

Original Article

Decomposition Analyses of the Trend in Poverty Among Older Adults: The Case of South Korea

Inhoe Ku, PhD¹ and Chang-O Kim, MD, MSW^{1,2}

¹Department of Social Welfare, Seoul National University, Seoul, Republic of Korea. ²Institute of Social Welfare, SungKongHoe University, Seoul, Republic of Korea.

Address correspondence to Inhoe Ku, PhD, Department of Social Welfare, Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul 08826, Republic of Korea. E-mail: inhoeku@snu.ac.kr.

Received: August 31, 2017; Editorial Decision Date: April 6, 2018

Decision Editor: J. Scott Brown, PhD.

Abstract

Objectives: We examine the sharp increase in poverty among older adults since the mid-1990s in South Korea.

Method: We apply decomposition analyses to quantify the contributions of demographic and household characteristics, as well as income sources, to the rise in poverty among older adults.

Results: A rapid increase in the number of older adults living independently, combined with an increase in the number of old older adults, largely explains the rising poverty rate among Korean older adults. At the same time, market incomes and private transfers are no longer dominant sources of income for older adults. Gradually rising public transfer incomes offset most of the decline in market and private transfer incomes. Public transfer could not counteract the formidable consequences of changing living arrangements and other changes related to a rapidly aging population.

Discussion: The Korean experience shows what would have happened to older adults in rich welfare states if mature old-age income security programs had not been in place. It may also provide some lessons for lower-income countries where poverty among older adults is set to become a larger problem in the coming decades.

Keywords: Living arrangements, Old-age pension, Poverty, Sources of income

One of the most striking trends in the well-being of older adults in the West in the last several decades has been the dramatic decline in poverty. The expansion of public pension benefits has contributed significantly in this regard (Engelhardt & Gruber, 2006; Hurd, 1990). The vast majority of older adults who receive public pension benefits are now not poor (Smeeding, Gao, Saunders, & Wing, 2008). Naturally, concerns about the well-being of older adults surface when reforms to public pension programs and potential benefit reductions are introduced (Been, Caminada, Goudswaard, & van Vliet, 2017).

Meanwhile, middle- and low-income countries struggle to adequately address the challenge of poverty among older adults. While a comparable measure of poverty among older adults is not readily available, evidence shows

that older adults are among the most vulnerable population subgroups (Barrientos, Gorman, & Heslop, 2003; Gasparini, Alejo, Haimovich, Oliveri, & Tornarolli, 2010; Kakwani & Subbarao, 2008). It has also been suggested that poverty among older adults is rising, and will become a larger problem in the coming decades (Barrientos et al., 2003; Smeeding et al., 2008).

The case of South Korea (hereafter Korea) presents a clear example of the growing problem of poverty among older adults. It has worsened rapidly in the last two decades. The poverty rate, based on a threshold of half of the median income, reached 48.1% in 2013 in Korea. This is extremely high compared to the poverty rate of 14.6% for the entire population of Korea and the average poverty rate of 13% for older adults among OECD member countries

(OECD, 2017). The Korean case contradicts a once popular view that an increase in the number of older adults leads to higher public spending on the aged, thereby reducing poverty among them (Preston, 1984; for a counterargument, see Brady, 2004). In reality, poverty among older adults is likely to grow among middle- and low-income countries faced with a rapidly aging population.

This study decomposes changes in poverty among older adults into contributions of related factors for the case of Korea. Previous studies in high-income countries have focused on the role of public pension benefits (Been et al., 2016; Engelhardt & Gruber, 2006). We broaden the understanding of poverty among older adults by examining the contributions made by demographic and household characteristics. We are especially interested in the contribution of changes in living arrangements, given the rapid rise in the number of older adults living independently in Korea and other lower-income countries (Knodel & Ofstedal, 2002; Smeeding et al., 2008). In addition, we evaluate the contributions of changes in major income components.

Conceptual Framework for Understanding Poverty Among Older Adults

Historically, expanding public pension benefits has increased the incomes of older adults (Engelhardt & Gruber, 2006). In many rich countries, older adults have become less vulnerable to poverty compared to children and adults of working age (Marchand & Smeeding, 2016). In most middle- and low-income countries, privileged groups among older adults have adequate levels of public pension benefits while the majority do not (Smeeding et al., 2008). Public assistance benefits for the poor may also serve as an important source of income given that older adults frequently face a high risk of poverty. With benefits at a modest level, public benefit programs may have a limited effect on poverty among older adults in middle- and low-income countries.

Instead, market incomes, including labor earnings and incomes from property, of older adults and private transfers from their family members living elsewhere constitute a significant portion of the older person's income. Those private incomes may affect their poverty. Demographic characteristics are often underlying factors associated with the economic status of older adults. Old or female older adults and those with low education are at a higher risk of poverty (Gasparini et al., 2010; Kakwani & Subbarao, 2008; Smeeding et al., 2008; Tai & Treas, 2009).

Given that older adults often earn modest private incomes by themselves, living arrangements may be a critical factor affecting their poverty status. Multi-generational extended families living together represent a form of private pension arrangement, whereby market incomes of young family members can be shared with older adults (Smeeding et al., 2008). In the arrangement, there are many family public goods, such as household space and

furniture, which household members including older adults consume collectively. Many goods including foods are pooled and consumed together (Deaton & Paxson, 1997). Furthermore, coresident adult children may transfer income to older adults to be spent on individual consumption (Chou, 2010). Thus, living together with adult-children has been a primary way by which older adults raise their living standard (Smeeding et al., 2008).

