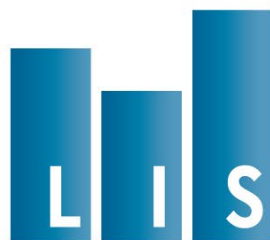# LIS
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Determinants of Elderly Poverty
in 21 European Countries, 1995-2022

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Determinants of elderly poverty in 21 European countries, 1995-2022[1]

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Abstract

Relative poverty has, in general, become a popular source of interest for research and the public. However, only a few studies have focused on the determinants of relative poverty among the elderly in a comparative setting over time. To fill in this gap, this study decomposed relative poverty among the elderly in 21 European countries, namely Austria, Belgium, Czech Republic, Denmark, France, Finland, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Romania, Solvakia, Spain, Sweden, Switzerland, and the United Kingdom, based on micro data from the Luxembourg Income Study from around 1995 to around 2022. Various counterfactuals were constructed and simulated. The results showed that relative poverty among the elderly has decreased and is mainly associated with changes in the distribution of pubic pensions, followed by changes in the distribution of private pensions. Labor market factors, especially earnings, have become more poverty-decreasing over time in most of the countries under study. Finally, the demographic structure played a positive role in driving relative poverty among the elderly.

Key words: relative poverty, elderly, poverty decomposition, European countries

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1. Introduction

Our world is experiencing fast ageing. In 2022, 771 million people were at the age of 65 or older, which accounted for 9.7 percent of the global population. By 2030, this number is expected to increase to 994 million, representing 11.7 percent of the world population (United Nations, 2022). Both industrialised nations such as the United States and Japan and developing economies like China have been confronted with the challenge of a grey or greying society. In this context, elderly's well-being becomes more and more crucial for now and in the coming future.

The bulk of poverty studies, however, have mainly focused on the total population,[2] with only scant attention being paid to elderly poverty.[3] This is regrettable as the latter has been reported to be high and rising in a few countries. For example, according to the Luxembourg Income Study (LIS) data, in around 1995, relative poverty rates of elderly were 18.88, 7.81, 21.31, 17.43, 19.57, and14.15 percent in Switzerland, Sweden, the Netherlands, Spain, Germany, and Poland, while these figures became 29.11, 22.32, 21.87, 21.07, 20.94, and 20.71 in most recent years. Not to mention some countries are experiencing a high level of elderly poverty, such as Ireland (31.72 percent in 2021) and Belgium (26.98 percent in 2021).

Elderly poverty has several adverse consequences. Firstly, poverty can have adverse effects on their physical and mental health. Even though the elderly can use medicare benefits for doctor visits, medicines, and medical procedures, poverty can still impact their health. Pal and Palacios (2011) found that there is a positive link between poverty and mortality among the elderly. Using cross-country data, Wang et al.(1997)

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[2] For example, Moller et al., 2003; OECD, 2008; Suryahadi et al., 2009; Ravallion and Chen, 2011; Wang et al., 2021; Burkhauser et al., 2024.

[3] For example, Engelhardt and Gruber, 2004; Smeeding et al., 2008; Pal and Palacios, 2011; Maes, 2013; Chan and Chou, 2018; Lefebvre et al., 2018; Calvi, 2020.

showed that poverty adversely affect mortality rates among the elderly. What's more, poverty could lead to a great deal of stress since the elderly may have to face monetary problems and social exclusion. The negative impact of poverty on mental health (such as depressive symptoms) of the elderly has been examined by Stolz et al. (2017), Lee et al. (2019), and Li et al. (2023). Secondly, the rising poverty among older people places a growing burden on public social expenditure, which creates more pressures to the prime-age workers force and harm their incentives (Walker,1990; Becker and Urzhumova, 1998). What's more, the poor elderly always need more care, which makes the caregivers more likely to leave paid work, transition early into retirement, or experience declines in hours and wages as a result of their caregiving obligations (Fahle and McGarry, 2017; Van Houtven et al., 2013; Skira, 2015), leading to a reduction in the labor supply side. Martey (2022) showed that the lost of time in the labor market due to caring for the elderly reduces family welfare.

However, little attention has been paid to the level and determinants of elderly poverty in a comparative setting. The main source of income for the working-age population is earnings from the labour market. On the other hand, the income of the elderly relies primarily on public and/or private pension benefits. The role of pensions in affecting elderly poverty has been examined by Pal and Palacios (2011), Kaushal (2014), and Zhang and Imai (2024). However, little information has been provided on its magnitude across countries. Delfani et al.(2015) found that the risk of being income-poor among elderly is somewhat alleviated in the case of a generous flat-rate public pension. Similarly, using data from OECD countries, Kuitto et al.(2023) showed that pensions systems and earnings-related schemes are efficient in reducing the risk of old-age poverty, among which minimum income provision plays an important role (Ebbinghaus, 2021). However, using data from 27 European countries, the relationship

between public pensions and old-age poverty is found to be nonlinear (Jacques et al., 2021). Meanwhile, the impact of private pensions on elderly poverty has long been ignored. Van Vliet et al. (2012) and Been et al. (2016) determined that more expenditure for private pensions was not associated with higher levels of inequality and poverty among the elderly over time and across countries.

Labour market factors and demographics may additionally affect the income distribution among the elderly. For example, welfare state reforms such as the elimination of mandatory retirement ages enable the elderly to earn more from work and increase their income share from earnings. People working beyond the official retirement age are usually more affluent than those living on pension benefits alone. With respect to the demographic structure of the elderly, Disney and Whitehouse (2002) showed that in general income tends to be lower at higher ages.

In this context, it is relevant to ask what the trend is regarding elderly's poverty rate; what role public and private pension benefits have played over time; and how changes in the distribution of earnings, household working status and household composition influence the elderly's poverty.

This paper contributes to the literature in three respects. First, it provides an initial attempt to explore the determinants on elderly poverty across countries and over time, and compare their relative contributions. These factors include changes in the composition of pensions (public versus private), household working status and demographic factors. Second, the profile of elderly poverty has been constructed for 21 European countries over time, offering a comparative perspective. Third, this study applies a new decomposition approach developed by Chen and Corak (2008) and Fortin et al. (2010). In this method several counterfactual income distributions were constructed to identify determinants of elderly poverty. The data source was the

Luxembourg Income Study Database (LIS, 2024), which allowed estimation of not only gross and disposable income, but also of income components. It also provides information on households' and individuals' labour market situation and the demographic status of the elderly.

