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The Economic Determinants of Old-Age Poverty in South Korea: Evidence from Longitudinal Household Data

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The Economic Determinants of Old-Age Poverty in South Korea: Evidence from Longitudinal Household Data

Abstract

In South Korea, nearly 40% of the elderly population lives in poverty, one of the highest rates in the developed world. As the country undergoes a rapid demographic transition and the share of older individuals increases, understanding the drivers of old-age poverty becomes increasingly important. We study the economic determinants of poverty among individuals aged 65 and over using eight waves of the Korean Longitudinal Study of Aging and the Korean Labor and Income Panel Study covering 2006–2020. We adopt a longitudinal framework and estimate fixed-effects ordered logistic regression models where poverty status is measured as an ordered outcome. The results show that living apart from one's children and residing in rental housing are associated with greater poverty. In contrast, co-residence with children, homeownership, and continued employment are strongly linked to lower poverty levels. Public transfers show no statistically significant association with poverty outcomes. These findings stress the importance of family co-residence, housing tenure, and labour market attachment in shaping old-age poverty in South Korea and suggest expanding housing support, employment opportunities, and strengthening social security coverage.

JEL classification

I32, I38, J14

Keywords

population ageing, old-age poverty, Korea, social security, pension system, fixed-effects ordered logistic regression

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1. Introduction

The 'Miracle on the Han River' transformed South Korea (hereafter Korea) from a poor agrarian country into a prosperous nation that is now a leading economic power in Asia with globally advanced information technology. Korea's remarkable economic growth in the second half of the 20th century positioned it among the world's wealthiest and most highly educated countries. However, this remarkable development came with significant trade-offs, particularly for older generations. Many of those who played a crucial role in rebuilding the country after the devastation of the Korean War are now in their 80s and 90s and face considerable economic hardship. In 2022, the relative poverty rate—with the poverty line defined as half of the national median income—among the population aged 65 and over was 38.10% in Korea (Statistics Korea, 2021a), the highest in the developed world (OECD, 2024a).

Old-age poverty is not unique to Korea, although its levels are among the highest. Several other high-income countries also face substantial elderly poverty, including Estonia (37.40%), New Zealand (33.70%), and the United States (23.10%), and in most of these countries elderly poverty has risen over the past decade (OECD, 2024a).

In high-income Asia, relative old-age poverty rates were 24.33% in Taiwan (2021), 16.31% in Japan (2020), and 14.50% in Hong Kong (2020) (LIS, 2025; Government of the Hong Kong SAR, 2021). The issue is also pronounced in upper-middle-income countries: between 2018 and 2019, 28.12% of the elderly in China and 41.40% in Malaysia lived in relative poverty (LIS, 2025; ASEAN, 2023). This points to a particularly challenging outlook for lower-income Asia, where, for example, almost one-quarter of people aged 60+ in Myanmar in 2017 and 15.60% of those aged 65+ in Lao PDR in 2019 lived in absolute poverty (ASEAN, 2023).

The world's population is rapidly ageing: by 2050 the number of older people is projected to double from 0.8 to 1.6 billion (UN DESA, 2024a). High-income countries were the first to undergo this demographic transition; today, older people already comprise about one-fifth of their populations, and in many cases outnumber those aged 0–24 (UN DESA, 2024a).

Korea is at the forefront of this shift. It became an "aged society" in 2017 (14% of its population aged 65+) and is expected to become a "super-aged society" in 2025 (over 20% aged 65+)—an exceptionally rapid transition by international standards (Statistics Korea, 2018; 2021; WB, 2021). By 2050, Korea is projected to be the second oldest country in the world, with nearly 40% of its population aged 65 or above (UN DESA, 2024a).

While ageing began in high-income countries, they account for only a small share of the world's older population. By 2050, about 75% of older people are expected to live in low- and middle-income countries (UN DESA, 2001; 2024a). Rapid growth is particularly anticipated in Africa and Western Asia—regions that already face significant challenges related to old-age poverty (UN DESA, 2023).

Societal ageing will force countries to support a growing elderly population, creating economic challenges due to higher pension and healthcare spending (UN DESA, 2023; ILO, 2024a) and potentially worsening old-age poverty if social protection systems are unprepared. Understanding Korea's experience offers valuable lessons for other high-income countries approaching rapid ageing, as well as developing countries at risk of "growing old before becoming rich," and is crucial for designing effective policies to improve the lives of the Korean elderly individuals.

The literature aimed at understanding the complexities of elderly poverty in Korea is scarce, and studies that attempt to establish the connection between multiple economic conditions and poverty are even rarer. Among the latter, Cho and Yeo (2017) show, using the Korean Welfare Panel Data (2006-2015), that irregular employment, higher living costs, and higher housing values increase poverty risk, while higher incomes reduce it. Cho and Seo (2019), using the same data for 2006–2017, show that female gender, non-homeownership, precarious employment, poor health, and family conflict raise poverty risk, whereas income, pensions, and education lower it. Ha (2021), using the Korean Labor & Income Panel Study (2004–2018), identifies age, employment, household size, number of pensioners, transfers from children, and net assets as key determinants of both absolute and relative poverty.

Hence, the present study aims to analyse which economic factors have the greatest impact on elderly poverty in Korea and whether these factors alleviate or exacerbate poverty. Using the Korean Longitudinal Study of Aging (KLoSA, 2006–2020) and the Korean Labor and Income Panel Study (KLIPS, 2006–2020), our analysis examines additional economic aspects of elderly poverty, including intergenerational resource transfers (in terms of whether the elderly live with their children) and the types of old-age pensions and benefits. Following OECD and UN DESA practices (2023), for example, and Korean official statistics (Statistics Korea, 2021a; 2021b; 2024a), we define elderly as those aged 65 and older. Adopting a relative poverty approach, we use the standard poverty line of 50% of median disposable income, which

reflects living standards and income inequalities (Förster, 1994; Marchand & Smeeding, 2016; UNECE, 2011). Individuals with disposable income[1] below this threshold are considered poor. To examine which economic factors determine poverty among Koreans aged 65+, we use a 'degree of poverty' variable that captures different poverty levels, unlike most studies. Individuals are classified as "extremely poor" (income<50% of the poverty line), "poor" (50–100%), "vulnerable to poverty" (100–125%), or "no risk of poverty" (≥125%), allowing us to identify factors that raise living standards or deepen poverty.

Using this variable and the 15-year panel, we employ fixed-effects ordered logistic regression to examine time-varying influences. Results show that household type (as a proxy for intergenerational resource transfers), housing, and employment largely determine poverty: living with children/extended family, homeownership, and employment reduce poverty, while living alone or in rental housing increases it. Pensions and benefits have limited effects.

While the study does not establish causality, the longitudinal data allow control for unobserved heterogeneity in time-invariant factors.

The remainder of this paper is structured as follows. Section 2 presents the conceptual framework and relevant literature. Section 3 illustrates the data, methodology and descriptive statistics. Section 4 presents the empirical findings. Section 5 discusses the results in relation to existing literature, offers policy recommendations, and concludes the study.

2. Conceptual background and literature review

2.1. Ageing society

Korea is going through a drastic and quick demographic change—it will become a super-aged country in 2025, just 8 years after becoming an aged one (Statistics Korea, 2018; 2021b)—, which is the result of the country's quickly falling fertility rate combined with the rapid increase in life expectancy.

Following the baby boom of the 1950s, Korea introduced family planning policies in the 1960s (Yang, 1979; Eun, 2008) which, together with other cultural and economic changes—such as urbanization and the increased importance of education (Eun, 2008)—, led to a significant decline in the country's fertility rate in the 1970s (Statistics Korea, 2023a). As of 2024, together with Hong Kong, Korea has the lowest fertility rate of 0.73 in the world—which is well below

[1] We use equivalised (square root equivalence scale) household disposable income to account for possible economies of scale between family members.

the replacement level of 2.1—and is not expected to show any improvements in the near future (UN DESA, 2024b).

As the country's young population is diminishing, the elderly population is on the rise. Men born in Korea in 2022, can expect to live until the age of 79.9, whereas women will likely celebrate their 85th birthday (Statistics Korea, 2023a). Going forward, the national statistical office of Korea predicts that life expectancy will further increase reaching 84.1 years for men and 89.1 years for women already by 2035 and will climb to 89.5 and 92.8 years, respectively, by 2070 (Statistics Korea, 2021b).

As a result of these two factors, while in 2020 the 65+ age cohort made up 15.7% of the country's total population, the elderly are projected to account for 40.1% of it in 2050, with the turning point arriving in 2070 when they will amount to 46.4% of the total population and thus exceed the working-age population (15–64-years of age) that will stand at 46.1% (Statistics Korea, 2021b).

This demographic shift puts considerable strain on the country's social welfare system, generates distortions in the labour market and is also associated with lower economic growth. Many researchers (e.g., Chun, 2013; Lim, 2016; IMF Blog, 2017) project the country's GDP growth rate to fall considerably due to population ageing, potentially reaching close to zero or even negative values by the 2040s (Cho, 2023) with continued negative values being highly likely in the decades after (Bank of Korea, 2023).

Additionally, population ageing is expected to heavily contribute to the rise in inequality in the coming years, especially among the older (and low-income) age groups (Hwang et al., 2021; Bank of Korea, 2023). Kim and Kim (2024) argue that the increase in bottom inequality—the widening gap between the 50th and 10th percentile income groups—is mainly due to population ageing, with additional contributions from labour market structural changes also linked to ageing.

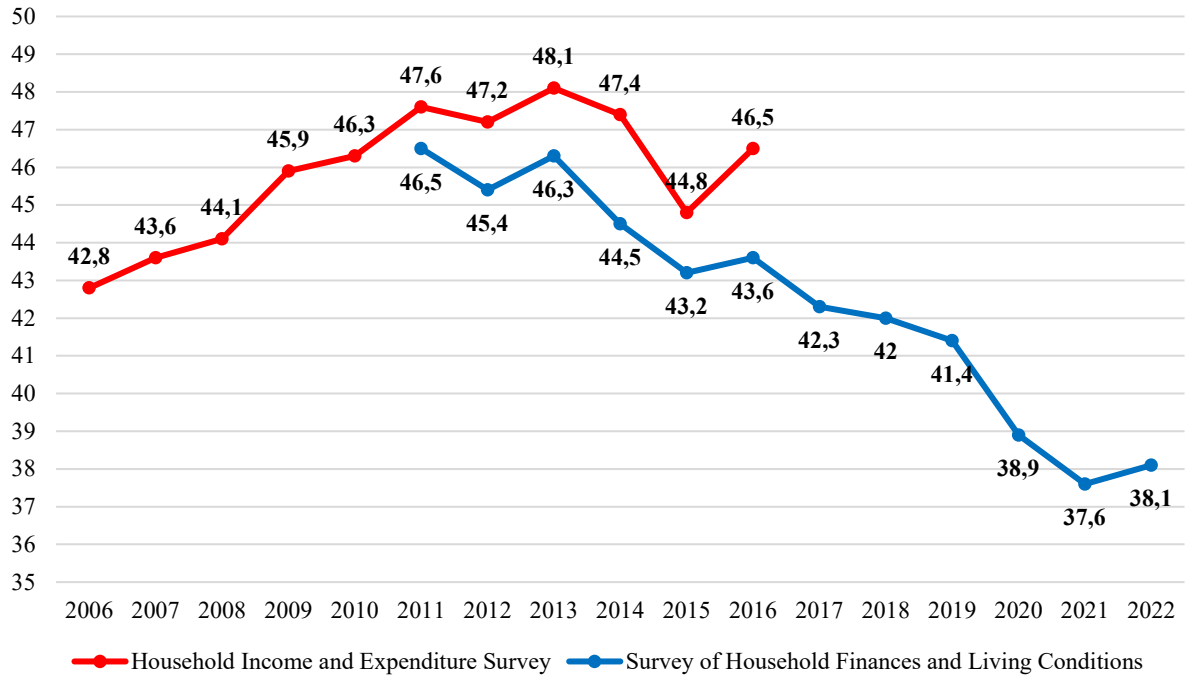
Through these effects societal ageing may further exacerbate elderly poverty, which is already a severe and widespread problem in Korea.