Coresidence of older parents with adult children declined substantially in many middle- and low-income countries (Knodel & Ofstedal, 2002; Silverstein, Cong, & Li, 2006; Smeeding et al., 2008). We expect that the decline of inter-generational coresidence may have a substantial explanatory power in accounting for the rise in poverty among older adults. However, prior research on the shift in living arrangements of the aged has implied a view to the contrary. It interprets the decline of coresidence in the United States as a result of the rising income of older adults partly due to the introduction of Social Security (Engelhardt, Gruber, & Perry, 2005; Michael, Fuchs, & Scott, 1980). This "affluence hypothesis" suggests the decline does not lead to the rise in poverty among older adults. However, recent research shows that the decline of coresidence results from increasing opportunities for the younger generation, rather than from the growing affluence of the aged. Many young people left their aged parents for high wages of urbanized areas, suggesting the possibility that older adults living alone may be left without adequate economic means (Ruggles, 2007). This is more consistent with the fact that older adults living alone face a high risk of poverty in many middle- and low-income countries.

The Korean literature shows that public transfer incomes have not played a significant role in reducing poverty among older adults (H. Kim, 2008, 2014). A public assistance program, named the National Basic Livelihood Security, has provided a benefit for at most 8% of older adults since 2000. The National Pension Scheme, a main public pension program of social insurance type, was introduced in 1988 but the only 32.3% among older adults received benefits in 2013. Since 2008, a tax-financed, non-contributory pension program, currently called the Basic Pension Scheme, has been providing a modest level of benefit for 70% of older adults with low income. Despite of all these recent improvements, public programs deliver benefits at a modest level with a limited effect on poverty among older adults.

The literature suggests other factors related to the trend in poverty among Korean older adults. Population aging is a widely perceived suspect, as reflected in the high poverty among old older persons. The proportion of those aged 65 or older increased at an unprecedented pace from 5.9% in 1995 to 12.8% in 2015 and are expected to increase to 32.8% in 2040 (Statistics Korea, 2017). On the other hand, improved education may help to increase income and reduce poverty. The percentage of older adults with no schooling decreased from 42.6% in 1995 to 13.4% in

2015 due to the dramatic educational expansion started in the late 1940s (Statistics Korea, 2016). However, it is also possible that educational improvement at such a low level is not an effective tool against poverty.

Coresidence with adult children and financial support from non-coresident children have been two forms of traditional family support for older people. According to the census, the percentage of older adults living independently grew from 36.8% in 1995 to 58.2% in 2015 in Korea (Statistics Korea, 2016). In addition, private transfer incomes from adult-children decreased in its size (Yeo, Kim, Kwon, Choi, & Choi, 2012). Industrialization and urbanization are often cited as contributors to the decline in the family support. Recently, changes in attitude toward support for older people have been noticeable. The share of citizens responding that families should support older adults decreased from 89.9% in 1998 to 31.7% in 2014 (E. Kim, Lee, Choi, Kim, & Lim, 2015).

In sum, the literature suggests that shifts in living arrangements may be a critical factor in explaining trends in poverty among older adults in middle- and low-income countries including Korea. If an increase in the number of old or female older adults due to rising life expectancy is accompanied by changing patterns in living arrangements, older adults may be subjected to high and increasing risks of poverty.

Method

Data

We use data from two nationally representative surveys conducted by the Statistics Korea: the 1996 National Survey of Family Income and Expenditure (NSFIE) and the 2014 Household Income and Expenditure Survey (HIES). The 1996 NSFIE contains detailed information on the income of each surveyed household for a year preceding the Asian economic crisis in the late 1990s. The second dataset, HIES, has accumulated information on household income and expenditure across the country since 2006. The 2014 HIES provides information on the incomes of households for a year when the Korean economy recovered from the 2008 financial crisis. The NSFIE and the HIES have proved helpful when consistently analyzing long-term trends in poverty (N. N. Kim & Kim, 2013). The sampling weights were applied to account for differential probabilities of sample selection and nonresponse.

Analytical Methods

We examine poverty among older adults by using a relative measure. We define an older adult as an individual aged 60 or older. An older person is classified as poor if his or her income is less than 50% of the median disposable income. Considering both income and wealth may be better to assess poverty (Gornick, Sierminska, & Smeeding, 2009).

Yet, information on asset holding is not available in our data. We adjust household income with an equivalence scale of a square-root-of-household-size. Here, we follow a generally adopted assumption that resources are equally allocated between family members including older adults (Deaton & Paxson, 1997).

We apply two different decomposition methods. First, we use an Oaxaca-Binder (O-B) decomposition method to quantify the contributions of changes in characteristics of older persons. We apply linear probability models to estimate the effects of characteristics on poverty status. Estimates from linear probability models approximate relatively well the nonlinear effect on dichotomous outcomes and are easy to interpret (Angrist & Pischke, 2008). The poverty status of older adults is regressed on a set of characteristics for each year as follows:

$$y_{14} = \beta_{14,0} + \sum_{k=1}^M \beta_{14,k} x_{14,k} + \varepsilon_{14}$$

$$y_{96} = \beta_{96,0} + \sum_{k=1}^M \beta_{96,k} x_{96,k} + \varepsilon_{96}$$

where y_{14} and y_{96} denote a poverty status for the years of 2014 and 1996, respectively, $x_{14,k}$ and $x_{96,k}$ denote a k th characteristic for each year, $\beta_{14,k}$ and $\beta_{96,k}$ denote a coefficient of a k th characteristic for each year, and ε_{14} and ε_{96} denote residual terms for each year.