The paper is structured as follows. Section 2 discusses possible poverty determinants and their impact, which are divided into three broad sets: income composition (mainly public and private pensions), labour market and demographic factors. The research methodology is outlined in section 3. Section 4 presents trends in elderly poverty across 21 countries over time (1995 – 2022) and its determinants, along with a sensitivity analysis. Section 6 presents the conclusions.

2. Determinants of poverty among the elderly

Following OECD (2008, pp. 288-292), there are three broad sets of factors affecting the income distribution and poverty: the composition or components of income, labour market factors, and demographic factors.

2.1 Income components

Gross income of the elderly consists of public and private pension benefits, labour income, other public transfers, private transfers and capital income. This paper will focus on changes in relative poverty brought about by pensions, and by earnings given that on the one hand, pensions and earnings account for a large part of gross income for the elderly and on the other, pensions are expected to play an important role in determining income inequality and poverty among elderly people across countries (Been et al., 2016). In general, public pensions are supposed to generate a more equal income distribution and less poverty among the elderly. Public pensions are usually pay-as-you-go systems, with flat-rate benefits, and based on income-related

contributions. Since elderly people usually do not have much income from work, public pensions are their main source of income. Private pensions, instead, are usually funded systems where the contributions paid are related to benefits and based on previous earnings. In the last decades, the rise of female labour force participation has automatically increased the coverage of private pensions. Furthermore, maturation of voluntary private pension schemes may have increased the share of private pensions.

The transition from public to private pensions, if any, can be measured by changes in the amount of public and private benefits received by elderly people. As private pension plans are based on a link between contributions paid and benefits received, they do not contain elements of income redistribution (Van Vliet et al., 2012). Consequently, private pensions are generally less redistributive than public social security which means the transition from public to private pensions may increase the relative poverty among elderly people. Other income sources also influence the relative poverty among elderly people besides pensions.

2.2 Labour market factors

Another broad set of factors affecting income distribution of the elderly is related to the labour market (OECD, 2008, p. 289). From the mid-1990s, welfare state reforms have led to changes in the labour market status of the elderly. OECD countries, European countries, and the United States have all experienced generally rapid growth in the labor force participation rate of the elderly in recent years. Existing research indicates that the institutional reform of the social security system, the elevation of retirement age, and the implementation of social investment policies constitute pivotal factors (Staubli & Zweimüller, 2013; Riphahn & Schrader, 2020; Kuitto & Helmdag, 2021). The distribution of earnings among the elderly has also changed. Take Denmark in the period 1997-2007, for example, where the largest change in earnings occurred

among the 60-64 year olds and to a less extent among the 70-74 year olds (Larsen &
Pedersen, 2012). Hungerford et al. (2001) pointed out that earnings may become a more
important source of retirement income in the future because of changes in the retirement
earnings test for social security beneficiaries. Through decomposition, Maestas et al.
(2023) found that one-third of the slowing effect of population aging on economic
growth comes from the slowdown in employment growth. Hence, working longer could
ease the burden of an ageing population (Burtless & Quinn, 2002; Laun, 2017).[4]

In this paper, labour market factors are represented by two variables: number of
household members with incomes from labour during the income reference period and
the annual earnings they obtain. According to the existing studies, the employment of
the elderly in the United States correlates positively with health, education and wealth
(Haider & Loughran, 2001; Zhao & Burge, 2017; Blundell et al., 2023). Therefore, if
rich elderly people have more earnings and a higher chance to work, the poverty risk
among the elderly should be lower. The reverse would be true if healthier elderly people
in lower income groups have a higher chance to earn more. Larsen and Pedersen (2012)
showed that in Denmark employment rates for elderly people aged 60-64 increased in
the period from 1995 to 2005 while they were rather stable for the group of people aged
65 and above.

Labour market factors also reflect broader forces such as the business cycle,
economic integration, technological changes and globalisation. Many of these factors
are independent of government transfers, yet there could certainly be important
interactions between the structure of social policy and labour supply, particularly

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[4] Cahill et al. (2016), among others, discussed the retirement patterns of elderly Americans since the
turn of the last century.

among low income groups in the working-age population and to a much lesser extent among elderly people.

2.3 Demographics of the elderly

Finally, changes in demographic structures of the elderly may affect poverty. Three variables are used in the empirical analysis: the proportion of households with a household head above 75 years old, whether the elderly people are living alone or not, and whether the household head attended university or higher education. The latter factor is measured by using a binary variable indicating whether the household head's education level is tertiary or above.

The ageing effect is captured by the first variable. In general, at a specific moment in time the income of elderly people tends to decline with age for several reasons (Disney & Whitehouse, 2002; Casey & Yamada, 2002). First, pensions of the elderly are determined by their past earnings, which tend to be higher for younger cohorts with a higher real lifetime income than older cohorts. Second, many old-age pensioners are women, who live longer than men and could be poorer than older men. Third, because of the immaturity of contribution-based pension-schemes, earlier contributors may not have accumulated sufficient entitlements for a 'full' pension. Fourth, partial non-indexation of pension benefits income may hamper older cohorts more than younger pensioners over the years. Fifth, a small number of younger elderly who are still working are relatively better off than their elder counterparts. Sixth, as the lifecycle hypothesis implies, older pensioners will have a lower income from savings than younger pensioners if they have spent their assets. However, older cohorts could also be richer because old-aged survivors typically have higher financial, housing and pension wealth than those who die young.

A single household living arrangement affects elderly income distribution in two

ways. On the one hand, a single pensioner tends to have a higher equivalised income than married couples where one partner has an incomplete contribution history. This is the case for most continental European systems in particular, where the amount of social security is fully based on contribution and earnings (OECD, 2001; Whitehouse, 2002a, 2002b; Hinrichs, 2021). This differs from the flat-rate benefit systems implemented in Denmark and the United Kingdom. On the other hand, assuming that household resources are shared among family members, relative poverty would be lower when less elderly people are living alone. For example, suppose an elderly man with both public and private pension benefits is living with an elderly woman having only a public pension. In that case their income is shared within their family, therefore redistributing their income within the family. This leads to a lower relative poverty in society than if both of them would live separately. Hence, we expect a lower share of single households may result in lower relative poverty rate.