2.2. Elderly poverty and its consequences on well-being

Old-age poverty has always been extremely high in Korea. the poverty rate rose sharply at the beginning of the 21st century, peaking around 2013, when nearly half of the country's elderly population lived below the poverty line. Since then, it has declined, falling by 8.2

percentage points over the following decade. In 2022, official statistics reported the elderly poverty rate at 38.1% (Figure 1).

Figure 1. Relative poverty rate among the 65+ population in South Korea, 2006–2022 [% of elderly population]

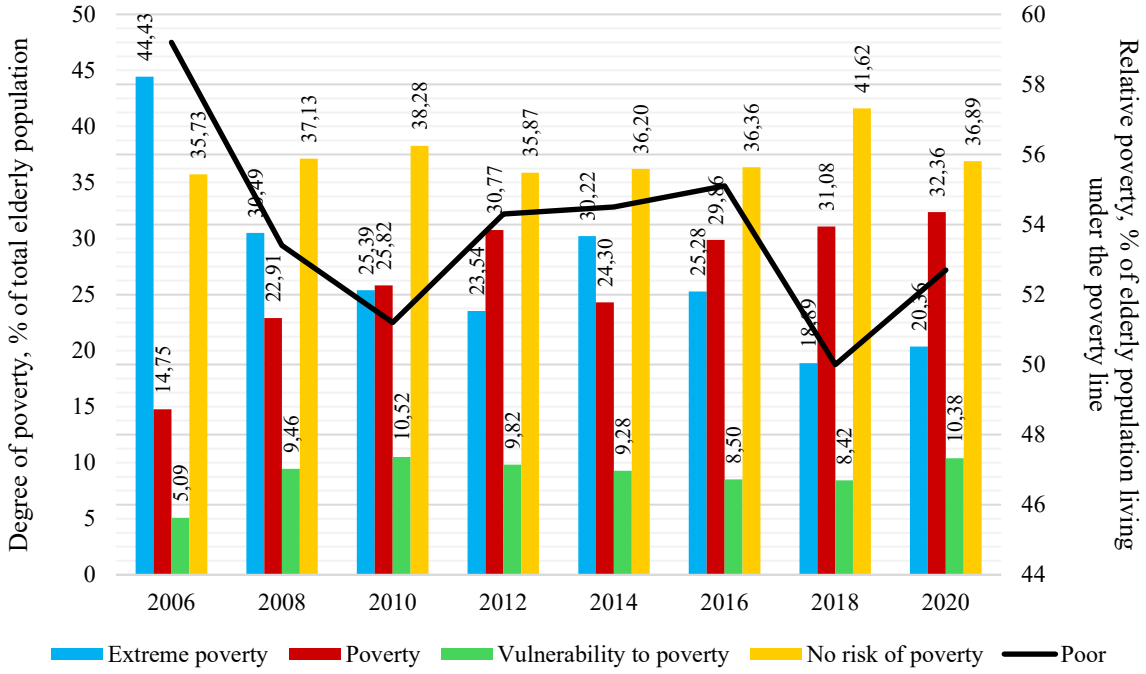


Notes: (1) The poverty rate is based on 50% of median income. (2) The current official statistic in South Korea is the one derived from the Survey of Household Finances and Living Conditions.
Source: Statistics Korea, 2021a

According to our data, the poorest of the poor experienced a rather positive development in the past two decades. Extreme poverty decreased significantly by 2020, especially when compared to the initial level of 44.43% in 2006 (Figure 2). This, of course, does not mean that the extreme poverty rate of 20.36% in 2020 is not alarmingly high; worryingly, 46.76% of the elderly experienced extreme poverty at least once during the observed period. Overall, however, extreme poverty shows a declining trend among the Korean elderly. The relative poverty rate did not decrease substantially over the years, indicating that the decline in extreme poverty was accompanied by a rise in the proportion of elderly living in poverty. While many escaped extreme poverty—a positive outcome—66.52% of the extreme poor remained in extreme poverty, and among the initially poor, 18.49% escaped poverty while 18.89% fell into deeper poverty. The 75–89 age group is most vulnerable, with 60.93% below the relative poverty line and over 30% living in extreme poverty. In contrast, the younger elderly, particularly those aged 65–69, are less susceptible, with 58.56% non-poor compared to 41.44% poor.

Among female respondents, 56.12% live in relative poverty, half of whom are extremely poor, compared with 50.59% of men, with slightly fewer in extreme poverty. Age patterns differ: women aged 65–84 face higher extreme poverty, while men exceed women after 85, peaking in the 90+ group (27.85% of women vs. 38.40% of men). Younger men are more likely than women to be non-poor, but in older age, a larger share of women are non-poor. Overall, women are more vulnerable in young-old age, whereas men are poorer in old-old age.

Figure 2. Relative poverty and degree of poverty among the Korean elderly, 2006–2020



Source: Authors' own elaboration based on KLoSA and KLIPS data

Such high poverty levels are especially concerning, as they undermine both the elderly's finances and overall well-being.

Firstly, severe health inequalities persist between the poor and non-poor elderly in Korea. Impoverished elderly are significantly more likely to suffer from severe diseases, such as cerebrovascular accident or chronic obstructive pulmonary disease, and experience higher hospital admission rates (Kim, Seo & Kang, 2022). Long-term poverty is also strongly associated with frailty among middle- and older-age women (Youn et al., 2020). In 2022, only 27% of elderly Koreans reported good health—one of the lowest rates in the OECD (OECD, 2024b).

Secondly, elderly Koreans report low life satisfaction and happiness. Those facing monetary deprivation are less happy than the non-poor (Nozaki & Oshio, 2016) and, in Seoul, income

growth most improves life satisfaction among the elderly after the 50–60 age group (Jin & Hong, 2022). In 2015, only 29.7% of those aged 65–74 and 25.7% of those 75+ rated their happiness 8 or higher on a 10-point scale (Seol & Chun, 2023). In 2022, their average life satisfaction score was 6.4 (OECD, 2024c). In a 2019 survey, the elderly reported lower life satisfaction and happiness than other age groups. They were most dissatisfied with their financial situation, followed by living standards and safety, with the largest gaps compared to other cohorts being in health and finances (Jung & Kim, 2020).

Thirdly, impoverished elderly Koreans face higher risks of depression and suicide. Economic hardship is strongly linked to depression across the general and elderly populations (Kim et al., 2016; Song & Kim, 2020; Kino et al., 2021). Poor housing and health, both tied to low income, further worsen mental well-being (Kino et al., 2021; Lee, 2021). In 2021, 13.6% of the elderly experienced depression (Statistics Korea, 2023b), and among those in poverty, nearly half reported poor mental health in 2014 (Kim, Kim et al., 2022). Poverty and depression also heighten suicidal ideation and behaviour, especially among men aged 60–74 (Ro et al., 2015; Ki et al., 2017; Choi et al., 2019; Lee & Atteraya, 2019). Although elderly suicide rates have declined, in 2019 Korea still recorded the highest among high-income nations (WHO, 2024) and registered 40.6 suicide deaths per 100,000 in 2023 (Statistics Korea, 2023c).

As the discussion above shows, poverty significantly affects the well-being of the elderly, making poverty alleviation a crucial first step in improving the lives of Korea's older population. With rapid population ageing, the situation is likely to deteriorate without timely action. It is therefore essential to gain a clearer understanding of the economic factors driving elderly poverty in order to develop effective and responsive policies.

2.3. The economic causes of old-age poverty

When examined from an economic perspective, poverty in old age can be traced back to four root causes in Korea: 1) changes in the pattern of intergenerational transfers of resources, 2) housing difficulties, 3) immature pension system and 4) labour market duality combined with a seniority-based wage system.

The literature on elderly poverty in Korea remains limited. Most studies examine only one of the key factors—typically intergenerational transfers, the pension system, or the labour market—while housing is often omitted. As a result, research that analyses how multiple economic factors interact to shape elderly poverty is rare.

Kim and Mah (2021) believe that the country's high elderly poverty rate is rooted in Korea's very rapid development and modernization resulting in an ageing population, the disintegration of multigenerational cohabitation and the subsequent reduction in financial support from adult children and an underdeveloped social welfare system.

Kang, Park and Cho (2022) apply a socioecological framework to elderly poverty in Korea, which considers not only individual but also environmental factors shaping one's situation and behaviour. They identify causes of poverty across five levels: individual (retirement preparation), interpersonal (declining filial obligations), organizational (early retirement, seniority-based wages), community (labour market duality), and systemic (gaps in the multi-pillar income security system).

The estimated fixed-effects model by Cho and Yeo (2017), using the Korean Welfare Panel, reveals that being in irregular employment, higher costs of living (logged monthly values) and higher housing value (logged price of the property one resides in) push the elderly into poverty (the poverty line was defined as 60% of the median income), whereas higher income increases the odds of not being a poor household. The counterintuitive results concerning property value stem from the fact that, as the authors explain, the house people live in cannot be liquidated to produce regular income and therefore it does not increase disposable household income.

The analysis of Cho and Seo (2019), by using the same dataset and estimating a panel probit model, shows that the factors that have the strongest association with poverty are being female, living in a rental housing and having a poor quality job, whereas the elderly with higher disposable income (logged values), public pension and higher education and the unmarried elderly are less likely to be poor (when the poverty line is defined as 60% of the median disposable income).

Lastly, Ha (2021) using the Korean Labor & Income Panel Study, estimates a fixed-effects panel logistic regression to analyse both absolute and relative poverty (defined as 50% of the median disposable income) rates among the 65+ age cohort. The author establishes that age, employment, household size, the number of pensioners in the household, monetary transfers from children and net assets are all strong determinants of both absolute and relative poverty, while subjective health plays a role only in the case of relative poverty. Among these variables it is age, not being employed and poor health that, in the case of relative poverty, increase the chances of falling below the poverty line.