Then, a change in poverty rates can be decomposed as follows:

$$\Delta_O^\mu = (\beta_{14,0} - \beta_{96,0}) + \sum_{k=1}^M x_{14,k} (\beta_{14,k} - \beta_{96,k}) + \sum_{k=1}^M \beta_{96,k} (x_{14,k} - x_{96,k})$$

$$= \Delta_S^\mu + \Delta_X^\mu$$

where Δ_O^μ denotes a difference in poverty rates between the two points in time, $\Delta_X^\mu = \sum_{k=1}^M \beta_{96,k} (x_{14,k} - x_{96,k})$ denotes contributions due to compositional changes in the characteristics, and $\Delta_S^\mu = (\beta_{14,0} - \beta_{96,0}) + \sum_{k=1}^M x_{14,k} (\beta_{14,k} - \beta_{96,k})$ represents contributions due to changes in the omitted group effect and the effects of the characteristics.

We now look at the role of income components in changing poverty among older adults. It may be useful to know how major income components contribute to changes in poverty. To this end, we apply a version of a budget incidence simulation method (Wang & Caminada, 2011), which simply compares poverty rates before and after the income source of interest is considered. It attributes the difference in poverty rates to the income source. We extend it to a longitudinal version, similar to that used by OECD (2008), to investigate how changes in income sources contribute to trends in poverty over time. We focus on four

major components of income: market income, private transfer income, public transfer income, and tax. We define market income as the sum of labor earnings and incomes from property. Private transfer income includes income transferred from other households and nongovernment institutions, but mainly consists of transfers from family members living apart. Public transfer income includes benefits from public pension and public assistance programs. Finally, we consider direct taxes paid.

We calculate a poverty change due to a change in each income source in a sequential order from market income through private and public transfer income to taxes. We first calculate a poverty change due to a change in market income, Δ_{mk}^{μ} , as a difference in poverty rates of market income in the beginning and the end of the examined period. In the same way, we can calculate a poverty change due to a change in primary income (defined as the sum of market income and private transfer income), Δ_{pm}^{μ} . To calculate a poverty change due to a change in private transfer income, we subtract the latter (Δ_{pm}^{μ}) from the former (Δ_{mk}^{μ}). We use the same method to calculate a poverty change due to a change in public transfer income. We subtract a poverty change due to a change in gross income (defined as the sum of market income, private transfer income, and public transfer income), Δ_{gs}^{μ} , from a poverty change due to a change in primary income, Δ_{pm}^{μ} . For an estimate of a poverty change due to a tax change, we should subtract a poverty change due to a change in gross income, Δ_{gs}^{μ} , from a change due to a change in disposable income, Δ_{dp}^{μ} .

By examining contributions of market income and private and public transfers, the analyses may show how changes in labor market, family support, and public policy influenced poverty among older adults. However, the analyses have a methodological limitation. Interactions between income sources are not considered. For example, a simple comparison between pretransfer and post-transfer poverty ignores any possible behavioral responses to public transfer such as reducing work efforts and/or crowding out private transfers (H. Kim, 2001). More generally, a change in an income component may affect other sources of income. Thus, results from our decomposition analysis should be accepted as an approximation of effects of various income sources.

On the other hand, our decomposition of a change in poverty over a relatively long period should be adjusted to reflect potential changes in compositions of the aged population. For example, let us assume that the number of old older adults who cannot work increased over a certain period of time. As a result of their decreased labor earnings, many of them may have slipped into poverty. If we do not account for the change, we would falsely attribute the resultant increase in poverty to declining work efforts on the part of older adults. To construct a counterfactual distribution that resembles the 2014 income distribution but holds characteristics of older adults equal to the 1996 data, we apply a simple reweighting method. We apply a

reweight to the sample of the comparison year (2014) to make it equal to that of the starting year (1996) in terms of living arrangements and age, gender, and educational level of older heads. The difference in the counterfactual poverty rate and the observed 2014 poverty rate is considered as the impact of the compositional change, Δ_X^{μ} . Then, a poverty change, Δ_O^{μ} , can be decomposed into contributions due to a compositional change and due to changes in income sources:

$$\Delta_O^{\mu} = \Delta_X^{\mu} + \Delta_{mk}^{\mu} + (\Delta_{pm}^{\mu} - \Delta_{mk}^{\mu}) + (\Delta_{gs}^{\mu} - \Delta_{pm}^{\mu}) + (\Delta_{dp}^{\mu} - \Delta_{gs}^{\mu})$$

where $(\Delta_{pm}^{\mu} - \Delta_{mk}^{\mu})$, $(\Delta_{gs}^{\mu} - \Delta_{pm}^{\mu})$, and $(\Delta_{dp}^{\mu} - \Delta_{gs}^{\mu})$ denote a change in poverty due to a change in private transfer, public transfer, or tax, respectively.