The third variable, education, is positively associated with earnings (Chevalier et al., 2004; Blundell et al., 2005; Heckman et al., 2018). Therefore, better educated households usually have a higher income after retirement. Furthermore, a higher education enhances the probability of remaining at work and the chances of becoming self-employed (Robinson & Sexton, 1994). Obviously, when the higher education level is located more in the upper part of the income distribution, relative poverty becomes larger (over time).

3. Analytical framework and data

3.1 Luxembourg Income Study (LIS)

Our analysis is based on micro data at household level from LIS, which is a cross-national data centre serving a global community of researchers and policy makers, and

providing detailed information with respect to income components, labour market status and demographic information.[5] Income components consist of income from labour, property, and transfers and taxes. Labour market status includes activity status, employment intensity, job characteristics and work experience. The demographic information contains variables such as household composition, age, gender, marital status. All variables are collected from surveys conducted by the national bureau of statistics or academic institutions and have been "harmonised" by LIS to make the information comparable among countries.[6] This study is based on data available from both private and public pension benefits, and focuses on 21 European countries from around 1995 to the latest around 2022.[7]

3.2 Calculation of poverty among the elderly

The elderly were defined as individuals aged 65 and above, including the household head, spouse and other relatives living in the household. The elderly group was categorized by age rather than by labour force withdrawal, as some elderly people were still self-employed. Furthermore, some early retired people are still middle-aged and were therefore not include in the elderly group.

For the purpose of international comparisons, poverty is aways a relative concept. In this study, we use the 60 percent of median equivalised income as the standard poverty line. In the sensitivity analysis, we apply poverty lines of 50 and 40 percent of the median equivalised income. Equivalised income was obtained by applying the LIS

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equivalence scale to divide total household income by the square root of the number of household members. It has been evidenced that the choice of equivalence scales affects international comparison in income poverty. Alternative adjustment method may influence the ranking of countries but the overall pattern remains the same (Atkinson et al., 1995). In line with LIS convention and the work of Caminada et al. (2021), we have elimited both observations with zero or a missing value of disposable income from LIS datasets.

3.3 Decomposition of poverty change among the elderly by income source and other factors

The aim of this analysis was to examine the relative influences of public versus private pension benefits, labour market and demographic factors on the overall changes in poverty among elderly people in 21 European countries. Labor marke factors include household working status and annual earnings. We captured the impact of changing demographis factors on changing poverty by considering three variables as stated above: the proportion of households with a household head above 75 years old, whether the elderly people are living alone or not, and whether the household head attended university or higher education. In order to gauge the impact of these factors on changes in poverty among the elderly between around 1995 to around 2022, we needed to estimate what the income distribution would have been conditional on the other factors in the earlier period. The starting point was to develop a counterfactual income distribution based on all impacts being constant around 1995, except for the specific factor under study. The impact of the certain factor we wanted to examine was the difference between the counterfactual poverty indicator and the actual poverty indicator in 1995. In order to develop the counterfactual income distribution, this study followed the approach outlined by DiNardo et al. (1996), Fortin et al. (2010), and Chen and Corak

(2005; 2008), which consisted of two methods: reweighting and rank-preserving exchange.

This approach belongs to a family of budget incidence analyses in line with the work of Musgrave et al. (1974); see also Caminada et al. (2021) and Liu et al. (2024). It assumes that individuals and households behave the same in the presence or absence of a particular factor (Frick et al., 2000; Palme, 1996). Using this approach, we could obtain the partial effect of each determinant holding everything else constant. In reality, people's behaviour usually changes when a variable disappears or emerges, e.g. when public or private pension income is present or absent. Government policies also change over time and it is almost impossible to incorporate policy impacts into any analytical framework. Therefore, the results and research findings of this paper are indicative only and must be interpreted with caution. To explore the determinants of poverty, another widely used approach is regression analysis (Gustafsson & Johansson, 1999). However, regression analysis focuses on the association between poverty and its determinants rather than disentangle their contributions. In this respect, our approach is superior by calculating the contributions of public versus private pension benefits, labour market and demographic factors to poverty among the elderly.

As introduced by DiNardo et al. (1996), the reweighting procedure replaces the marginal distribution of a factor (or factors) X in period 0 with its counterpart in period 1 using a reweighting factor (DiNardo et al., 1996):

$$\varphi(X) = \frac{dF_{X1}(X)}{dF_{X0}(X)} \tag{1}$$

where $dF_{X0}(X)$ is the marginal distribution in period 0, $dF_{X1}(X)$ is the marginal distribution in period 1, and $\varphi(X)$ is the reweighting factor, the ratio of two multivariate marginal distribution functions (of the covariates X). This allows us to

simulate a counterfactual income distribution using a probit model to estimate the counterfactual weight and decompose the impact of changes in multiple factors on income distribution. This approach can be applied both to averages and global indicators of poverty and is used by, among others, Chen and Corak (2005; 2008), Chiquiar and Hanson (2005) and Daly and Valletta (2006).

The reweighting method can be used to isolate the impact of a binary variable or categorical variables (with more than 2 categories) as well as continuous variables. Let us consider the binary variable S that defines whether an elderly individual lives alone or not ($S = 1$ indicates a single elderly household and $S = 0$ indicates other living arrangements). The density of year-1995-equivalised incomes $f_{95}(y)$ can be expressed as the weighted sum of the densities of elderly people living in a single household and elderly people living in other household types:

$$f_{95}(y) = Pr_{95}(S = 1)f_{95}(y|S = 1) + Pr_{95}(S = 0)f_{95}(y|S = 0) \qquad (2)$$

Suppose that the share of elderly people living in a single household has increased from 10% in 1995 to 20% in 2022. To examine the influence of this change over time, each observation can be reweighted according to the percentage change in the share of each group. Therefore, every single-household elderly individual in 1995 should be up-weighted by 2 (that is 0.20/0.10) and every elderly person in another type of household should be down-weighted by 0.889 (that is 0.80/0.90). After reweighting, the counterfactual density function is:

$$f_{95}^*(y) = \varphi(S = 1)Pr_{95}(S = 1)f_{95}(y|S = 1) + \varphi(S = 0)Pr_{95}(S = 0)f_{95}(y|S = 0)$$

$$(3)$$

where the reweighting factor is

$$\varphi(S) = \frac{dF_{95}(S)}{dF_{20}(S)} = S \cdot \frac{Pr_{20}(S=1)}{Pr_{95}(S=1)} + (1 - S) \cdot \frac{Pr_{20}(S=0)}{Pr_{95}(S=0)} \qquad (4)$$

For non-binary variables, the reweighting procedure can be implemented by pooling data from the two years under study and using a probit model to obtain the reweighing factor.