In our study, we selected the following factors for further analysis as a comprehensive set: changing nuclear family structure (household composition and private transfers from children), the country's social protection system (receipt of the National Pension), and labour

market indicators (employment status and earnings). Finally, we included housing (homeownership or type of rental), which has often been overlooked in previous analyses of the causes of elderly poverty. To our knowledge, the only exception is the study by Cho and Seo (2019), which highlights the importance of housing in determining the poverty status of the elderly. They find, in particular, that elderly individuals living in rental accommodation are more likely to experience poverty, and that these effects vary considerably across regions, being especially strong in Seoul. In line with this, our empirical findings indicate that the form of housing in which the elderly reside is closely associated with their level of poverty, which is why we treat housing as a key factor contributing to elderly poverty in Korea.

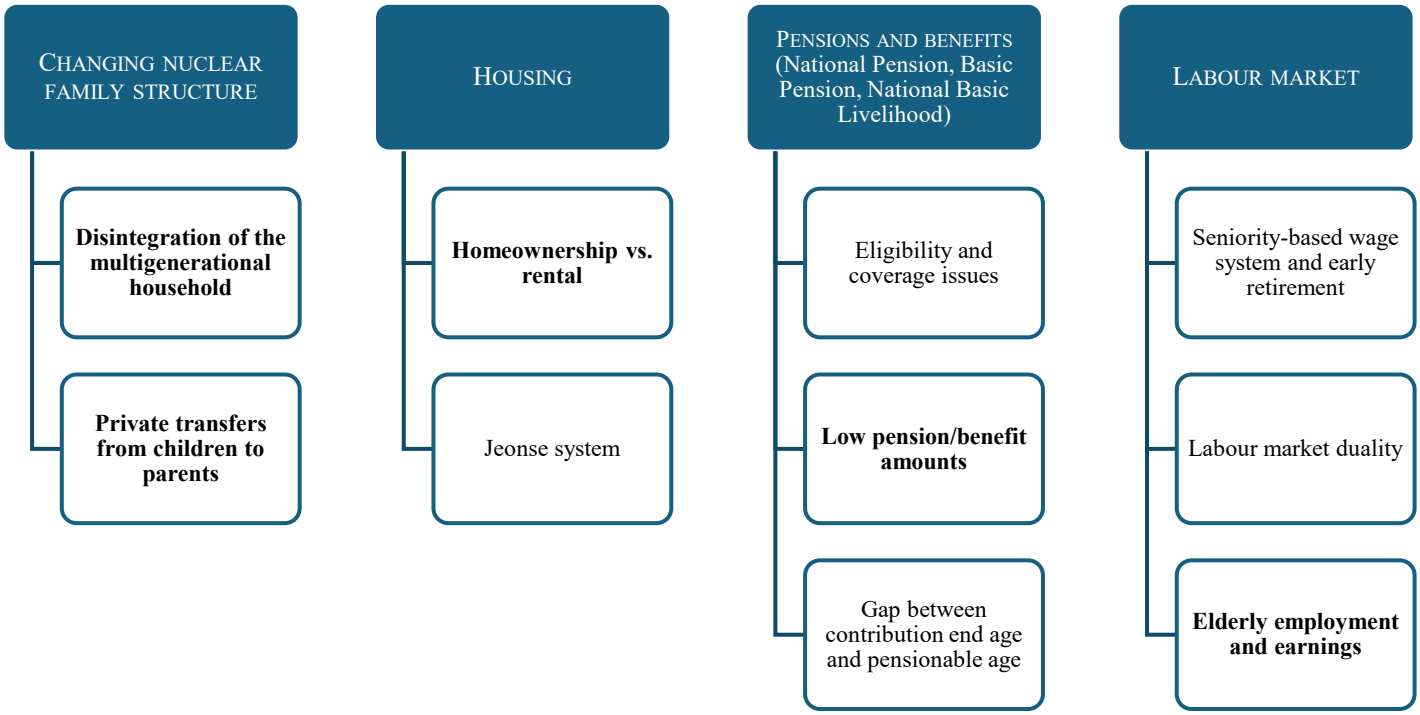
Figure 3 illustrates the potential relationships we have identified that shape poverty among the 65+ age cohort in Korea, with further details provided in Appendix A (Table A1).

The elderly cannot benefit from economies of scale and the sharing of resources with other family members (Nelson, 1988; Ku & Kim, 2020) as the traditional notion of filial piety is undergoing a change in Korean society (Choi, 1996; Park et al., 2005; Eun, 2008; Choi et al., 2018; Chung, 2018; Kim & Mah, 2021; Statistics Korea in Kang, Park & Cho, 2022). More and more children wish to live independently from their parents leading to the breakdown of the intergenerational family model and to an increased number of elderly living apart from their children (Chung, 2018; Ku & Kim, 2020; Statistics Korea, 2024a). It is undeniable that such living arrangements negatively affect the elderly's finances (Ku & Kim, 2020; Ha, 2021; Ku et al., 2021; Kim & Lee, 2025).

Since it is not particularly studied by the literature, the mechanism of why and how housing, in terms of ownership vs. type of rental[2], affects elderly poverty is unknown. We develop an explanation for it based on our empirical results in Section 4.

[2] The monthly rental system is called *Wolse* where conditions can vary substantially. Usually, the tenant pays an initial deposit amounting to 10 times the monthly rental fee or even more, and then also pay a monthly rent; at the end of the contract the deposit is given back to the tenant (Moon, 2023; Yoon, 2023; Seoul Metropolitan Government, n.d.). The other possibility is the *Jeonse*. In the *jeonse* system tenants are required to make a one-time payment at the start of the contract and there are no monthly payments (Moon, 2018; Moon, 2023; Yoon, 2023; Seoul Metropolitan Government, n.d.). For this reason, however, the initial payment is very high, between 50-70% of the property's market value, and once the (usually 2-year) contract is over, this lump sum amount is paid back to the tenant by the landlord (Moon, 2018; Moon, 2023; Yoon, 2023; Seoul Metropolitan Government, n.d.).

Figure 3. Potential causes of elderly poverty in South Korea



Note: Variables in bold indicate those controlled for in the empirical analysis.
Source: Authors' own elaboration based on the established literature. See also Table A1 in Appendix A.

Korea's social protection system is relatively young and has not had the time to mature yet. The National Pension Scheme was introduced only in 1988 and gradually expanded to cover all working individuals by 2006 (NPS, 2014). Because of the novelty of the pension system many of today's elderly could not join the scheme while they were still working or could contribute only for a short period of time, resulting in low pension benefits (on average, beneficiaries receive 35.8% of the average wage (OECD, 2024d)) (NPS, 2014; ISSA, 2022)—if they are even eligible for pension (in 2022, only 58.38% of the 65+ age cohort proved to be recipient (NPS, 2023)).

Basic Pension was introduced in 2008 to provide a minimum standard of living to the poor elderly (OECD, 2022a). In 2022, 67.5% of the total elderly population benefitted from this welfare programme (NPS, 2023) and research shows that it has successfully increased the living standards of the elderly (Shin & Do, 2015; Lee et al., 2019; Kang, Park & Ahn, 2022; Lee, 2022; Ahn et al., 2023). However, the maximum benefit amount is only 7.8% of average earnings (UN ESCAP, 2015; OECD, 2022a).

The high level of labour market duality between regular and non-regular workers as well as between SMEs and large companies (Schauer, 2018; Hwang et al., 2022; Statistics Korea,

2024c) sets many people on the path of poverty already during their working years as those in precarious working conditions have lower earnings and are not adequately covered by the pension system (NPS, 2014; 2023; OECD, 2018c; 2022b; Schauer, 2018; Hwang et al., 2022). Furthermore, because of the seniority-based wage system and the institution of "honorary retirement", individuals are often forced to retire in their 50s (Lazear, 1979; van Ours & Stoeldraijer, 2010; OECD, 2018a; 2024e; Kang, Park & Cho, 2022; Statistics Korea, 2024b) and can find re-employment only in lower-skilled and lower-paid jobs (OECD, 2018a; 2018b; 2024e; Lee & Lee, 2023). Even the re-employed elderly are affected by this dichotomy of the labour market as most of them become non-regular workers for little pay (Chung, 2018; Lee & Lee, 2023). Nonetheless, re-employment in old age seems to have a poverty-alleviating effect (Yang, 2011; Lee & Lee, 2023).

3. Data, methodology and descriptive statistics

3.1. Data

This study uses the Korean Longitudinal Study of Aging [KLoSA] and the Korean Labor and Income Panel Study [KLIPS].

The KLoSA (KEIS, 2006–2020) is carried out by the Korea Employment Information Service, an affiliated organization of the Ministry of Employment and Labor. It is a biannual, individual survey gathering information on people aged 45 and older regarding a wide range of topics, such as demographic characteristics, family, economic activities, work status, health conditions and life satisfaction. Since the target demographic of this survey coincides with the age group of interest (65 and older), it is a good fit for analysis offering a large sample size. The original, nationally representative sample of 10 254 adults was collected in 2006, and a refreshment sample was introduced in 2014. The survey covers all provinces of Korea except for Jeju Island.

We use the first eight waves, covering a 15-year period between 2006 and 2020. We draw the data from the original 2006 sample but consider only individuals aged 65 and older, resulting in an unbalanced panel of 33 578 observations.

Since the KLoSA contains information on the 45+ age group, it does not allow for the calculation of a nationwide median income for each observed year, which is indispensable for the aims of this study. For these purposes, we use the KLIPS (KLI, 2006–2020), an annual

household survey conducted since 1998 by the Korea Labor Institute, which interviews all household members aged 15 and older.

3.2. Methodology

As already mentioned (*Section 1*), due to the nature of the dependent variable, we use ordered logistic regression. Given the 15-year panel, the fixed-effects method effectively controls both time-variant and time-invariant factors, ensuring consistent estimates (e.g., Hill et al., 2011; Woolridge, 2012; Stock & Watson, 2020).

The estimation is based on the following equation:

$$Y_{it}^{*} = \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it} + \alpha_i + \varepsilon_{it}$$

where Y_{it}^{*} is the latent variable 'degree of poverty' for individual i at time t, $X_1 \ldots X_k$ are k explanatory variables, α_i stands for the time-invariant individual characteristics and ε_{it} represents the unobservable but time-variant characteristics.

The observed dependent variable Y_{it} takes its values according to the rule:

$$Y_{it} = \begin{cases} 1, & if\ Y_{it}^{*} < 50\%pvl \\ 2, & if\ 50\%pvl \leq Y_{it}^{*} < 100\%pvl \\ 3, & if\ 100\%pvl \leq Y_{it}^{*} < 125\%pvl \\ 4 & if\ Y_{it}^{*} \geq 125\%pvl \end{cases}$$

where *pvl* stands for poverty line.