Results

In Korea, poverty rates among the entire population rose from 8.8% in 1996 to 13.3% in 2014. Among older adults, poverty rates grew from 28.7% to 40.8% over the same period. We find a similar trend in poverty rates, albeit at a lower level, for the urban population living in households with two or more members, which can be estimated every year since 1990 from the HIES (Supplementary Figure S1).

We then examine how income distribution among older adults changed, thereby increasing poverty rates over the examined period. In Figure 1, the solid and dashed lines depict income distributions in 1996 and 2014, respectively. The vertical lines show poverty lines for each year. Monetary values are converted to the 2014 constant price: 1,000 KRW is approximately equivalent to 1 USD. A comparison of the solid and dashed lines suggest that the number of older adults whose income was in the middle

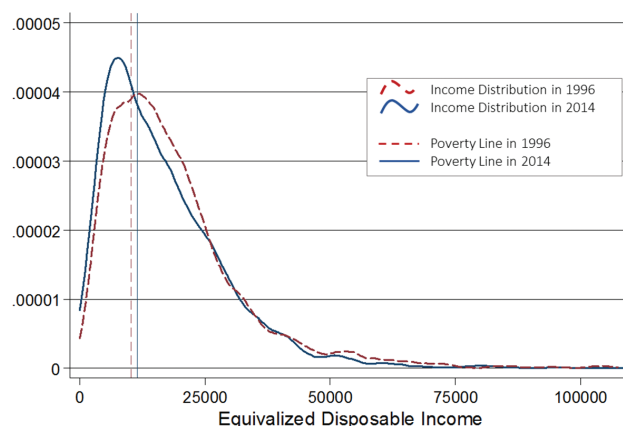


Figure 1. Change in income distribution among older adults, 1996–2014. *Note:* Number of older adults are 6,929 for 1996 and 5,318 for 2014, respectively. Kernel density estimation technique is used to smooth the income distribution. All monetary values are converted to constant 2014 thousand Korea Won using the Consumer Price Index of Korea. *Source:* 1996 National Survey of Family Income and Expenditure, 2014 Household Income and Expenditure Survey. Full color version is available within the online issue.

of the income distribution, above the dashed poverty line and below 25 million KRW, decreased substantially between 1996 and 2014. At the same time, the number of older adults in the lower part of the distribution, especially below the 1996 poverty line, increased. Rising poverty was also partly due to the upward shift in the poverty lines, driven by income growth among working-age population.

To further investigate why the middle part of the income distribution shrank, we examine descriptive statistics of older adults by household type in our sample in Table 1. We classify older adults into four groups according to living arrangements: single households; couple households; households with adult-child members; and households headed by an adult child. The percentage of older adults living independently rose from 32.8% to 61.7% while the percentage of those living with an adult-child head declined from 42.9% to 14.4%. Our data slightly overestimate the shift in living arrangements, compared to the census statistics mentioned earlier. Similarly, the percentage of older people living in households headed by those aged 75 or older increased by 15.0 percentage points. During the examined period, the proportion of older persons living in female-headed households rose by 6.9 percentage points. The changes in compositions by age and gender of heads reflect the alarmingly fast aging process in Korea. In addition, the percentage of older adults living with heads with no schooling decreased substantially while the percentage of those who were headed by primary school graduates increased.

The third and fourth columns show that poverty risks for subgroups vary considerably. Poverty rates for older people living apart from adult children remained extremely high at 57.8% in 1996 and 54.9% in 2014. Conversely, poverty rates for those living with an adult-child head were much lower at 10.5% in 1996 and 14.3% in 2014. Older persons living in households headed by old older adults or female adults fared much worse. Households headed by those with no schooling faced extremely high poverty risks over the period. Given the different poverty risks associated with each subgroup, compositional changes seem to be a main contributor to the lowering of the economic status of middle-income older adults during the examined period.

Table 2 provides results from O-B analyses to show how changes in characteristics are associated with a rise in poverty among older adults. The first panel shows that a main contributor to the rise in poverty is the compositional change in living arrangements. The increased number of older adults living independently and the decreased number of older adults living with adult-child heads were responsible for an increase in the poverty rate of 13.6 percentage points. The poverty risk of those living with adult-child heads increased while poverty risks of other subgroups decreased. Although each change in poverty risk is not significant, when these changes combined account for a reduction in the poverty rate of 1.5 percentage points.

The second panel presents results from an analysis adding age, gender, and educational level of household heads to the regression model used in the O-B decomposition

Table 1. Characteristics and Poverty Rates for Older Adults by Type of Household

	Proportion (%)		Poverty rate (%)	
	1996	2014	1996	2014
Total sample	100.0	100.0	28.7	40.8
Living arrangement				
Older adult only	32.8	61.7	57.8	54.9
Single	(13.4)	(24.7)	(72.5)	(69.7)
Couple	(19.3)	(37.0)	(47.6)	(45.0)
With adult-child member	24.3	23.9	21.5	20.4
With adult-child head	42.9	14.4	10.5	14.3
Age of head				
<75	92.5	77.5	25.1	32.0
≥75	7.5	22.5	72.1	70.9
Gender of head				
Male	73.2	66.3	19.0	32.0
Female	26.8	33.7	55.2	58.0
Education of head				
Any college	21.9	20.3	5.9	17.5
High school graduate	27.4	27.4	15.3	27.7
Primary school graduate	33.4	39.9	31.4	50.3
No schooling	17.3	12.4	73.6	77.2

Note: Number of older adults are 6,929 for 1996 and 5,318 for 2014, respectively. "Older adult only," "With adult-child member," and "With adult-child head" are households in which only older adults reside (i.e., single or couple households), households headed by older adults in which adult child members coreside, and households headed by an adult child in which older adults coreside, respectively.