Subsequently, the counterfactual income distribution can be simulated with the adjusted weights equal to the reweighting factor multiplied by the original weight. The impact of changes in single elderly households can be computed by comparing the poverty rate based on the counterfactual with the actual poverty in the initial year observed (around 1995).

Chen and Corak (2008) noted that the reweighting method assumes that the distribution of the characteristics does not affect the distribution of the outcome variable. For example, the influence of all of the demographic factors and some of the labour market factors are assumed constant. This is a rather bold assumption and unrealistic for the purpose of isolating the impacts of earnings or pensions on changing poverty among elderly people. This is because the equivalised income of elderly people derives mostly from pension and labour income and the welfare system and labour market have undergone significant changes over time. To address this concern, we further used the rank-preserving exchange method when assessing the impacts of earnings and pension variables.

The rank-preserving exchange approach maps the variable that needs to be fixed in a certain rank of the income distribution in one period to the same rank of the income distribution in the other period. It can be applied to simulate the impact of changes in earnings, private and public pensions on income distribution among the elderly, conditional on other factors. In the case of public pensions, for example, this approach involves subtracting each elderly person's equivalised public pensions from his or her total equivalent disposable income in 1995 and adding back the amounts in the latest

year around 2022 from the same income rank. That is:

$$I_{95}^* = I_{95} - Pubpen_{95} + Pubpen_{22} \qquad (5)$$

where I_{95}^* is the counterfactual equivalised income of the elderly people in 1995, I_{95} is the actual equivalised income of the elderly people in 1995, and $Pubpen_{95}$ and $Pubpen_{20}$ are the equivalised public pensions of the elderly people in 1995 and 2022, respectively. In the empirical application, all elderly people are first ranked from lowest to highest by equivalised income and divided into equally sized groups, considering household sampling weights.[8] At this point the median incomes within each percentile in 1995 can be computed. Following this the equivalised public pensions are subtracted in 1995 and replaced with the variable in 2022 for the same percentile rank. The resulting counterfactual income distribution is the distribution holding all factors at the same level as in 1995, with the exception of public pensions. The difference between poverty based on the distributions of I_{95}^* and I_{95} is the contribution of changes in the public pension's distribution to the changes in poverty from 1995 to around 2022.

The assumption of the rank-preserving approach is in line with the assumption of budget incident analysis, which assumes that individuals and households behave the same in the presence or absence of a particular factor. This assumption is similar as the regression analysis that the effect of a particular factor is estimated holding everything else constant. The limitation of this approach is that it could not be applied to variables that are not ordinal. In that case, the variable under study in different periods could not be ordered and further matched. This approach has been adapted for elderly from an analysis of adults in Daly & Valletta (2006) and children in Chen & Corak (2008).

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[8] The number of groups is determined by the sample size. The larger the number of groups, the less the bias of the global poverty indicator arising from the grouping.

To recap, the reweighting method was applied to analyse the impacts of all demographic factors (share of households with the household head above 75 years old, education level of the household, and single household) and some of the labour market factors (household working status). For other factors such as annual earnings, public and private pension benefits, the rank-preserving exchange approach was used.

It should be noted that the decomposition method applied may produce a residual term due to two reasons. First, other factors not taken into account could play a role. Second, residuals arise due to overlap when variables measuring partial decomposition effects reflect the same effects. It is common to find such residuals with this decomposition approach (see Chen & Corak, 2005; 2008, OECD, 2011).

4. Empirical results

4.1 Poverty among the elderly

Table 1 illustrates the level of poverty among elderly people in the countries under study and how it has changed from the mid-1990s to around 2022, taking 60 percent of median equivalised household income as the poverty line. For comparison, we also officially published poverty statistics from the LIS website. Clearly, our simulations are similar to that of LIS official statistics, indicating that our calculation is reliable. To start with, in around 2022, the highest poverty rate was found in Ireland with 31.59 of the elderly were living in poverty. Belgium, Germany, the Netherlands, Spain, Sweden, Switzerland and the United Kingdom all witnessed a poverty above 20 percent. Luxembourg, on the other hand, had the lowest poverty rate. The main pattern for the observed period was that poverty among the elderly has decreased over time. On average across our 21 European countries, the poverty rate decreased from 22.36 percent to 18.71 percent, i.e. by 3.64 percentage points. The largest reduction was found

for Greece (22.95 percent), followed by Denmark (21.95 percent) and Norway (15 percent). There were also several countries which went through increases in poverty among the elderly, including Germany, the Netherlands, Poland, Spain, Sweden and Switzerland, among which Sweden saw the largest rise of 14.62 percent in the poverty rate. Notably, the LIS key figures show more or less the same results.

Table 1. Relative Poverty among the elderly, 1995-2022 (60 percent poverty line, %)