A difficulty of the fixed-effects ordered logistic regression, however, is that there are different views on how the fixed-effects estimator should be applied to the ordered logit model. This work follows the procedure devised by Baetschmann et al. (2015) who use the BUC ("blow-up and cluster") method to get consistent and efficient estimators.[3]

[3] Before the analysis of the dependent variable 'degree of poverty', we conducted a preliminary analysis with the variable 'relative poverty' which is a dichotomous variable, assigning the value 0 if the individual is not poor and 1 if they are considered poor. For that analysis fixed-effects binary logistic regression was implemented with the aim of understanding which economic factors are associated with elderly poverty. Then, a more detailed analysis was performed through the 'degree of poverty'. The results of the analysis regarding 'relative poverty' can be found in the Appendix (Table A2).

3.3 Variables and descriptive statistics

Our outcome variable, 'degree of poverty', provides a comprehensive view of poverty by recognizing both the different levels of living standards experienced among the poor and the vulnerability of those who, while not currently poor, are at risk of falling into poverty. This categorical variable has four ordered outcomes: (1) "extremely poor" if the elderly individual's income is below 50% of the poverty line; (2) "poor" if income is between 50% and 100% of the poverty line; (3) "vulnerable to poverty" if income is between 100% and 125% of the poverty line; and (4) "no risk of poverty" if income exceeds 125% of the poverty line.

The independent variables were selected based on the relevant literature and the data availability of the KLoSA data.

Household composition is a categorical variable that depicts the living arrangements of the elderly, whether they live alone or with their spouse, children or other family members. It is an important variable as it gives a view of the changing nuclear family structure in Korea, but it is also a proxy for the state of intergenerational transfers of both financial and non-financial resources. *Private transfers from children* is a continuous variable counting all monetary transfers from children to parents, regardless of whether they live together or not. *Housing* is a categorical variable coded depending on whether the home is owned by the respondent, or if the respondent lives in a rental. In the KLoSA questionnaire *jeonse* is a deposit-based rental home without monthly rent, *jeonwolse* corresponds to a monthly rental home with a deposit and *wolse* indicates a monthly rental home without a deposit. The different pensions and benefits are all continuous variables and refer to the year prior to the survey. *Private pension, National Pension*, *corporate pension* and the *National Basic Livelihood Security* were monitored during the whole observation period of 2006–2020. *Basic Pension*, however, was introduced into the survey only in 2014, when it underwent a major reform after its implementation in 2008. In terms of work activities, *employment* shows whether the respondent was working at the time of the survey or not. The *employment status* is only recorded for those elderly that were reported to be working, and *earned income*, just like every other form of income, is a continuous variable concerning the year preceding the survey. All variables referring to monetary amounts are measured in 10,000 Korean Won [KRW].

Apart from the focal variables, several other variables were controlled for. *Age*, *marital status*, *physical health* and *depression (proxy for mental health)* capture individual characteristics. Gender and education are omitted from the analysis because of the fixed effects estimation method (education after age 65 is unchanged in over 99% of the cases). Variables

regarding the nuclear family structure are *household size* and the number of *children* the respondent has. Lastly, the variable *provinces* extends the analysis to the geographical sphere to capture regional differences.[4] See Table 1 for the list and definitions of variables, as well as for the descriptive statistics.

The mean value of our outcome variable 'degree of poverty' (ranging from 1=extremely poor to 4=not being at risk of poverty) is 2.562, with a median of 2, indicating that at least half of elderly Korean individuals live in poverty. See Appendix B for more details about measuring poverty.

Regarding the independent variables, the mean age of the panel is 74.66, and 58.07% are women. Most elderly respondents live apart from their children, and this is strongly associated with poverty: 73.84% of those living alone are poor, compared to 34.66% of those living with their children. Living with children is also linked to lower extreme poverty (44.18% among those living alone vs. the lowest (15.16%) among co-residents). Private transfers are widespread (78.56%), and children provide support regardless of parents' poverty status.

A large majority (82.91%) live in owner-occupied or family-owned housing, which is associated with the lowest poverty and extreme poverty (25.27%) rates. Among renters, *jeonse* (8.06%) and *jeonwolse* (6.45%) have similar overall poverty rates (≈66%), though *jeonse* tenants face higher extreme poverty (38.17% vs. 31.67%). *Wolse* tenants (1.18%) are the most disadvantaged, with an 85.14% poverty rate and nearly half in extreme poverty.

Only 29.49% receive National Pension, often due to late age, low lifetime income, or lack of formal employment. Benefits are heavily skewed: most recipients get between 90,000 and 510,000 KRW, with a median of 190,000 KRW per month. Coverage and benefit levels decline sharply with age, and the pension shows little observable poverty-reducing effect (poverty rates: 51.28% for recipients vs. 54.90% for non-recipients). Basic Pension performs better: 73.83% of the extreme poor receive it, and eligibility exceeds 70% among those 80+. However, nearly 40% of recipients are non-poor, indicating targeting issues. The median benefit is 160,000 KRW per month. Overall, 18.22% receive both pensions, 17.39% only National Pension, 39.33% only Basic Pension, and 25.06% receive neither.

[4] In relation to the listed variables, on average, each survey respondent was observed 4.5 times, meaning that they were followed over the course of 7 years since the KLoSA survey is administered every two years. The exception is *Basic Pension*, which was introduced into the KLoSA questionnaire only in 2014. As a result, in that case, respondents were typically observed only 3 times.

Table 1. Descriptive statistics and definitions of the variables

Variable	Mean	Std. dev.	Min	Max	Variable description
OUTCOME VARIABLE					
Degree of poverty	2.562	1.239	1	4	categorical; 1=extreme poverty (R<50% of the poverty line), 2=poverty (50% poverty line≤R<poverty line), 3=vulnerability to poverty (poverty line≤R<125% poverty line, 4=no risk of poverty (R≥125% poverty line)
INDEPENDENT VARIABLES					
Individual characteristics					
Age	74.655	6.889	65	107	age in years
Marital status	1.362	.521	1	3	categorical; 1=married, 2=widowed, 3=not married
Physical health	2.684	.884	1	5	5-point scale; 1=very bad health, 5=very good health
Depression	1.012	.885	0	3	number of signs of depression shown by the respondent; 0=no signs of depression, 1=1-2 signs, 2=3-6 signs, 3=7-10 signs (based on CESD-10)
Nuclear family structure					
Household size	2.433	1.280	1	11	number of household members
Household composition	2.420	1.146	1	8	categorical; 1=elderly living alone, 2=elderly couple, 3=elderly living with children only, 4=elderly living with children and grandchildren/parents/both, 5=elderly living with parents, 6=elderly living with grandchildren, 7=elderly living with siblings, 8=other
Children	3.498	1.576	0	10	number of alive children of the respondent
Private transfers from children	191.470	457.956	0	30060	total amount of transfers received in the last year, unit: 10,000 KRW
Housing					
Housing	1.301	.761	1	5	categorical; 1=own home (owned by R or relative), 2=Jeonse, 3=Jeonwolse, 4=Wolse, 5=other
Pensions and benefits					
Private pension	7.238	101.207	0	3600	total amount of private pension received in the last year, unit: 10,000 KRW
National pension	94.406	220.261	0	5000	total amount of National Pension received in the last year, unit: 10,000 KRW
Corporate pension	99.454	511.116	0	12000	total amount of corporate pension received in the last year, unit: 10,000 KRW
Basic Pension	104.961	110.363	0	360	total amount of Basic Pension received in the last year, unit: 10,000 KRW
National Basic Livelihood Security	16.670	88.884	0	1320	total amount of Basic Livelihood Benefit received in the last year, unit: 10,000 KRW
Employment and earnings					
Employment	.221	.415	0	1	dummy; 0=not working currently, 1=currently working
Employment status	3.445	1.214	1	5	categorical; 1=regular worker, 2=temporary worker, 3=daily worker, 4=self-employed, 5=unpaid family worker
Earned income	277.948	846.577	0	60000	total amount of earned income in the last year, unit: 10,000 KRW
Regions					
Provinces	8.126	4.996	1	16	16 geographical areas (the provinces and provincial-level cities of South Korea), Jeju Island not included

Number of observations:	**33578**

Note: The values reported here were calculated based on the total number of observations.

Private and corporate pensions are rare (1.28% and 5.16%, respectively), though corporate pensions are associated with substantially lower poverty (82.33% of the recipients are non-poor). National Basic Livelihood Security mainly reaches poor households (88% of recipients), but only about 2% of the elderly qualify due to strict family-based eligibility rules.
Finally, 22.07% of the elderly are still working. Employment is highest among those vulnerable to poverty (≈30%) and lowest among the extreme poor (12.03%). Those aged 65–74 tend to work to prevent poverty, whereas those aged 75+ work mainly to mitigate existing poverty.

4. Empirical results

4.1. Household composition and private transfers, housing, pensions and employment

The estimation results presented in Table 2 suggest that living with extended family is a very effective poverty-alleviating arrangement; therefore, the decline of this tradition could pose serious risks for older adults. Elderly individuals residing with extended family are three times more likely to be less poor than those living alone. The average degree of poverty of the elderly living alone is 2.02 (below the sample average of 2.56), implying that most of them fall in the category of 'poor'. By contrast, this value is 3.22 for elderly individuals residing with their extended family, indicating that they generally enjoy a higher standard of living than those living alone—they are not poor, though many remain vulnerable to poverty. Those living only with their children are also better off, though to a lesser degree: their odds ratio is 2.12 and their degree of poverty is 2.97. Compared to living alone, living as a couple also helps reduce poverty; however, it only increases the odds of having a higher standard of living by 38.2 percentage points and is associated with an average poverty score of 2.42. Overall, the results show that elderly people living with non-elderly family members are far less likely to be poor, though many remain vulnerable, whereas elderly couples—despite being better off than those living alone—still face a high risk of poverty. Direct monetary aid appears ineffective, as financial help from children is not statistically significant. Overall, shared financial and non-financial resources through cohabitation help the elderly more than higher monetary support without co-residence.

Housing is another key factor shaping elderly poverty. Renting rather than owning substantially increases poverty risk: the chances of renters being in a higher (less poor) category are nearly halved compared with homeowners. *Wolse* renters experience the largest reduction in odds (40.3 percentage points), followed by *jeonse* renters (39 points), while *jeonwolse* is only

marginally significant and shows a smaller effect. These patterns are consistent with the average poverty levels by housing type. Homeowners have an average value of 2.63, close to the sample mean (2.56), indicating that many are vulnerable but not poor. *Wolse* renters have a much lower value (1.79), reflecting widespread severe poverty. *Jeonse* and *jeonwolse* renters have similar averages (2.22 and 2.28), suggesting that many live in poverty, though not at the extreme levels observed among *wolse* tenants.

Living in *jeonse* and *wolse* rentals might have such a considerable negative effect on elderly poverty because of the nature of these housing arrangements. Because *wolse* rentals require no upfront deposit, they are often chosen by elderly individuals who lack the savings needed for Korea's typically high housing deposits. As the lowest-cost option, *wolse* becomes the default choice for the poorest elderly. Indeed, 46.6% of *wolse* tenants live in extreme poverty.