Source: 1996 National Survey of Family Income and Expenditure, 2014 Household Income and Expenditure Survey.

Table 2. Oaxaca-Blinder Decomposition of the Rise in Poverty Among Older Adults, 1996–2014

	Composition effect		Structure effect		Contribution	
	Δ_x^u	95% CI	Δ_s^u	95% CI	Total	(%)
A. Living arrangement						
Older adult only	0.105	(0.094, 0.116)	−0.011	(−0.039, 0.017)	0.094	77.7
With adult–child head	0.031	(0.023, 0.039)	0.007	(−0.001, 0.015)	0.038	31.4
With adult–child member			−0.011	(−0.048, 0.026)	−0.011	−9.1
Total	0.136	(0.125, 0.147)	−0.015	(−0.034, 0.004)	0.121	100.0
B. + Age, gender and education						
Older adult only	0.068	(0.058, 0.077)	0.004	(−0.023, 0.032)	0.072	59.5
With adult–child head	0.008	(0.000, 0.015)	0.010	(0.002, 0.018)	0.018	14.9
With adult–child member			−0.013	(−0.057, 0.031)	−0.013	−10.7
Older (≥75) head	0.020	(0.014, 0.027)	0.022	(0.010, 0.034)	0.042	34.7
Female head	0.009	(0.006, 0.012)	−0.015	(−0.029, −0.001)	−0.006	−5.0
No schooling	−0.016	(−0.022, −0.011)	−0.007	(−0.015, 0.001)	−0.023	−19.0
Primary school graduate	0.005	(0.003, 0.007)	0.027	(0.009, 0.044)	0.032	26.4
Any college	0.001	(−0.000, 0.003)	−0.002	(−0.012, 0.008)	−0.001	−0.8
Total	0.095	(0.081, 0.109)	0.026	(0.007, 0.045)	0.121	100.0

Note: Number of older adults are 6,929 for 1996 and 5,318 for 2014, respectively. “Older adult only,” “With adult–child member,” and “With adult–child head” are households in which only older adults reside (i.e., single or couple households), households headed by older adults in which adult child members coreside, and households headed by an adult child in which older adults coreside, respectively.

Source: 1996 National Survey of Family Income and Expenditure, 2014 Household Income and Expenditure Survey.

in panel A. The largest contribution to the rise in poverty is still attributable to the growth in the number of older adults living independently (+6.8%p). The growing proportion of households headed by those aged 75 or above also emerges as a nontrivial contributor (+2.0%p). We find that older adults living with adult–child members face a lower poverty risk (−1.3%p). On the other hand, the increase in the number of female-headed households led to a slightly higher poverty rate (+0.9%p). Yet, the lowering of their poverty risk reduced the poverty rate further (−1.5%p). Households headed by those who graduated from primary school face a higher poverty risk (+2.7%p).

The last column in panel A shows that the changes in the number of older adults living independently and their poverty risk explain 77.7% of the increased poverty rate (+9.4%p among the total change of +12.1%p) over the examined period. Even after we control for age, gender, and educational level of heads, we find that the changes in older adults living independently still explain a major portion (+59.5%) of the increased poverty rate as presented in the last column in panel B. On the other hand, households headed by those aged 75 or older or those who completed primary school emerged as subgroups substantially contributing to the increased poverty rate over the period.

Table 3 presents percentages of income sources for older adults in 1996 and 2014. The first column shows that market income declined from 77.5% to 58.2% among older adults in all the households over the examined period. It is also noteworthy that private transfer incomes decreased significantly from 20.3% in 1996 to 14.5% in 2014. Except for those headed by adult–child heads, which

already had a low level of private transfer income in 1996, this type of income fell sharply. Conversely, public transfer income increased from 4.8% to 34.8% mainly due to benefits provided by a noncontributory pension program called the Basic Pension Scheme. Among older adults living independently, public transfer income became the largest source of income (44.0%) in 2014.

Table 4 shows results from analyses which decompose the rise in the poverty rate among older adults into contributions made by changes in income components. In the first panel, we display a result from an analysis using our data, as actually observed in 1996 and 2014, as a reference. The first row shows a result from the decomposition while the other rows present background information used for the decomposition. For example, the first column shows that the total change in the poverty rate is 12.1 percentage points, a difference between the 2014 actual poverty rate (40.8%) and the 1996 rate (28.7%). The second column reports how much of the total change is explained by compositional changes. Since we simply used the actual data in this panel, assuming no compositional changes, the 2014 poverty rate remained at 40.8%. The entire change in poverty rates (12.1%p) should be attributed only to changes in total incomes, as presented in the third column.