	Around 1995	Around 2022	Change 95-22	Around 1995	Around 2022	Change 95-22
	Own calculations based on LIS data			LIS key figures		
AT (Austria, 1995-2021)	23.24	18.00	-5.24	.	18.07	.
BE (Belgium, 1995-2021)	31.30	26.93	-4.37	31.05	26.98	-4.07
CZ (Czech Republic,1996-2016)	22.11	16.09	-6.02	22.11	16.09	-6.02
DK (Denmark, 1995-2022)	35.22	13.26	-21.95	35.17	13.22	-21.95
FR (France, 1996-2018)	12.32	11.15	-1.17	12.29	11.22	-1.07
FI (Finland, 1995-2016)	18.45	16.04	-2.41	18.45	16.04	-2.41
DE (Germany, 1995-2020)	19.25	20.78	1.53	19.57	20.94	1.37
GR (Greece, 1995-2016)	36.01	13.06	-22.95	35.62	13.52	-22.10
HU (Hungary, 1994-2015)	21.04	15.83	-5.21	21.15	15.83	-5.32
IE (Ireland, 1995-2021)	34.51	31.59	-2.92	34.52	31.72	-2.81
IT (Italy, 1995-2020)	23.15	17.54	-5.61	22.63	17.39	-5.24
LU (Luxembourg, 1995-2019)	13.66	9.02	-4.64	13.67	9.02	-4.64
NL (Netherlands, 1993-2021)	21.42	21.97	0.54	21.31	21.87	0.56
NO (Norway, 1995-2021)	28.67	13.67	-15.00	28.48	13.64	-14.85
PL (Poland, 1995-2020)	13.23	19.50	6.27	14.15	20.71	6.56
RO (Romania, 1995-2021)	21.80	19.71	-2.09	21.80	19.73	-2.08
SK (Slovakia, 1996-2018)	17.62	14.37	-3.25	.	14.35	.
ES (Spain, 1995-2019)	17.43	20.69	3.26	17.43	21.07	3.64
SE (Sweden, 1995-2021)	7.69	22.31	14.62	7.81	22.32	14.51
CH (Switzerland, 1992-2019)	18.70	29.17	10.47	18.88	29.11	10.23
UK (United Kingdom, 1995-2021)	32.69	22.32	-10.37	32.56	22.19	-10.37
Mean	22.36	18.71	-3.64	22.56	18.81	-3.48

4.2 Income components of gross income of the elderly across 21 European countries, 1995-2022

Table 2 shows the aggregate shares of income components of the elderly's grossincome from around 1995 to around 2022 across 21 European countries. Elderly's

grossincome is the sum of public pensions (PubP), private pensions (PriP), earnings (Earn), other public transfers (OPubTr), private transfers (PriTr), capital income (CapIn) and taxes. Following the definition of LIS, public pension benefits consisted of public non-contributory pensions including universal pensions, assistance pensions and public contributory pensions, while private pension benefits included occupational pensions and individual pensions. Besides pensions, other income sources such as earnings, other publictransfers, private transfers, capital income and income taxes and contributions also influenced the relative poverty among elderly people.

On average, most gross income of the elderly came from public pension benefits, followed by private pensions benefits, labour and capital earnings, other public transfers and property income, while private transfers only made up less than 1% of the gross income and taxes reduces the overall income, both around 1995 and 2022. In around 2022, the largest share of public pensions existed in Luxembourg (above 100%), followed by Belgium (97.99%), Italy (97.25%), and Austria (97.15%). Yet, the lowest share was found in France and Finland with less than 10% share of public pensions. As for private pensions, the highest share was found in the Finland (93.39%), while the low shares could be found in Austria, Belgium, Czech Republic, Hungary, Ireland, Luxembourg, Romania and Slovakia (less than 1%). About 20% of the total gross income was allocated to taxes in around 2022. However, in Czech Republic, Ireland, Slovakia, and the United Kingdom, taxes only accounted for less than 10%, with the lowest share appeared in Czech Republic (2.46%).

Throughout the entire period under study, both the shares of public pensions and private pensions in gross income increased on average. The largest increases in public pensions were observed in Slovakia (34.10%), Romania (31.97%), Luxembourg (28.03%), and Greece (27.61%) and the largest rise in private pensions occurred in

Finland (23.42%), the Netherlands (22.12%), and Switzerland (20.53%). Interestingly, we found that in a few counties, including Finland, Denmark, Germany, the Netherland, Sweden and the United Kingdom, there was an increase in private pensions but a decrease in public pensions, showing a shift from public to private pensions. In the Netherlands, Sweden, and the United Kingdom, the increase in private pensions had even been higher than the decrease of public pensions.

Furthermore, the share of other public transfers increased by 1.19 points on average, with the largest rise taking place in Ireland, but a moderate drop was seen in Finland, Slovakia, and Sweden. The levels of earnings, property income and private transfers were rather stable over time from around 1995 to around 2022. There was significant variation across time and space in the level of pensioner taxation (cf. Pedersen, 2004). Taxes rose on average from 7.99 to 19.73% of equivalised gross income among the elderly, especially in the Switzerland and Greece. (see Table 2).

Table 2. Income components (aggregate share) of equivalised gross income among elderly people, 1995-2022 (%)