The case of *jeonse* is more complex. Elderly *jeonse* renters, like *wolse* tenants, have a high share of extreme poverty (38.17%), yet many are also at no risk of poverty (26.39%, compared with 10.83% among *wolse* renters). This contrast may stem from the large lump-sum deposit required for *jeonse*. Those able to pay 60–70% of a home's value upfront are likely not poor, which aligns with the sizeable share of *jeonse* tenants who face no poverty risk. However, these funds are not liquid and cannot be easily used. As discussed earlier (*Section 2.3.*) regarding housing value and poverty, a home cannot be converted into regular income and therefore does not raise disposable resources (Cho & Yeo, 2017). The same applies to the large *jeonse* deposit, leaving many elderly *jeonse* tenants effectively poor. Another drawback is that the deposit earns no interest and loses value over time. Although tenants receive it back at the end of the contract, inflation reduces its real worth, making them poorer. This can trigger a downward cycle of moving into smaller or lower-quality homes if they cannot save enough to offset the loss. While working-age households may manage this, elderly people relying on pensions or benefits usually cannot increase their savings.

Elderly individuals living in non-conventional housing (e.g., nursing hospital, free residence (housing provision), farmhouse)—indicated as 'other' in Table 2—have considerably lower living standards as well with respect to homeowners, though these housing situations are quite rare.

In relation to household composition and housing, we found that the interactions of main interest (i.e., homeownership and living with children and/or extended family) are not statistically significant.

Table 2. Degree of poverty [Odds ratios, selected variables]

	Coefficients	Robust standard errors
HOUSEHOLD COMPOSITION		
Elderly living alone	1.000	(.)
Elderly couple	1.382***	(0.157)
Elderly living with children only	2.122***	(0.264)
Elderly living with children and grandchildren/parents/both	3.102***	(0.540)
Elderly living with parents	1.499	(0.416)
Elderly living with grandchildren	0.948	(0.208)
Elderly living with siblings	1.248	(0.268)
Other	2.938*	(1.669)
PRIVATE TRANSFERS FROM CHILDREN		
In last year, the total amount of financial support from children (unit: 10,000 KRW)	1.000	(0.000)
HOUSING		
Own home (home owned by R or R's relative)	1.000	(.)
Deposit-based rental home without monthly rent (i.e., *jeonse*)	0.610***	(0.067)
Monthly rental home with a deposit (i.e., *jeonwolse*)	0.803*	(0.107)
Monthly rental home without a deposit (i.e., *wolse*)	0.597**	(0.144)
Others	0.651**	(0.122)
PENSIONS AND BENEFITS		
Private pension		
In last year, the total amount of Private Pension Benefit (unit: 10,000 KRW)	1.001**	(0.000)
National Pension		
In last year, the total amount of National Pension Benefit (unit: 10,000 KRW)	1.000	(0.000)
Corporate pension		
In last year, the total amount of Specific Corporate Pension Benefit (unit: 10,000 KRW)	1.001***	(0.000)
Basic Livelihood Benefit		
In last year, the total amount of National Basic Livelihood Security Benefit (unit: 10,000 KRW)	1.000	(0.000)
EMPLOYMENT AND EARNINGS		
Employment		
No, currently not working	1.000	(.)
Yes, currently working	1.430***	(0.113)
Earned income		
In last year, the total amount of earned income (unit: 10,000 KRW)	1.001***	(0.000)
Individual characteristics	✓	
Household characteristics	✓	
Geographical location	✓	
Observations	23973	

Notes: (1) Poverty index coded from 1 (extreme poverty) to 4 (no risk of poverty). (2) Exponentiated coefficients. (3) Individual characteristics include age, marital status, physical and mental health. Household characteristics are household size and number of children. Geographical location refers to the region in which the respondent resides. See Table A3 for the full list of explanatory variables.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

National Pension—the core of Korea's old-age social protection—shows no significant effect on living standards, while less widespread private and corporate pensions have a modest poverty-reducing impact: a 100,000 KRW increase raises the chances of being in a less poor group by 1 percentage point. This highlights a structural gap in Korea's social protection system. Despite rapid economic growth, public pensions have not developed sufficiently to ensure well-being in retirement, unlike European welfare systems. Consequently, many elderly remain reliant on family support or limited private savings, with corporate and private pensions alleviating poverty only for a minority.

Employment is highly beneficial for the elderly, as it promotes upward mobility—those who work are 1.43 times more likely to belong to a higher living standard category than those who do not. Elderly individuals not in employment tend to be closer to the 'poor' category, with an average degree of poverty of 2.48, whereas employed elderly are more likely to be 'vulnerable to poverty,' with an average degree of poverty of 2.84, slightly above the sample mean of 2.56. Job quality is equally important, as higher earned income reduces poverty risk; specifically, a 100,000 KRW increase in income raises the probability of being less poor by 1 percentage point. However, as discussed in *Section 2.3.*, structural barriers—such as labour market duality, limited skills, and employers' reluctance to hire older workers—prevent many elderly from accessing jobs that provide sufficient income.

Overall, the most important determinants of the level of poverty the elderly live in are household composition (living together with one's children and/or extended family in particular), whether the elderly live in a rental home or not (especially *jeonse* and *wolse* rentals) and being in employment.

4.2. Other, non-economic variables

As people age, their likelihood of being poor increases: each additional year reduces the probability of belonging to a less-poor category by 3 percentage points. Physical health is not a major determinant of poverty—only reporting very good health (a rare condition among the elderly) has a statistically significant positive effect. Mental health matters more: showing one or two symptoms of depression lowers the chances of being in a higher living-standards category by 11.1 percentage points compared with those without symptoms. Household size has a similar impact—each additional member reduces the odds of being less poor by 14.3 percentage points. Lastly, place of residence matters. Elderly people living in Gangwon and Gyeongsangbuk are far more likely to be poor than those in Seoul, with an odds ratio of 0.147,

suggesting that living in these provinces hinders upward mobility. Daejeon shows an even lower odds ratio of 0.061, though this result is only marginally significant at the 10% level.

4.3. Heterogeneity analyses

We also conducted complementary analyses to deepen the understanding of old-age poverty investigating the effects of the Basic Pension and gender, age, household composition and regional differences as well as the elderly in employment. The key findings are summarised below.

When Basic Pension is introduced into the model (Table 3), it shows that in recent years (2014–2020) it did not have a statistically significant effect on elderly poverty. Living with one's children and/or extended family, renting under *jeonse* conditions and being employed, however, proved to be quite prominent even in the last few years.

In the gender-specific analysis (Table 3), the largest differences between female and male respondents appear in household composition and employment, while the remaining variables show no significant disparities. For men, only living with extended family is statistically significant (odds ratio = 2.76), while for women living with extended family (3.01), as well as living with a partner (1.35), and living only with a child (2.30) improve living standards relative to living alone. In employment, working men gain more than working women—their odds ratios differ by 26.8 percentage points.

In the age-based heterogeneity analysis (Table 3), all variables show stronger associations with poverty for those aged 75 and over than for the younger elderly. The largest differences appear in household composition: while living with extended family is significant for both groups, living only with children markedly improves living standards for the 75+ group. Housing also shows a clear gap—*jeonse* rentals substantially hinder upward mobility among the older elderly (odds ratio for 75+ = 0.51, significant at the 1% level vs. 0.75 for those under 75, significant at the 10% level).

Table 3. Heterogeneity analyses [Odds ratios, selected variables]

	Gender differences		Age differences		Household composition			Regional differences						Working elderly	Basic Pension Included
	Men	Women	<75	≥75	Elderly living alone	Elderly living with their spouse	Elderly living with their children	Seoul	Southern cities	Northern and middle cities	Southern provinces	Western provinces	Eastern and middle provinces		
Household composition															
Elderly living alone	1.000	1.000	1.000	1.000	–	–	–	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Elderly couple	1.111	1.353**	1.370*	1.088	–	–	–	2.530***	0.960	1.222	0.894	1.301	2.125**	0.892	1.193
Living with children only	1.535	2.301***	1.470*	2.731***	–	–	–	1.942**	1.260	1.962**	1.509	3.053***	3.139***	1.252	1.600***
Living with children and grandchildren/parents/both	2.760***	3.009***	2.851***	2.916***	–	–	–	2.551**	2.802**	3.157**	2.105	4.434***	3.580**	3.093**	2.570***
Living with parents	1.252	2.440	1.169	1.094	–	–	–	1.075	2.348	2.237	0.408	2.214	0.395	0.700	2.547**
Living with grandchildren	0.655	1.024	1.126	0.883	–	–	–	0.797	0.813	0.850	0.558	1.903	0.924	0.066***	0.718
Living with siblings	1.027	1.232	1.802*	1.220	–	–	–	0.292	0.642	1.637	2.993	1.136	2.439*	1.406	1.355
Other	7.729***	1.354	1.801	3.058*	–	–	–	–	–	–	–	–	–	1.014	0.628
Private transfers from children	1.000**	1.000	1.000	1.000**	1.000**	1.000	1.001***	1.000	1.000***	1.000	1.001**	1.000	1.000**	1.001*	1.000
Housing															
Own home	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Jeonse	0.624***	0.614***	0.746*	0.513***	0.428***	0.822	0.520***	0.659*	0.479**	0.707	0.948	0.708	0.690	0.608*	0.540***
Jeonwolse	0.758	0.811	0.828	0.702*	0.568*	0.782	0.800	1.154	0.398**	1.526	0.582	0.683	0.300**	0.501	0.829
Wolse	0.585	0.649	0.706	0.374*	0.754	0.707	0.504*	4.781**	0.595	3.879**	0.408*	0.170***	0.334**	0.368**	0.909
Others	0.593	0.677*	0.416***	0.639*	0.615	0.731	0.492**	0.484	0.253**	0.616	1.511	1.222	0.435**	0.210**	0.566
Pensions and benefits															
Private pension	1.001**	1.000	1.002***	1.000	1.002	1.001**	1.000	1.003*	0.999	1.001	1.001	1.001*	1.001	1.002**	1.001**
National Pension	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.001	1.000	1.000	1.000	1.001***	1.001	1.001	1.000
Corporate pension	1.001***	1.001***	1.001***	1.001***	1.002***	1.001***	1.001**	1.002**	1.001**	1.000	1.003***	1.001***	1.001***	1.003***	1.001***
Basic Pension	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.000
Basic Livelihood Benefit	1.000	1.000	1.001*	1.000	1.001	1.001***	1.000	0.999	1.001	0.999	1.001**	1.001	1.002***	1.003	1.001**
Employment															
No, currently not working	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	–	1.000
Yes, currently working	1.588***	1.320**	1.338***	1.636***	0.930	1.643***	1.061	0.653*	1.664**	0.914	1.992***	1.413**	2.219***	–	1.645***
Employment status															
Regular worker	–	–	–	–	–	–	–	–	–	–	–	–	–	1.000	–
Temporary worker	–	–	–	–	–	–	–	–	–	–	–	–	–	0.771	–
Daily worker	–	–	–	–	–	–	–	–	–	–	–	–	–	0.499*	–
Self-employed	–	–	–	–	–	–	–	–	–	–	–	–	–	0.779	–
Unpaid family worker	–	–	–	–	–	–	–	–	–	–	–	–	–	2.878*	–
Earned income	1.001***	1.001***	1.001***	1.001***	1.004***	1.001***	1.000**	1.001***	1.001***	1.001***	1.001***	1.001***	1.001***	1.001***	1.001***
Individual characteristics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Household characteristics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Geographical location	✓	✓	✓	✓	✓	✓	✓	_	_	_	_	_	_	✓	✓
Observations	10021	13890	10683	9274	3764	9811	6541	3362	3067	3284	4262	5994	3619	4137	9138