The fourth to the final column show a result of a more detailed decomposition by income source, which suggests that declining market income has made a dominant contribution. As shown in the fifth column, the change in market income explains an increase in the poverty rate of 21.2 percentage points. This is the difference between the 2014 market income poverty rate (58.6%) and the 1996

Table 3. Income Sources Among Older Adults by Living Arrangement

	Total households		Older adult only		With adult-child member		With adult-child head	
	1996	2014	1996	2014	1996	2014	1996	2014
Median income (1,000 KRW)	9075	14048	5176	10306	10366	20338	11204	20931
Proportion of income source (%)								
Market income	77.5	58.2	51.0	42.0	79.5	78.9	96.6	92.3
Private transfer	20.3	14.5	42.5	19.7	17.4	6.7	5.0	5.7
Public transfer	4.8	34.8	8.9	44.0	5.5	21.7	1.2	17.8
Old-age pension	(2.9)	(28.6)	(3.9)	(36.1)	(4.7)	(17.3)	(1.0)	(15.1)
Other social security	(1.9)	(6.3)	(5.0)	(7.9)	(0.8)	(4.4)	(0.2)	(2.7)
Taxes	-2.6	-7.5	-2.4	-5.7	-2.4	-7.3	-2.8	-15.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Number of older adults are 6,929 for 1996 and 5,318 for 2014, respectively. "Older adult only," "With adult-child member," and "With adult-child head" are households in which only older adults reside (i.e., single or couple households), households headed by older adults in which adult child members coreside, and households headed by an adult child in which older adults coreside, respectively. Equivalized disposable income was measured by nominal value of each year. Source: 1996 National Survey of Family Income and Expenditure, 2014 Household Income and Expenditure Survey.

Table 4. Decomposition of the Rise in Poverty Among Older Adults by Income Source, 1996–2014

	Total change	Change in composition	Change in income source				
			Total income	Market income	Private transfer	Public transfer	Tax
A. Actual income distribution							
Result from decomposition	12.1	0.0	12.1	21.2 (21.2)	1.9 (23.1)	-9.0 (14.1)	-2.0 (12.1)
2014 poverty rate	40.8	40.8		58.6	54.9	43.2	40.8
1996 poverty rate	28.7			37.4	31.8	29.1	28.7
B. Reweighted income distribution							
Result from decomposition	12.1	10.2	1.9	4.8 (4.8)	3.7 (8.5)	-5.3 (3.1)	-1.2 (1.9)
2014 poverty rate	40.8	30.6		42.2	40.3	32.2	30.6
1996 poverty rate	28.7			37.4	31.8	29.1	28.7
C. Hypothetical income distribution							
Result from decomposition	1.1	9.2	-8.1	4.8 (4.8)	3.7 (8.5)	-15.1 (-6.7)	-1.5 (-8.1)
2014 poverty rate	29.8	20.6		42.2	40.3	22.4	20.6
1996 poverty rate	28.7			37.4	31.8	29.1	28.7

Note: Number of older adults are 6,929 for 1996 and 5,318 for 2014, respectively. Panel A reports results using the actual 2014 data. Panel B reports results using data constructed by reweighting the 2014 data by characteristics of older adults. Panel C reports results using data constructed by increasing public transfer incomes of older adults in 2014 to hold the ratio of median household income among older adults to median household income among younger adults equal over the period between 1996 and 2014 and reweighting in the same way as in panel B.

Source: 1996 National Survey of Family Income and Expenditure, 2014 Household Income and Expenditure Survey.

market income poverty rate (37.4%). Next, to assess the contribution of private transfer incomes, we should compare contributions made by changes in primary incomes (the sum of market incomes and private transfer incomes) and market incomes. The change in primary incomes is associated with a poverty increase of 23.1 percentage points, which is a difference between the 2014 primary income poverty rate (54.9%) and the corresponding 1996

rate (31.8%). We already know the contribution made by changing market income (21.2%p). Thus, private transfer incomes are only responsible for a slight increase in poverty rates of 1.9 (= 23.1 – 21.2) percentage points. Figures in the next two columns can be understood in the same way. Ultimately, changes in public transfer and tax together account for a reduction in the poverty rate of 11.0 percentage points.

However, the results presented in panel A are misleading since they do not consider compositional changes in characteristics of older adults over the examined period. The next two panels show results taking compositional changes into account. Panel B shows results from a decomposition using a 2014 sample reweighted by living arrangements and age, gender, and education of household heads. The reweighting generates a counterfactual distribution which resembles the 1996 sample in terms of the four characteristics but holds all else equal as observed in the 2014 sample. The poverty rate estimated from the counterfactual distribution is 30.6%. We find that compositional changes led to an increase in the poverty rate of 10.2 percentage points ($= 40.8\% - 30.6\%$), as reported in the second column. While compositional changes explain most of the change in the poverty rate, changes in incomes contribute to a very small increase (1.9%p). This is consistent with the result from the O-B decomposition provided in Table 2.

To be specific, the change in market income did not play an important role as this only accounts for 4.8 percentage points (instead of 21.2%p in panel A). A large part of the increased poverty rate that was attributed to reduced market income reported in panel A is actually caused by compositional changes. The change in private transfer incomes explains a poverty increase of 3.7 percentage points. The poverty increase due to declined market incomes and private transfer incomes is mostly compensated for by the poverty reduction associated with changes in public transfer and tax (-5.3% p and -1.2% p, respectively).