	Around 1995							Around 2022							Change 95-22						
Country	PubP	PriP	Earn	OPubTr	PriTr	CapIn	Taxes	PubP	PriP	Earn	OPubTr	PriTr	CapIn	Taxes	PubP	PriP	Earn	OPubTr	PriTr	Prop	Taxes
AT (1995-2021)	77.71	.	20.63	3.02	0.62	1.19	-3.77	97.15	0.93	12.94	5.38	0.43	3.17	-20.00	19.44	.	-7.69	2.36	-0.20	1.98	-16.23
BE (1995-2021)	84.17	0.97	4.55	2.04	0.20	3.57	-0.59	97.99	0.12	10.51	5.46	0.14	4.42	-18.63	13.82	-0.85	5.96	3.42	-0.06	0.84	-18.04
CZ (1996-2016)	80.29	.	21.83	0.78	.	0.35	-2.32	83.47	0.09	14.18	2.21	1.72	0.78	-2.46	3.19	.	-7.65	1.43	.	0.43	-0.14
DK (1995-2022)	91.65	19.88	10.62	5.47	0.59	6.15	-27.23	88.32	20.07	19.95	6.56	0.02	6.58	-41.88	-3.33	0.20	9.32	1.10	-0.57	0.43	-14.65
FR (1996-2018)	2.32	.	9.64	2.23	0.59	10.29	-5.21	1.20	.	6.86	2.32	1.14	9.96	-15.46	-1.12	.	-2.77	0.09	0.55	-0.33	-10.25
FI (1995-2016)	35.47	69.97	9.90	2.56	0.13	2.53	-16.45	9.85	93.39	10.60	2.43	0.13	4.60	-21.00	-25.62	23.42	0.70	-0.13	0.00	2.06	-4.54
DE (1995-2020)	86.56	3.75	9.87	1.43	0.33	2.96	-7.65	77.70	6.46	16.27	2.85	0.31	4.94	-17.25	-8.86	2.71	6.39	1.42	-0.02	1.98	-9.60
GR (1995-2016)	68.85	1.52	20.33	1.29	1.08	2.55	-0.04	96.46	2.75	19.46	2.41	1.43	3.71	-28.80	27.61	1.23	-0.87	1.12	0.35	1.16	-28.76
HU (1994-2015)	80.69	.	14.90	0.72	0.09	0.08	.	81.85	0.00	14.68	2.85	0.35	0.26	.	1.17	.	-0.21	2.13	0.26	0.18	.
IE (1995-2021)	73.59	.	18.71	2.80	0.05	2.00	0.14	75.06	0.58	18.12	11.20	0.11	2.77	-7.84	1.47	.	-0.59	8.39	0.06	0.77	-7.98
IT (1995-2020)	77.35	1.00	14.13	0.29	0.29	3.77	.	97.25	1.16	16.68	1.15	0.24	1.85	-18.56	19.89	0.16	2.55	0.86	-0.05	-1.92	.
LU (1995-2019)	78.18	0.14	13.89	1.61	0.10	3.30	.	106.22	0.35	6.63	1.64	0.53	5.41	-20.79	28.03	0.21	-7.26	0.03	0.43	2.11	.
NL (1993-2021)	77.71	29.53	6.13	1.13	0.24	4.67	-14.39	60.76	51.65	11.16	3.62	0.10	2.40	-29.69	-16.94	22.12	5.04	2.48	-0.14	-2.27	-15.30
NO (1995-2021)	.	16.06	13.84	0.93	0.09	4.38	-8.58	.	21.08	17.18	2.23	0.00	3.70	-22.38	.	5.02	3.35	1.30	-0.09	-0.68	-13.80
PL (1995-2020)	91.61	.	-0.90	1.85	8.55	0.06	-7.15	79.01	.	15.77	3.03	1.77	0.25	.	-12.60	.	16.66	1.18	-6.78	0.19	.
RO (1995-2021)	43.40	.	55.01	0.04	0.04	0.01	-0.05	75.37	0.05	34.13	2.21	0.39	0.10	-12.26	31.97	.	-20.88	2.18	0.35	0.10	-12.21
SK (1996-2018)	42.89	.	47.21	3.83	0.21	0.06	.	76.99	0.03	27.33	1.93	0.33	0.16	-6.86	34.10	.	-19.88	-1.90	0.11	0.10	.
ES (1995-2019)	.	.	19.24	4.48	0.12	2.66	.	77.99	1.89	29.63	5.17	0.28	5.84	-20.80	.	.	10.39	0.70	0.15	3.18	.
SE (1995-2021)	89.25	14.18	4.85	7.49	0.01	6.25	-21.88	78.45	25.71	10.18	3.33	0.01	4.28	-22.84	-10.80	11.53	5.33	-4.16	0.00	-1.97	-0.96
CH (1992-2019)	56.81	17.37	11.70	1.21	1.08	18.59	-9.05	72.47	37.90	17.03	1.37	0.50	10.57	-41.15	15.66	20.53	5.33	0.15	-0.57	-8.02	-32.10
UK (1995-2021)	51.86	22.33	9.05	9.32	0.08	4.20	-3.59	49.70	30.03	13.33	10.22	0.14	2.79	-6.21	-2.15	7.70	4.28	0.89	0.06	-1.41	-2.61
Mean	67.91	16.39	15.96	2.60	0.73	3.79	-7.99	74.16	15.49	16.32	3.79	0.48	3.74	-19.73	6.05	7.83	0.36	1.19	-0.31	-0.05	-12.48

Source: Own calculations using micro data from LIS.

4.3 Decomposition results

Table 3 shows the decomposition results of poverty among the elderly by the composition of pension income, labour market factors and demographic factors from around 1995 to around 2022 in the 21 European countries. On average, the poverty rate decreased by 3.64 percent, and mainly contributed by public versus private pension benefits (-17.8), especially public pensions (-10.3), and to a lesser extent by the changes in labor market factors (-6.0). However, this increase was partly offset by the effect of the demographic factors (+5.0). In particular, all demographic factors, including the share of people above 75 years old, single household occurrence and university attendance among the elderly could contribute to an increased poverty among the elderly.

There was, however, large variation across countries. Conditional on other labour market and demographic factors, in 6 out of the 21 countries, including France, Luxembourg, Poland, Romania, Spain, and Sweden, pensions contributed to the rose of poverty among the elderly. A special case was in Romania where the poverty-increasing effect of private pensions exceed the poverty-reducing effect of public pensions.

Labour market factors have led to a lower poverty among the elderly in all the countries studied except for Poland, Romania, Spain, Sweden, and Switzerland. The household working status had an poverty-increasing effect on average but Austira, Czech Republic, Germany, Italy, Norway, and the United Kingdom has gained poverty reduction from changing the working status of the elderly. Changes in the distribution of earnings also led to lower poverty in all countries excep for Poland, Romania, and Sweden.

In terms of demographic factors, the change in the share of people above 75 years

old was associated with higher poverty in all countries except for Belgium, the Netherland, Norway, Poland, Sweden and the United Kingdom. Elderly people living in single family households caused increased poverty except in Belgium, Luxembourg, the Netherlands, Spain, and Sweden. University attendance of the household head in elderly households also generated a poverty-increasing effect in almot all countries although in Austria and Hungary we found weak poverty reduction attributed to attendance of the household head.

The residual captures the impacts of omitted variables and the possible overlapping of one or more variables. On average, the residual explained 15.2% of the poverty change among the elderly. The model's explanatory power differed across countries with pretty good power for Austria, Finland, Germany, Hungary, Ireland, Italy, Norway, Slovakia, Sweden and Switzerland (around 90% of poverty changes were captured). The contribution rates from pension benefits and labor market and demographis factors outreached 100% in France, Luxembourg, Poland, Romania, and Spain, implying the possible overlapping of the factors. Fortunately, in these countries the variables studied over explained the change among the elderly by less than 30% and in most cases less than 20%. However, model results seemed less reliable for Belgium and Denmark (over 50%). Its rather large residual suggested that important factors may have been neglected.