Notes: (1) Poverty index coded from 1 (extreme poverty) to 4 (no risk of poverty). (2) Exponentiated coefficients. (3) Individual characteristics include age, marital status, physical and mental health. Household characteristics are household size and number of children. Geographical location refers to the region in which the respondent resides. (4) Cities and provinces were categorised as the following. Capital: Seoul; Southern cities: Busan, Ulsan, Gwangju; Northern and Middle cities: Incheon, Daejeon, Daegu; Southern provinces: Jeollanam, Jeollabuk, Gyeongsangnam; Western provinces: Gyeonggi, Chungcheongnam; Eastern and Middle provinces: Chungcheongbuk, Gyeongsangbuk, Gangwon. The analysis does not consider the city of Sejong because of the low number of respondents and Jeju Island as it is not yet covered by the KLoSA survey. (5) The provinces were grouped together based on their geographical location, while also taking into account the poverty rate they demonstrated in our preliminary analyses and the effect residing in them had on the elderly's odds of poverty (Table A2). (6) Compared to Table 2, the reduced sample size in the last column is due to missing data on Basic Pension receipt, mainly because it was not included in the survey in 2006 (we have data starting from 2014).

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In the household-composition heterogeneity analysis (Table 3), the determinants of poverty differ markedly across living arrangements. Monetary transfers from children matter only for elderly people living with their children—unsurprising given their greater likelihood of sharing resources. Other financial support, such as pensions and benefits, has the strongest positive effect for elderly couples. Housing effects also vary: elderly couples are unaffected by their housing conditions, while living in a *jeonse* notably reduces upward mobility for those living alone (odds ratio = 0.43) and for those living with their children (0.52). Lastly, only those living with a partner gain from employment in terms of living standards, though higher earned income has a larger impact on solo elderly (odds ratio = 1.004 vs. 1.001 for couples).

Regional heterogeneity (Table 3) in the determinants of old-age poverty is considerable. Living with extended family increases upward mobility in most regions, though the effect varies widely—from an odds ratio of 2.551 in Seoul to 4.434 in the Western provinces—and is absent only in the Southern provinces. Living solely with one's child also tends to improve outcomes, except in Southern cities and provinces—in Southern provinces monetary support from children appears more important than co-residence. In Seoul and in the Eastern and Middle provinces, elderly people living with a spouse are better off than those living alone.

Housing effects also differ across regions. *Jeonse* matters only in Seoul (10% level) and Southern cities (5% level), while *jeonwolse* is significant only in Southern cities and the Eastern and Middle provinces; both rental types have negative effects. Wolse rentals are generally harmful outside the major provincial-level cities, but in the capital and in Northern and Middle cities they show the opposite pattern, increasing upward mobility nearly four- and fivefold.[5]

National Pension benefits are mostly ineffective across regions, with the exception of the Western provinces, where they show a small but significant positive impact (1% level).

Employment remains an effective tool against poverty in most regions—except Seoul and Northern and Middle cities. Its strongest impact appears in the Eastern and Middle provinces (odds ratio = 2.219), which include one of Korea's poorest regions (Gangwon), suggesting employment may be a crucial path out of poverty for the most vulnerable elderly. This is reinforced by the high effect observed in the Southern provinces (1.992), another region with high levels of elderly poverty.

[5] This result contradicts earlier findings, where *wolse* rentals reduced the elderly's chances of escaping poverty. The difference may stem from the fixed-effects ordered logistic regression, which considers only individuals whose situation changed over the observation period. Most elderly in *wolse* rentals may have experienced no change, while a few saw improvements between 2006 and 2020, influencing the results. Alternatively, unique conditions in Seoul, Incheon, Daejeon, and Daegu may give elderly *wolse* renters better opportunities for upward mobility. Further research is needed to understand regional housing differences in Korea.

When the sample is limited to employed elderly (Table 3), many variables lose significance. The strongest associations with poverty (significant at the 1% level) are living with grandchildren (odds ratio = 0.07, though this arrangement is very rare), receiving a corporate pension (1.003), and having higher earned income (1.001). The type of employment has little impact on poverty: only daily workers (0.50) and unpaid family workers (2.88) show significance, and only at the 10% level.[6]

5. Discussion and conclusion

This study applied fixed-effects logistic regression to 2006–2020 KLoSA data (using 2006–2020 KLIPS data for the calculation of the poverty line) to identify the economic conditions shaping elderly poverty in Korea. In 2020, the relative poverty rate reached 52.70%, meaning that more than half of older Koreans lived on less than 50% of the median national income. Although extreme poverty has declined over time, it remained a pervasive challenge: one-fifth of the 65+ population still lived below half the relative poverty line in 2020.

Using an ordered dependent variable capturing the elderly's "degree of poverty," ranging from extreme poverty to being not at risk, the analysis identified three central determinants of living standards: household composition, housing tenure, and employment. Household arrangements—which represent the structure of intergenerational resource sharing—proved especially influential. Relative to the elderly living alone, those living with a spouse were 1.38 times, those living with their children 2.12 times, and those co-residing with children and extended family 3.10 times more likely to attain higher living standards. These results are fully consistent with previous findings (Ku & Kim, 2020; Ha, 2021; Ku et al., 2021), confirming that intergenerational co-residence remains a crucial buffer against old-age poverty. Housing status also exerted a strong effect. Compared to homeowners, elderly individuals in rental housing—particularly under *jeonse* and *wolse* contracts—were significantly more likely to experience lower living standards. Those living in *jeonse* rentals were only 0.61 times as likely as homeowners to see improvements in their poverty category. These results align with Cho and Seo (2019), who similarly documented heightened poverty risks among elderly renters. Considering that housing is seldom treated as a central variable in analyses of elderly poverty in Korea, the findings demonstrate that housing conditions need to be fully incorporated into future research and policy debates.

[6] The extended versions of the tables presented in *Section 4* are available on request.

Employment played a substantial role in alleviating poverty: working individuals aged 65 and older were 1.43 times more likely to move into a better poverty category than their non-working peers. This supports existing literature showing that continued employment helps mitigate old-age poverty (Yang, 2011; Lee & Lee, 2023; Statistics Korea, 2023d), though contrary to Yang's findings, the present study found no major gender disparities. Women benefited from employment nearly as much as men, though the magnitude of the effects for women was slightly lower.

Public transfers, by contrast, had no significant impact. While small increases in private and corporate pension income (100,000 KRW) modestly increased the odds of belonging to a higher living-standard group by about 1 percentage point, the National Pension Scheme—the backbone of old-age income security—showed no significant poverty-reducing effect. More than half (51.28%) of its recipients remained poor, compared to 54.90% among non-recipients, suggesting that even receipt of National Pension does not meaningfully change the poverty status of older Koreans. This reflects deep structural issues in the pension system's design. Similarly, although previous studies have argued that the Basic Pension improved consumption and supported the poorest elderly, evidence about its success in lifting recipients out of poverty is mixed (Shin & Do, 2015; UN ESCAP, 2015; Lee et al., 2019; Kang, Park & Ahn, 2022; Lee, 2022; Ahn et al., 2023). The present analysis contributes to this debate by showing that the Basic Pension had no statistically significant effect on poverty alleviation in the observed sample.

While the study's strengths include its nationwide representativeness, long time span, and extensive set of socioeconomic variables, certain limitations must be acknowledged. First, poverty is measured only in monetary terms, even though elderly deprivation is increasingly conceptualized as multidimensional. Aspects such as access to long-term care or health services may therefore not be fully captured. Second, the KLoSA dataset lacks complete lifetime employment histories, making it impossible to account for factors such as early retirement and re-employment patterns, which previous research has identified as central to poverty trajectories among older adults (Yang, 2011; NPS, 2014; 2023; OECD, 2018a; 2018b; 2018c; 2022b; Schauer, 2018; Hwang et al., 2022; Lee & Lee, 2023).

Despite these limitations, the empirical findings point clearly to the central drivers of elderly poverty in Korea: household composition, housing conditions, and employment opportunities. The sharp contrast in poverty outcomes between those co-residing with adult children and those living alone underscores the continuing importance of intergenerational transfers within the household. Yet, due to ongoing cultural shifts and the growing preference

for independent living, policies to encourage co-residence are unlikely to be feasible or desirable.

Housing, however, is a domain in which targeted interventions are more straightforward. Because elderly renters—particularly those in *wolse* and *jeonse* arrangements—face disproportionately high poverty risks, expanding housing subsidies, rental support, and homeownership assistance could be highly effective. Enhancing the housing component of the National Basic Livelihood Security scheme and promoting affordable homeownership among younger generations could also prevent future widespread poverty among today's workers.

Expanding employment opportunities for older adults is another crucial policy direction. Creating additional jobs, improving working conditions, and strengthening programs such as the Senior Employment and Social Activity Support Program (KORDI, 2022), whose current 2027 target of reaching 10% of the elderly population (MOHW, 2023b) may be insufficient in an ageing society, are all essential steps. Further measures include expanding lifelong learning—particularly digital skills training (see e.g., Chung & Lee, 2022; Lee et al., 2022 for the importance of IT skills for the elderly)—, reducing labour-market dualism between regular and non-regular workers, phasing out mandatory early retirement, and reforming seniority-based wage systems in favour of performance- and skill-based pay. Raising the statutory retirement age would also help align labour-market structures with Korea's increasing life expectancy.

Finally, the study underscores the urgent need for structural reform of the social security system. Given that neither the National Pension nor the Basic Pension had significant poverty-alleviating effects in the empirical analysis, policymakers must address the gaps in coverage and inadequacy of benefit levels. For future retirees, extending National Pension coverage, increasing contribution rates—which are among the lowest in the OECD (OECD, 2023)—and requiring contributions until statutory retirement age are necessary to prevent widespread poverty and to avoid depletion of the Pension Fund, which is projected to run out by 2055 (MOHW, 2023a). For current elderly who lack National Pension benefits, expanded social assistance and increased Basic Pension amounts should be considered. The relative effectiveness of corporate and private pensions further suggests the need for incentives to increase participation in supplementary pension schemes.

In sum, old-age poverty in Korea is a multidimensional challenge requiring coordinated action by the state, families, and society. Effective policy must focus on the root causes identified in this study: the erosion of intergenerational support structures, growing housing insecurity, weak labour-market integration of older workers, and longstanding structural

deficiencies in the country's pension system. Addressing these interconnected issues is essential to ensuring economic security and dignity for Korea's rapidly growing elderly population.