Next, we conduct another decomposition analysis. We construct a hypothetical distribution where household incomes of older adults increased at the same rate as household incomes of younger adults over the examined period. Specifically, we increase public transfer incomes of older adults in 2014 to keep their household incomes in line with growing household incomes of younger adults. It should be remembered here that a part of the increased poverty rate is due to the upward shift in the poverty lines, reflecting the growing household incomes among younger adults.

Panel C reports the decomposition results. The poverty rate is 29.8% in the hypothetical distribution. Thus, the poverty increase is only 1.1 percentage points during the examined period. Again, compositional changes lead to a poverty increase of 9.2 percentage points. However, changes in income source, as a whole, are associated with a poverty reduction of a similar size (-8.1% p). Changes in market income and private transfer income contribute to the same extent as in the panel B. Public transfer incomes increased by construction lead to a considerable drop in the poverty rate of 15.1 percentage points, which nearly cancelled out the poverty increase due to changes in composition, market income, and private transfers. The poverty rate among older adults might not have increased significantly had public transfer income increased sufficiently in Korea.

Discussion and Conclusion

This study assessed contributions of various factors to the rise in poverty among older adults since the mid-1990s in Korea. We find that the following three factors in particular are highly influential: (a) the rapid growth in the number of older adults living apart from their adult-children; (b) the rising risk of poverty among older adults living in households headed by those aged 75 or older or those with low education; and (c) the changes in the share of major income components.

In particular, the rapid growth in the number of older adults living independently, combined with aging of older people, explains most of the poverty increase. In rich welfare states, the shift in living arrangements among older adults has been explained by the development of public pension benefits which enabled them to maintain suitable living standards (Engelhardt et al., 2005). The Korean experience contradicts the so-called “affluence” hypothesis. The case of Korea suggests that the number of older adults living apart has grown quickly despite their vulnerable financial conditions. We find that the shifting living arrangements, without sufficiently developed public pension benefits, are catastrophic for older people’s economic status. This is also consistent with findings from studies that living independently from adult children is a significant predictor of poverty among older adults in many countries (Saunders & Lujun, 2006; Smeeding et al., 2008; Tai & Treas, 2009).

Market income lost its dominant status as an income component for older adults over the decades. Private transfer income from non-coresident adult children also dropped sharply. Attitudinal changes among younger generations are also evident. Financial support to older adults was considered as a moral obligation of adult children in the past. Now many citizens think responsibility for supporting older adults should be shared between government, family, and older individuals themselves (E. Kim et al., 2015). On the other hand, rising public transfer incomes offset most of the decline in both private transfer and market incomes. A study shows that the Basic Pension Scheme, a tax-based, noncontributory pension benefit, has been effective in reducing poverty among older adults although it has not been sufficient to curb the rising poverty (Lee, Ku, & Shon, 2017).

Our findings come with some caveats. This study examined poverty based on income. Some of older adults with insufficient income may maintain adequate consumption by using other resources such as savings or assets (Gornick, Sierminska, et al. (2009). By relying on income only, this study may have overstated poverty among older Koreans. We also assumed that older adults equally share incomes earned by their adult-children in multi-generational households. To the extent that it is not true, we may have underestimated poverty among older people living in those households.

The Korean experience shows what may have happened to older adults in rich welfare states if they did not have mature old-age income security programs in place. It may also provide some lessons for lower-income countries where older adults are likely to face a higher risk of poverty.

Supplementary Material

Supplementary data is available at *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* online.

Acknowledgments

An earlier version of this article was presented at the 23th International Research Seminar on Issues in Social Security in Sigtuna, Sweden, June 19–21, 2017. We are very grateful to the Institute of Social Welfare at Seoul National University for its financial support. *Authors' Contribution:* I. Ku planned the study, supervised the data analysis, and wrote the article. C.O. Kim performed all statistical analyses and contributed to revising the article.

Conflict of Interests

The authors declare no potential conflicts of interest.