Table 3. Decomposition of changes in relative poverty(60%) among the elderly, 1995-2022

	AT	BE	CZ	DK	FR	FI	DE	GR	HU	IE	IT	LU	NL	NO	PL	RO	SK	ES	SE	CH	UK	Average
1. Relative poverty among the elderly																						
Around 1995	23.2	31.3	22.1	35.2	12.3	18.5	19.3	36.0	21.0	34.5	23.2	13.7	21.4	28.7	13.2	21.8	17.6	17.4	7.7	18.7	32.7	22.4
Around 2022	18.0	26.9	16.1	13.3	11.2	16.0	20.8	13.1	15.8	31.6	17.5	9.0	22.0	13.7	19.5	19.7	14.4	20.7	22.3	29.2	22.3	18.7
Change	-5.2	-4.4	-6.0	-22.0	-1.2	-2.4	1.5	-23.0	-5.2	-2.9	-5.6	-4.6	0.6	-15.0	6.3	-2.1	-3.3	3.3	14.6	10.5	-10.4	-3.6
2. Contribution to changes in relative poverty among the elderly																						
2a. Public/Private mix of pensions	*-11.9*	*-47.7*	*-26.5*	*-65.4*	*1.3*	*-12.3*	*-6.2*	*-40.5*	*-13.8*	*-33.1*	*-15.2*	*2.0*	*-35.4*	*-25.7*	*6.8*	*4.7*	*-12.0*	*3.7*	*1.6*	*-8.1*	*-39.3*	*-17.7*
Public pensions	-8.0	-27.6	-18.2	-35.1	0.9	-1.5	-3.1	-25.3	-10.8	-19.7	-7.7	0.9	-17.3	-6.8	-2.1	-5.4	-5.0	1.9	0.1	-4.8	-21.3	-10.2
Private pensions	-4.0	-20.2	-8.3	-30.3	0.4	-10.8	-3.2	-15.1	-3.0	-13.4	-7.5	1.1	-18.1	-19.0	8.9	10.1	-7.0	1.8	1.5	-3.4	-18.0	-7.5
2b. Labour market factors	*-5.0*	*-21.8*	*-10.0*	*-24.5*	*-0.9*	*-7.0*	*-6.7*	*-17.7*	*-5.3*	*-7.4*	*-10.7*	*-1.5*	*-9.1*	*-8.5*	*9.7*	*12.4*	*-1.0*	*4.5*	*4.3*	*0.7*	*-20.7*	*-6.0*
Household working status	-1.2	0.9	-2.1	2.2	0.0	1.1	-1.3	0.8	1.6	5.9	-2.0	0.2	2.1	-1.9	0.9	.	.	4.6	2.3	2.3	-4.6	0.6
Annual earnings	-3.8	-22.7	-7.9	-26.7	-0.9	-8.1	-5.4	-18.4	-7.0	-13.3	-8.7	-1.6	-11.2	-6.7	8.9	12.4	-1.0	-0.1	2.0	-1.6	-16.2	-6.6
2c. Demographic factors	*5.7*	*2.3*	*5.7*	*5.3*	*2.8*	*5.9*	*0.7*	*3.2*	*3.1*	*25.7*	*7.9*	*5.4*	*3.9*	*1.3*	*1.3*	*9.6*	*3.4*	*8.4*	*0.7*	*1.7*	*0.0*	*5.0*
Share of people above 75 years old	2.5	-0.4	0.8	0.1	0.2	1.4	0.1	1.5	1.2	2.2	0.1	0.4	-1.8	-1.5	-1.4	4.7	1.5	0.2	-0.1	0.0	-0.2	0.5
Single household	3.5	-0.2	3.0	0.0	0.6	2.4	0.4	0.4	2.0	7.3	1.0	-0.5	-1.4	0.6	0.9	4.1	1.3	0.0	-0.5	0.4	0.2	1.2
University attendance of household head	-0.3	2.9	1.9	5.2	1.9	2.1	0.3	1.3	0.0	16.2	6.8	5.5	7.2	2.1	1.8	0.8	0.7	8.2	1.3	1.2	.	3.2
Residual	5.9	62.8	24.8	62.6	-4.3	11.0	13.8	32.0	10.8	11.9	12.3	-10.6	41.1	18.0	-11.5	-28.8	6.4	-13.3	8.0	16.2	49.7	15.2

Note: Information on education is not available for the United Kingdom; Information on working status is not available for Rominia and Solvakia.

4.4 Robustness test

The exercise was repeated using poverty lines of 50 and 40 percent of median equivalised income to explore the sensitivity of the results. The poverty rates are presented in Table 4. The higher poverty line applied, the higher poverty rates we would get. Overall, the trends did not change using the 50 or 40 percent poverty line than that using the 60 percent poverty line. The exceptions were Austria, Denmark, Ireland, Luxembourg, Norway, and Switzerland, which observed increased poverty rates using the 40 percent poverty line.

Next, the decomposition results based on 50 and 40 percent poverty lines are shown in Table 5 and Table 6. The results did not seem to change when using the 50 percent poverty standard. That is, public and private pensions as well as labour market factors are more poverty-reducing while demographic factors were more poverty-increasing. It should be noted that when applying the 40 percent poverty line, the impact of private transfers on poverty change became positive. Labour market factors also played a positive role. Especially, we see negative but negibile impact of household working status. The results for annual earnings became positive compared with results in Table 3 and Table 5. Moreover, the overall impact of public pension benefits and demographic factors did not change.

Table 4. Relative Poverty among the elderly, 1995-2022 (50 and 40 percent poverty lines, %)

Country	PL50			PL40		
	Around 1995	Around 2022	Change 95-22	Around 1995	Around 2022	Change 95-22
AT (1995-2021)	13.93	11.04	-2.88	5.14	5.49	0.35
BE (1995-2021)	17.19	8.86	-8.33	6.35	3.30	-3.06
CZ (1996-2016)	8.20	4.52	-3.68	1.36	0.74	-0.62
DK (1995-2022)	11.36	3.24	-8.12	0.57	0.92	0.35
FR (1996-2018)	5.15	4.43	-0.72	1.46	1.38	-0.08
FI (1995-2016)	5.55	4.88	-0.67	0.84	0.69	-0.16
DE (1995-2020)	10.14	13.81	3.68	5.79	7.27	1.48
GR (1995-2016)	27.29	7.17	-20.12	19.20	2.85	-16.35
HU (1994-2015)	10.10	6.60	-3.50	4.38	1.75	-2.63
IE (1995-2021)	17.64	17.44	-0.20	2.13	2.99	0.85
IT (1995-2020)	14.31	10.15	-4.16	4.74	4.17	-0.57
LU (1995-2019)	6.50	4.71	-1.78	1.48	1.95	0.47
NL (1993-2021)	6.21	7.28	1.07	3.08	2.42	-0.66
NO (1995-2021)	13.81	3.99	-9.83	0.70	0.80	0.10
PL (1995-2020)	7.30	10.00	2.70	3.65	3.95	0.31
RO (1995-2021)	12.72	13.20	0.47	6.18	6.06	-0.12
SK (1996-2018)	8.77	5.06	-3.71	3.98	1.17	-2.82
ES (1995-2019)	6.86	11.05	4.19	2.29	4.91	2.62
SE (1995-2021)	2.63	8.29	5.66	0.69	2.76	2.07
CH (1992-2019)	7.62	17.97	10.35	3.12	9.82	6.70
UK (1995-2021)	15.54	12.33	-3.21	4.74	5.24	0.50
Mean	10.90	8.86	-2.04	3.90	3.36	-0.54

