaving the labour market, and an increase in income and a decrease in poverty upon re-entry. As emphasised above, in a situation where outright retirement from one's primary job greatly increases the risk of poverty, this unstable labour trajectory goes hand in hand with having to make such a difficult decision due to a labour market that does not guarantee a stable retirement age, a welfare state that does not provide sufficient public retirement income, and a gradually weakening familial support system.

[10] Companies that have not set a retirement age cannot fire older workers because of their age.

Finally, yet importantly, this study is meaningful in that it presented a research case that analyses the labour market from a lifetime process perspective using panel data. In order to examine the trend of income changes according to an individual's labour market transition path, panel data are needed to track and investigate information on an individual's labour market status and economic conditions of households for a long time. The availability of a long-term accumulated panel survey will greatly help the progress of related research in the future.

▶ References

Chang, JY. 2003. "Career Transitions of the Older Workers: Part-time Work and Self-employment as an Alternative Retirement Process", in *Korean Journal of Sociology*, 37(2): 95-122. (in Korean)

Chang, JY. 2007. "Hierarchical Structure of the Older Workers Labor Market", in *Democratic Society and policy Studies*, (11): 62-86. (in Korean)

Cheon, BY. 2003. "A Study of Selection of Self-employment in Korea", in *Korean Journal of Labor Economics*, 26(3): 149-179. (in Korean)

Choi, O. 2008. "An Analysis of the Job Sequences of the Working Poor", in *Korean Journal of Social Welfare*, 60(4): 55-77. (in Korean)

Coile, C. C. 2015. "Economic determinants of workers' retirement decisions", in *Journal of Economic Surveys,* 29(4): 830-853.

Costa, D. L. 1998. "The evolution of retirement: Summary of a research project", in *The American Economic Review*, 88(2): 232-236.

Gratton, B. 1996. "The poverty of impoverishment theory: the economic well-being of the elderly, 1890-1950", in *The Journal of Economic History,* 56(1): 39-61.

Gruber, J. and D. Wise. 1999. "Social security programs and retirement around the world", in *Research in Labour Economics,* 18: 1-40.

Han, joseph. 2019. "The Labor Market Impacts of Delayed Mandatory Retirement", in *KDI Policy Study*, 2019-03 (in Korean)

Hong, B., Kim, H. 2010. "A study on the type of retirement processes and its determinants for the aged", in *Korea Social Policy Review,* 17(1): 291-319. (in Korean)

Jones, A. M., N. Rice and J. Roberts. 2010. "Sick of work or too sick to work? Evidence on self-reported health shocks and early retirement from the BHPS", in *Economic Modelling*, 27(4): 886-880.

Kim, DH. 2010. "The Generosity of Unemployment Benefits in Korea: Comparative Analysis and Policy Implications", in *Quarterly Journal of Labor Policy*, 10(1): 69-87. (in Korean)

Kim, EH. 2009. "Determinants of the Working Poor Women's Poverty Exit: Focusing on human capital, household characteristics, and labor market status", in *Social Welfare Policy*, 36(3): 239-268. (in Korean)

Kim, JY. 2010. "Career Interruptions and Re-entry into the Labor Market for Women", in *Monthly Labor Review* (Issue No. 65, August 2010): 36-50. (in Korean)

Ko, HJ. 2019. "Multiple Segregation of the Korean Labor Market", in *Korean journal of social welfare studies*, 50(1): 169-200. (in Korean)

Kweon, MI. 1996. "Determinants of Retirement and Post-Retirement Work Behavior of Older Koreans", in *Korean journal of social welfare studies*, 8(1): 41-67. (in Korean)

Kwon, S, Hwang KS. 2004. "A study on Determinants of the Elderly`s Retirement: Focusing on Differences by Gender and Residential District", in *Journal of the Korean Gerontological Society*, 24(3): 69-90. (in Korean)

Lee, BH. 2008. "Analysis of the Low-Income Labor Market in Korea", *Korea Labor Institute*. (in Korean)

Lee, CH. 2006. "Old labor in Korea : long-term changes in economic activity and employment structure", Seoul National University Press. (In Korean)

Lee, SH. 2019. "A study on the trend in employment rates for older adults in South Korea : A focus on the change in 2008-2016", Doctoral dissertation, Seoul National University. (in Korean)

Lee, SH., Lee, WJ. and Kim, SY. 2020. *"Old-labor and Poverty in Korea"*, Korea Labor Institute. (in Korean)

Lee, WJ. 2013. "Why does Income Inequality Rise in Old Age?: An Exploratory Analysis on a Cumulative Advantage/Disadvantage Model", in *Korean Journal of Sociology*, 47(5): 241-275. (in Korean)

Lee, WJ. 2012. "Changes in Income Inequality and Income Mobility Associated with a Transition to Old Age", in *Korean Journal of Social Welfare*, 64(2): 185-212. (in Korean)

Lee, C., Lee, J. 2015. "Long-Term Changes in Old-Age Incomes: Results from Cohort Analyses", in *Journal of Korean Economy Studies*, 33(3): 5-34. (in Korean)

McDonald, I. M., R. M. Solow. 1985 "Wages and employment in a segmented labor market", in *The Quarterly Journal of Economics*, 100(4): 1115-1141.

Mitchell, O. S., P. B. Levine, S. Pozzebon. 1988. "Retirement differences by industry and occupation", in *The Gerontologist,* 28(4): 545-551.

Moen, P., S. Sweet & R. Swisher. 2005. "Embedded career clocks: The case of retirement planning", in *Advances in Life Course Research*, 9: 237-265.

Nam, JR. 2018. "The Employment Effects of Statutory Retirement System in Korea", Korea Labor Institute. (in Korean)

Park, KS. 2003. "Labor Exit Process of Old Workers Aged 55 and over: Implication for Typology of Retirement", in *Quarterly Journal of Labor Policy*, 3(1): 103-140. (in Korean)

Yoon, YG, Seong JM. 2011. "Analysis of Low-wage Worker's Labor Market Transition Trajectories and Determinants", Korea Labor Institute. (in Korean)

Shultz, K. S., M. Wang. 2007. "The influence of specific physical health conditions on retirement decisions", in *The International Journal of Aging and Human Development*, 65(2): 149-161.

Sung, J., Ahn J. 2006. "What Makes the Older Work for Satisfactory Lives?", in *Quarterly Journal of Labor Policy*, 6(1): 39-74. (in Korean)

Vaccaro, G., Orsholits, R., Steinmetz, S., Studer, M., Vandecasteele, L. 2022, "Measuring labour market transitions using a life-course perspective in selected developed and developing countries: An inventory of existing panel data and methods of analysis", Building partnerships on the Future of Work, International Labour Organization, Background paper, 4, February

Korea Labor Institute. *"Korea Labor and Income Panel Study"*, raw data each year

International Labour Organization

Route des Morillons 4

CH-1211 Geneva 22, Switzerland

European Commission

Rue du Champ de Mars 21

1050 Brussels, Belgium