CRediT authorship contribution statement

Gianna Claudia Giannelli: Writing – review & editing, Validation, Supervision, Conceptualization. **Tamara Hegyi:** Writing – review & editing, Writing – original draft, Software, Methodology, Investigation, Econometric Analysis, Data curation, Conceptualization.

Data availability / Data statement

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Appendix A.

Table A1. Potential Causes and Consequences of Elderly Poverty in South Korea

CAUSES	CONSEQUENCES
CHANGING NUCLEAR FAMILY STRUCTURE **Disintegration of the multigenerational household** • Traditional norms and views are changing. The share of individuals aged 15+ believing that supporting old-age parents is the sole responsibility of family members decreased from 70.7% in 2002 to 22% by 2020 (Statistics Korea in Kang, Park & Cho, 2022). • More and more elderly live apart from their children—the share of elderly living apart from their children almost doubled between 1996 and 2014 (Ku & Kim, 2020) and reached 72% in 2017 (Chung, 2018). • The number of one-person elderly households is on the rise—in 2023, 37.8% of all elderly households was a one-person household (Statistics Korea, 2024a).	Not living together with their children, and especially living alone, increases the elderly's chances of falling into poverty (Ku & Kim, 2020; Ha, 2021). The decrease in the number of multigenerational households also leads to elevated income inequality (Ku et al., 2021) as well as to higher consumption inequality (Kim & Lee, 2025) among the elderly.
Private transfers • Exact changes in private transfers are quite difficult to measure but they most likely experienced the biggest drop at the beginning of the 2000s and stabilized afterwards. Today private transfers give a lower share of the elderly's income than they did in the past and a big part of that decrease happened in the early 2000s (e.g., Ham & Song, 2014; Chung, 2018; Kim & Mah, 2021). Between 2006–2018 the amount of financial assistance children gave to their parents actually increased (Gurín & Brandt, 2024). • In that same period the ratio of elderly receiving support stayed relatively stable (Gurín & Brandt, 2024). However, the exact value of that ratio is unclear, ranging from 10% to 60% in case of regular support and from 50% to 90% in case of occasional support (Chung, 2018; Gurín & Brandt, 2024). • Private transfers are the most prevalent in high-income multigenerational households (Kim & Lee, 2025).	Private transfers have a poverty alleviating role (Kim & Cook, 2011; Ha, 2021) and can decrease income inequality among the elderly (Kim & Cook, 2011). Therefore, we might say that negative trends in private transfers from children to parents can cause a deterioration in the level of poverty the elderly live in. However, nowadays, private transfers might not affect the old-age population as much as they used to. Ku et al. (2021) found that declining private transfers were a bigger contributor to poverty and inequality between 1996–2010 than between 2010–2016. Currently the change in household composition is a more substantial issue than the decline in private transfers.
HOUSING **Homeownership vs rental** • The elderly living in a home owned by them or in different rental types (*jeonse* and *wolse*).	The mechanism through which it affects elderly poverty in Korea is not clear, further research is needed.
PENSIONS AND BENEFITS **National Pension Scheme** • The Pension Scheme was established in 1988 (NPS, 2014), relatively late for a country with Korea's current level of development, and was also quite slow to expand, reaching full coverage of all working individuals only in 2006 (NPS, 2014). As a result, many of today's elderly either could not join it while working or contributed only briefly, resulting in low or no pension benefits. (To be eligible for partial pension 10 years of paid contributions are needed, for full pension the requirement is 20 years (NPS, 2014; ISSA 2022).) In 2022, only 58.38% of the 65+ age cohort was recipient of National Pension (NPS, 2023). • The low payout rate lowers the income of the elderly. On average, the amount beneficiaries receive equals 35.8% of the	Although it is the core of the country's old-age welfare system, the National Pension Scheme is not as often studied in relation to elderly poverty as the Basic Pension—understandably, since the Basic Pension is the welfare program that targets specifically the impoverished elderly and so whether it achieves its intended aims is of great importance. In case of the National Pension what can be said is that following its 1999 expansion, when elderly parents enrolled in the Pension System children tended to decrease the private transfers given to their parents (Jung et al., 2015). Moreover, between 1988–2010 the scheme further exacerbated income inequalities (Hwang, 2016).

average wage (net replacement rate), which is significantly lower than the OECD average of 60.6% for women and 61.4% for men (OECD, 2024d). • A possible problem for present and future retirees is that the current eligibility age of 63 is expected to further increase to 65 years by 2033 (NPS, 2014; UN ESCAP, 2015), even though mandatory contributions stop at the age of 60 (NPS, 2014). Therefore, there is a period of time in which people might still be working but not make any contributions to the Pension Fund, causing their actual years of employment not to match their years of contribution (Hwang et al., 2022) and thus receive a lower amount of pension compared to what they would be entitled to. (There exists the possibility to stay voluntarily insured after the age of 60 (NPS, 2014), but, as it is discussed under 'Labour market', people often struggle to stay employed in the later stages of their careers.)	Yet, at the same time, Ha (2024) found that in 2006–2018 the National Pension had the biggest poverty-alleviating effect out of all the various public transfers, though its "poverty reduction efficiency" showed a decline over the observed period. Similarly, Ku and Kim (2020) state that in 1996–2014 public transfers had a poverty-reducing effect but they also note that the public transfer income of the elderly did not increase at an appropriate rate over the years. If it had expanded at the rate the income of younger age groups did, the elderly poverty rate would be substantially lower now.
Basic Pension • Introduced to provide a minimum standard of living to the poor elderly (OECD, 2022a), in 2022, the Basic Pension covered 67.5% of the total elderly population (NPS, 2023). • The maximum benefit amount is only 7.8% of average earnings (UN ESCAP, 2015; OECD, 2022a).	Results on the crowding-out effect of the Basic Pension are mixed. Some studies say that it has led to the decrease intergenerational financial support since its introduction in 2008 (Koh & Yang, 2021; An & Ahn, 2024), whereas others say that the effect is present only since 2018 (Lee, 2022) or not at all (Lee et al., 2019). In its early stages, Basic Pension did not achieve the desired effects when the poverty level of elderly households increased considerably alongside the Gini coefficient, indicating higher income inequality as well (UN ESCAP, 2015). However, especially since the 2014 reform, Basic Pension seems to have a particularly strong positive effect on extreme poverty (Lee, 2022). Many studies indicate that the elderly use the income they receive from the Basic Pension Scheme to meet their basic needs, and it helps lessen their financial burdens in the case of essential goods and services, such as heating, utilities and food (Shin & Do, 2015; Lee et al., 2019; Kang, Park & Ahn, 2022; Ahn et al., 2023). Based on the findings of these studies, it appears that, so far, the Basic Pension has been successful in increasing the elderly's living standards even though it might not have necessarily lifted them out of poverty.
LABOUR MARKET	
Seniority wage system and early retirement • Because of the seniority-based wage system, as employees get older often large gaps between their pay and productivity arise which incentivizes firms to force their workers to retire already in their 50s (Lazear, 1979; van Ours & Stoeldraijer, 2010; Kang, Park & Cho, 2022; OECD, 2024e). In 2024, on average, men left their longest working job at the age of 51.3 and women at an even younger age at 47.7 years old (Statistics Korea, 2024b). • Even though the abolition of a legislation that allowed companies to set a retirement age lower than the statutory one (which in itself was a problem) became applicable to all workplaces in 2017 (Jang, 2017; OECD, 2022a; 2024e; Lee & Lee, 2023), many companies still push their employees into 'honorary retirement' before they reach the statutory retirement age of 60 (OECD, 2018a; 2024e). • Many of the early retirees can find re-employment only in low-quality, low-skilled and low-paid jobs (OECD, 2018a; 2018b; Lee & Lee, 2023). In 2023, only two thirds of those forced into early retirement managed to get a new job and those were "mostly poor quality, insecure and low-paid jobs with limited pension contributions" (OECD, 2024e).	In the current system people are often required to give up their primary job at a younger age and find lower quality re-employment. It can be argued that the seniority-based wage system causes many middle-aged Koreans to face income insecurity because early retirement affects both their current (not having a job or finding new employment in low-skilled low-paid jobs) and future incomes (no or small pension payouts due to not adequate pension coverage because of not having a job or working in irregular employment after being let go from their primary job).
Labour market duality • There is high level labour market duality between regular and non-regular workers as well as between large companies and SMEs. The primary market consists of large enterprises that employ regular workers who enjoy higher wages, job security with proper labour market regulations in place and certain pension coverage	The high prevalence of the secondary market is detrimental to old-age poverty. Apart from the problems this causes while they are still in employment, lower wages prevent non-regular workers from properly preparing for retirement. Non-regular workers having lower

(NPS, 2014; Schauer, 2018; Hwang et al., 2022; OECD, 2022b). The secondary market, however, is made up of SMEs where non-regular workers have lower wages and are faced with job insecurity (NPS, 2014; Schauer, 2018; Hwang et al., 2022; OECD, 2022b). • This labour market duality sets many people on the path of poverty already during their working years as those in precarious working conditions have lower earnings and are not adequately covered by the pension system (NPS, 2014; 2023; OECD, 2018c; 2022b; Schauer, 2018; Hwang et al., 2022). • In 2023, regular workers accounted for only 46% of the labour force, whereas the share of temporary and daily workers was 16%; the self-employment rate stood at 19% and independent workers amounted to 19% as well (Statistics Korea, 2024c). Irregular workers gave a quarter (26%) of salaried workers (Statistics Korea, 2024c).	earnings means that these workers' contributions to the Pension Fund are quite low, which translates to low payouts in old age. A further problem is that irregular workers are covered by the National Pension Scheme only if they meet certain conditions in terms of working hours and employment duration (NPS, 2023). In 2016, for instance, only 56.7% of non-regular workers were insured by the National Pension Scheme, whereas the rate among regular workers was 98.2% (OECD, 2018c). Therefore, non-regular employment poses a serious risk to the middle-aged population who might, because of their previous employment status, fall into poverty when they retire.
Elderly employment • With 40% Korea had the highest elderly labour force participation rate among high-income nations in 2024 (ILO, 2024b; Statistics Korea, 2024d). The participation rate among men was 49%, whereas it stood at 33.2% among women (Statistics Korea, 2024d). The oldest elderly are quite strongly affected as well, 26.6% of the 75+ age cohort was in employment in 2024 (Statistics Korea, 2024d). • The duality of the labour market affects the elderly too as most of them become non-regular workers for little pay (Chung, 2018; Lee & Lee, 2023). • In 2017, 40.1% of the elderly was employed in low-skill jobs and a third of the 65+ population worked in the agriculture, forestry and fishing industries (Chung, 2018). Only 5.6% of the elderly had full-time jobs, the rest were temporary workers or self-employed with 12% of the elderly being unpaid family workers (Chung, 2018). • Elderly workers are likely to work in low-skilled jobs because they do not receive on-the-job education and training to improve their skills (OECD, 2022a), which then lags behind especially in the domain of information technologies (Chung & Lee, 2022). Additionally, long working hours are required by many full-time high-skill jobs that the elderly might not be able to undertake and the employers are unwilling to employ older workers as they are likely to suddenly quit because of worsening health (Jang, 2017).	Even though the earnings of the elderly tend to be on the lower side (Chung, 2018; OECD, 2022a), in 2021, almost all of the working elderly (93%) were able to pay for their living expenses themselves and did not have to rely on their children or governmental and social support, whereas this statement applied to only 52% of the non-working elderly (Statistics Korea, 2023d). The literature on this topic is scarce, but it seems that remaining in the workforce in old age has a poverty-alleviating effect (Yang, 2011; Lee & Lee, 2023).