References

- Angrist, J. D., & Pischke, J. S. (2008). *Mostly harmless econometrics: An empiricist's companion*. Princeton: Princeton University Press.
- Barrientos, A., Gorman, M., & Heslop, A. (2003). Old age poverty in developing countries: Contributions and dependence in later life. *World Development*, 31, 555–570. doi:10.1016/S0305-750X(02)00211-5
- Been, J., Caminada, K., Goudswaard, K., & van Vliet, O. (2017). Public/private pension mix, income inequality and poverty among the elderly in Europe: An empirical analysis using new and revised OECD data. *Social Policy and Administration*, 51, 1079–1100. doi:10.1111/spol.12282
- Brady, D. (2004). Reconsidering the divergence between elderly, child, and overall poverty. *Research on Aging*, 26, 487–510. doi:10.1177/0164027504266587
- Chou, K. L. (2010). Number of children and upstream intergenerational financial transfers: Evidence from Hong Kong. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 65, S227–S235. doi:10.1093/geronb/gbp103
- Deaton, A. S., & Paxson, C. H. (1997). The effects of economic and population growth on national saving and inequality. *Demography*, 34, 97–114. doi:10.2307/2061662
- Engelhardt, G. V., & Gruber, J. (2006). Social security and the evolution of elderly poverty. In A. J. Auerbach, D. Card, & J. M. Quigley (Eds.), *Public policy and income distribution* (pp. 259–287). New York: Russell Sage Foundation.
- Engelhardt, G. V., Gruber, J., & Perry, C. D. (2005). Social security and elderly living arrangements: Evidence from the social security notch. *Journal of Human Resources*, 40, 354–372. doi:10.3368/jhr.XL.2.354
- Gasparini, L., Alejo, J., Haimovich, F., Oliveri, S., & Tornarolli, L. (2010). Poverty among older people in Latin America and the Caribbean. *Journal of International Development*, 22, 176–207. doi:10.1002/jid.1539
- Gornick, J. C., Meyers, M. K., Wright, E. O. & Bergmann, B. (2009). *Gender equality: Transforming family divisions of labor*. New York: Verso Books.
- Gornick, J. C., Sierminska, E., & Smeeding, T. M. (2009). The income and wealth packages of older women in cross-national perspective. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 64, 402–414. doi:10.1093/geronb/gbn045
- Hurd, M. D. (1990). Research on the elderly: Economic status, retirement, and consumption and saving. *Journal of Economic Literature*, 28, 565–637. Retrieved from <https://www.jstor.org/stable/2727265>
- Kakwani, N., & Subbarao, K. (2008). Poverty among the elderly in Sub-Saharan Africa and the role of social pensions. *The Journal of Development Studies*, 43, 987–1008. doi:10.1080/00220380701466476
- Kim, E., Lee, Y., Choi, S., Kim, G., & Lim, S. (2015). *The diversification of family structure and the role of families and governments in family support*. Sejong: Korea Institute of Health and Social Affairs. [In Korean]
- Kim, H. (2001). Do welfare states reduce poverty? A critical shortcoming in the standard analysis of the anti-poverty effect of welfare states. *European Journal of Social Security*, 3, 25–44. doi:10.1023/A:1011556807766
- Kim, H. (2008). Private income transfers and old-age income security. *KDI Journal of Economic Policy*, 30, 74–130. [In Korean]
- Kim, H. (2014). *The roles of family and government for old-age income security*. Sejong: Korea Development Institute. [In Korean]
- Kim, N. N., & Kim, J. I. (2013). *Reexamination of income redistribution indices*. Seoul: Naksungdae Institute of Economic Research. [In Korean]
- Knodel, J., & Ofstedal, M. B. (2002). Patterns and determinants of living arrangements. In A. I. Hermalin (Ed.), *The well-being of the elderly in Asia* (pp. 143–184). Ann Arbor: University of Michigan Press.
- Lee, S., Ku, I., & Shon, B. (2017). The effects of old-age public transfer on the well-being of older adults: The case of social pension in South Korea. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*. doi:10.1093/geronb/gbx104
- Marchand, J., & Smeeding, T. (2016). Poverty and aging. In J. Piggott, & A. Woodland (Eds.), *Handbook of the economics of population aging* (pp. 905–950). Amsterdam: Elsevier B.V. doi:10.1016/bs.hespa.2016.09.004
- Michael, R. T., Fuchs, V. R., & Scott, S. R. (1980). Changes in the propensity to live alone: 1950–1976. *Demography*, 17, 39–56. doi:10.2307/2060962
- OECD. (2008). *Growing unequal? Income distribution and poverty in OECD countries*. Paris: OECD Publishing.
- OECD. (2017). Poverty rate (indicator). Retrieved August 11, 2017 from <https://doi.org/10.1787/0fe1315-en>
- Preston, S. H. (1984). Children and the elderly: Divergent paths for America's dependents. *Demography*, 21, 435–457. doi:10.2307/2060909
- Ruggles, S. (2007). The decline of intergenerational coresidence in the United States, 1850 to 2000. *American Sociological Review*, 72, 964–989. doi:10.1177/000312240707200606

- Saunders, P., & Lujun, S. (2006). Poverty and hardship among the aged in urban China. *Social Policy and Administration*, 40, 138–157. doi:10.1111/j.1467-9515.2006.00481.x
- Silverstein, M., Cong, Z., & Li, S. (2006). Intergenerational transfers and living arrangements of older people in rural China: Consequences for psychological well-being. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 61, S256–S266. doi:10.1093/geronb/61.5.S256
- Smeeding, T. M., Gao, Q., Saunders, P., & Wing, C. (2008). *Elder poverty in an ageing World: Conditions of social vulnerability and low income for women in rich and middle-income nations*. Luxemburg: LIS Cross-National Data Center.
- Statistics Korea. (2016). Results of the 2015 population and housing census (population, household and housing). Retrieved from <http://kosis.go.kr/portal/eng/pressReleases>
- Statistics Korea. (2017). 2017 Statistics on the aged. Retrieved from <http://kosis.go.kr/portal/eng/pressReleases>
- Tai, T. O., & Treas, J. (2009). Does household composition explain welfare regime poverty risks for older adults and other household members? *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 64, 777–787. doi:10.1093/geronb/64.6.777
- Wang, C., & Caminada, K. (2011). *Disentangling income inequality and the redistributive effect of social transfers and taxes in 36 LIS countries*. Leiden: Leiden Law School, Department of Economics.
- Yeo, E., Kim, M., Kwon, M., Choi, O., & Choi, J. (2012). *Old-age poverty in Korea and how should the government reduce it*. Sejong: Korea Institute of Health and Social Affairs. [In Korean]