Source: Authors' own elaboration based on the established literature

Table A2. Relative poverty [Odds ratios]

	Coefficients	Standard errors
INDIVIDUAL CHARACTERISTICS		
Age		
Age	1.069***	(0.006)
Marital status		
Married	1.000	(.)
Widowed	0.470***	(0.060)
Not married	1.780	(0.880)
Physical health		
Very bad	1.000	(.)
Bad	1.105	(0.095)
Fair	1.087	(0.101)
Good	0.987	(0.105)
Very good	0.773	(0.181)
Depression		
No depression	1.000	(.)
1-2 symptoms	1.144***	(0.059)
3-6 symptoms	1.081	(0.075)
7-10 symptoms	0.947	(0.092)
NUCLEAR FAMILY STRUCTURE		
Household size		
Number of household members	1.143***	(0.051)
Household composition		
Elderly living alone	1.000	(.)
Elderly couple	0.686***	(0.078)
Elderly living with children only	0.445***	(0.056)
Elderly living with children and grandchildren/parents/both	0.303***	(0.055)
Elderly living with parents	0.674	(0.210)
Elderly living with grandchildren	0.883	(0.207)
Elderly living with siblings	0.707	(0.199)
Other	0.264***	(0.133)
Children		
The number of alive children	0.920	(0.092)
Private transfers from children		
In last year, the total amount of financial support from children (unit: 10,000 KRW)	1.000***	(0.000)
HOUSING		
Own home (home owned by R or R's relative)	1.000	(.)
Deposit-based rental home without monthly rent (i.e., *jeonse*)	1.711***	(0.187)
Monthly rental home with a deposit (i.e., *jeonwolse*)	1.165	(0.171)
Monthly rental home without a deposit (i.e., *wolse*)	2.300***	(0.721)
Others	1.506*	(0.318)
PENSIONS AND BENEFITS		
Private pension		
In last year, the total amount of Private Pension Benefit (unit: 10,000 KRW)	0.999***	(0.000)
National Pension		
In last year, the total amount of National Pension Benefit (unit: 10,000 KRW)	1.000*	(0.000)
Corporate pension		
In last year, the total amount of Specific Corporate Pension Benefit (unit: 10,000 KRW)	0.999***	(0.000)
Basic Livelihood Benefit		
In last year, the total amount of National Basic Livelihood Security Benefit (unit: 10,000	1.001***	(0.000)

KRW)		
EMPLOYMENT AND EARNINGS		
Employment		
No, currently not working	1.000	(.)
Yes, currently working	0.748***	(0.060)
Earned income		
In last year, the total amount of earned income (unit: 10,000 KRW)	0.999***	(0.000)
PROVINCES		
Seoul	1.000	(.)
Busan	0.493	(0.488)
Daegu	1.660	(1.500)
Incheon	1.654	(0.858)
Gwangju	0.449	(0.509)
Daejeon	1.25e+07	(1.19e+10)
Ulsan	0.092**	(0.111)
Sejong	9.403*	(11.268)
Gyeonggi	1.020	(0.265)
Gangwon	10.195**	(9.577)
Chungcheongbuk	3.687	(3.619)
Chungcheongnam	1.756	(1.030)
Jeollabuk	3.446	(3.547)
Jeollanam	0.914	(0.650)
Gyeongsangbuk	5.722**	(3.893)
Gyeongsangnam	1.791	(2.703)
Observations	16225	

Notes: Exponentiated coefficients. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A3. Degree of poverty [Odds ratios]

	Coefficients	Robust standard errors
INDIVIDUAL CHARACTERISTICS		
Age		
Age	0.970***	(0.005)
Marital status		
Married	1.000	(.)
Widowed	1.805***	(0.240)
Not married	0.672	(0.287)
Physical health		
Very bad	1.000	(.)
Bad	0.954	(0.064)
Fair	0.997	(0.074)
Good	1.147	(0.100)
Very good	1.508**	(0.300)
Depression		
No depression	1.000	(.)
1-2 symptoms	0.889***	(0.039)
3-6 symptoms	0.947	(0.055)
7-10 symptoms	1.021	(0.081)
NUCLEAR FAMILY STRUCTURE		
Household size		
Number of household members	0.857***	(0.038)
Household composition		
Elderly living alone	1.000	(.)
Elderly couple	1.382***	(0.157)
Elderly living with children only	2.122***	(0.264)
Elderly living with children and grandchildren/parents/both	3.102***	(0.540)
Elderly living with parents	1.499	(0.416)
Elderly living with grandchildren	0.948	(0.208)
Elderly living with siblings	1.248	(0.268)
Other	2.938*	(1.669)
Children		
The number of alive children	1.035	(0.077)
Private transfers from children		
In last year, the total amount of financial support from children (unit: 10,000 KRW)	1.000	(0.000)
HOUSING		
Own home (home owned by R or R's relative)	1.000	(.)
Deposit-based rental home without monthly rent (i.e., *jeonse*)	0.610***	(0.067)
Monthly rental home with a deposit (i.e., *jeonwolse*)	0.803*	(0.107)
Monthly rental home without a deposit (i.e., *wolse*)	0.597**	(0.144)
Others	0.651**	(0.122)
PENSIONS AND BENEFITS		
Private pension		
In last year, the total amount of Private Pension Benefit (unit: 10,000 KRW)	1.001**	(0.000)
National pension		
In last year, the total amount of National Pension Benefit (unit: 10,000 KRW)	1.000	(0.000)
Corporate pension		
In last year, the total amount of Specific Corporate Pension Benefit (unit: 10,000 KRW)	1.001***	(0.000)
Basic Livelihood Benefits		
In last year, the total amount of National Basic	1.000	(0.000)

Livelihood Security Benefit (unit: 10,000 KRW)		
EMPLOYMENT AND EARNINGS		
Employment		
No, currently not working	1.000	(.)
Yes, currently working	1.430***	(0.113)
Earned income		
In last year, the total amount of earned income (unit: 10,000 KRW)	1.001***	(0.000)
PROVINCES		
Seoul	1.000	(.)
Busan	1.347	(1.294)
Daegu	1.137	(0.738)
Incheon	0.593	(0.351)
Gwangju	2.254	(2.301)
Daejeon	0.061*	(0.089)
Ulsan	2.479	(3.067)
Sejong	0.188*	(0.185)
Gyeonggi	0.971	(0.261)
Gangwon	0.147**	(0.126)
Chungcheongbuk	0.805	(0.596)
Chungcheongnam	0.685	(0.422)
Jeollabuk	0.352	(0.459)
Jeollanam	1.092	(0.885)
Gyeongsangbuk	0.147***	(0.055)
Gyeongsangnam	0.889	(0.975)
Observations	23973	

Notes: (1) Poverty index coded from 1 (extreme poverty) to 4 (no risk of poverty). (2) Exponentiated coefficients.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix B.

Measuring poverty

Median incomes and poverty lines are reported in Table 2 for each year of observation. As discussed previously (*Section 1*), the poverty line is set at 50% of the national median disposable income, which is composed of earned income, real estate income, financial income, and public and private transfer incomes net of taxes and other non-consumption expenditures. This definition of disposable income follows the practice of other studies conducted on Korea (e.g., Ha, 2021; An & Ahn, 2024) as well as the practice of the country's statistical office, Statistics Korea (e.g., Statistics Korea, 2024e). Furthermore, to consider possible economies of scale among family members, we use household disposable income and apply the square root equivalence scale to obtain individual income.

Table B1. Equivalised disposable household income and poverty line in Korean Won

Year	Korean nationwide median income	Elderly mean income	Elderly median income	**Poverty line**
2006	1,452	713	360	**726**
2008	1,679	975	707	**840**
2010	1,697	1,030	800	**849**
2012	1,910	1,186	849	**955**
2014	2,056	1,205	894	**1,028**
2016	2,238	1,285	1,000	**1,119**
2018	2,202	1,444	1,073	**1,101**
2020	2,400	1,521	1,080	**1,200**

Notes: (1) Yearly amounts [unit: 10,000 KRW]. (2) Column 2: Korean median income from KLIPS dataset, Col.3: mean of elderly income from KLoSA dataset, Col.4: median of elderly income from KLoSA dataset, Col.5: poverty line as 50% of the median income from the KLIPS dataset.

As can be seen in the table, the median income of the elderly is consistently below both the national median and elderly mean income. This shows significant income inequality among the elderly, with most living on small incomes while a few receive much higher amounts. Even more worrying is that the elderly's median income is well below the poverty line, indicating that more than half of the elderly live in poverty. Indeed, our data show that during the observation period, on average, 53.80% of the elderly lived in poverty and 68.63% of the elderly were poor at some point in time.

However, different papers and statistics report vastly different elderly poverty rates for Korea (e.g., UN ESCAP, 2015; Hwang, 2016; Ku & Kim, 2020; Lee & Lee, 2023; Byun, 2024). The

official OECD data for 2020 are 40.50% (OECD, 2024a) and Statistics Korea reports 38.90% for the same year (Statistics Korea, 2021a), whereas our data show that, in 2020, 52.70% of the Korean elderly lived in poverty. In fact, our measurements consistently overestimate the figures of those institutions throughout the whole observation period of 2006–2020.

The explanation for this discrepancy might lie in the design of the study. It uses the original KLoSA sample of 2006 and applies an age restriction of 65 and older. Therefore, even though new individuals enter the study's selected sample in every wave (when they reach the age of 65), many of the respondents in the sample are present since the first wave. This means that the mean age of the sample is increasing year by year: it was 73 in 2006, which rose to 76 by 2020, and the share of individuals aged 75+ increased from 35.57% to 53.50%. This is important because in Korea people over the age of 75 are more likely to be poor (Ku & Kim, 2020; Ha, 2021; MOHW, 2024) and accordingly we find poverty rates that exceed the official figures.

Another possible explanation is that, given that we use panel data, we follow the same individuals over time. However, as it has been established by the literature (Kim & Shin, 2014; Kang, 2015), exiting poverty can be extremely difficult. Hence, in this study, those who fall into poverty are likely to remain poor throughout the observation period—this is shown by the fact that over 15 years only 14.8% of the initially poor managed to escape poverty—which may result in higher poverty rates than those found in cross-sectional studies.

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