Source: Own calculations based on LIS data.

Table 5. Decomposition of changes in relative poverty(50%) among the elderly, 1995-2022

	AT	BE	CZ	DK	FR	FI	DE	GR	HU	IE	IT	LU	NL	NO	PL	RO	SK	ES	SE	CH	UK	Average
1. Relative poverty among the elderly																						
Around 1995	13.9	17.2	8.2	11.4	5.2	5.6	10.1	27.3	10.1	17.6	14.3	6.5	6.2	13.8	7.3	12.7	8.8	6.9	2.6	7.6	15.5	10.9
Around 2022	11.0	8.9	4.5	3.2	4.4	4.9	13.8	7.2	6.6	17.4	10.2	4.7	7.3	4.0	10.0	13.2	5.1	11.1	8.3	18.0	12.3	8.9
Change	-2.9	-8.3	-3.7	-8.1	-0.7	-0.7	3.7	-20.1	-3.5	-0.2	-4.2	-1.8	1.1	-9.8	2.7	0.5	-3.7	4.2	5.7	10.4	-3.2	-2.0
2. Contribution to changes in relative poverty among the elderly																						
2a. Public/Private mix of pensions	*-6.9*	*-26.5*	*-9.3*	*-21.9*	*1.5*	*1.8*	*-1.2*	*-35.1*	*-8.1*	*-16.3*	*-10.8*	*2.0*	*-9.2*	*-10.4*	*5.4*	*9.3*	*-7.4*	*10.7*	*1.9*	*2.0*	*-17.8*	*-7.0*
Public pensions	-4.9	-15.5	-7.4	-11.3	1.2	5.6	-0.4	-22.0	-7.0	-14.4	-5.8	0.5	-4.3	-0.1	-1.9	-3.5	-4.3	5.9	0.8	0.4	-10.2	-4.7
Private pensions	-2.0	-11.0	-1.9	-10.6	0.3	-3.8	-0.8	-13.2	-1.1	-1.8	-5.1	1.4	-4.9	-10.3	7.3	12.8	-3.1	4.8	1.1	1.6	-7.6	-2.3
2b. Labour market factors	*-2.5*	*-12.9*	*-2.4*	*-8.8*	*0.0*	*-1.5*	*-3.1*	*-15.0*	*-3.1*	*2.1*	*-7.2*	*-0.1*	*-4.1*	*-1.5*	*8.0*	*17.0*	*3.0*	*7.6*	*1.8*	*2.6*	*-9.0*	*-1.4*
Household working status	-1.5	0.8	-1.6	2.1	0.0	0.4	-0.6	0.9	0.8	3.5	-1.0	0.0	0.1	-1.9	0.5	.	.	4.5	1.1	1.4	-2.4	0.4
Annual earnings	-1.0	-13.7	-0.9	-10.9	0.0	-2.0	-2.5	-16.0	-3.9	-1.4	-6.2	-0.1	-4.2	0.4	7.5	17.0	3.0	3.1	0.7	1.2	-6.7	-1.7
2c. Demographic factors	*5.2*	*1.4*	*1.0*	*5.1*	*1.3*	*1.8*	*1.1*	*3.5*	*1.1*	*27.2*	*5.3*	*1.9*	*0.6*	*2.7*	*0.3*	*6.9*	*1.3*	*6.2*	*0.3*	*1.5*	*0.6*	*3.6*
Share of people above 75 years old	1.9	-0.5	-0.4	0.0	0.0	0.1	0.2	2.1	0.8	0.5	-0.2	0.2	-0.7	-0.6	-1.0	3.6	0.2	-0.6	-0.1	0.0	0.2	0.3
Single household	2.1	-0.1	0.4	0.1	0.3	0.4	0.3	0.3	-0.1	3.8	1.5	-0.4	-0.8	0.3	0.2	3.0	0.0	-0.4	-0.2	0.0	0.4	0.5
University attendance of household head	1.2	1.9	1.0	5.0	0.9	1.2	0.6	1.1	0.4	22.9	4.0	2.2	2.0	2.9	1.0	0.3	1.1	7.2	0.6	1.5	.	2.8
Residual	1.3	29.7	7.1	17.5	-3.5	-2.7	6.9	26.6	6.6	-13.2	8.6	-5.6	13.8	-0.6	-11.0	-32.7	-0.6	-20.3	1.6	4.3	23.1	2.7

Note: Information on education is not available for the United Kingdom; Information on working status is not available for Rominia and Solvakia.

Table 6. Decomposition of changes in relative poverty (40%) among the elderly, 1995-2022

	AT	BE	CZ	DK	FR	FI	DE	GR	HU	IE	IT	LU	NL	NO	PL	RO	SK	ES	SE	CH	UK	Average
1. Relative poverty among the elderly																						
Around 1995	5.1	6.4	1.4	0.6	1.5	0.8	5.8	19.2	4.4	2.1	4.7	1.5	3.1	0.7	3.7	6.2	4.0	2.3	0.7	3.1	4.7	3.9
Around 2022	5.5	3.3	0.7	0.9	1.4	0.7	7.3	2.9	1.8	3.0	4.2	2.0	2.4	0.8	4.0	6.1	1.2	4.9	2.8	9.8	5.2	3.4
Change	0.4	-3.1	-0.6	0.4	-0.1	-0.2	1.5	-16.4	-2.6	0.9	-0.6	0.5	-0.7	0.1	0.3	-0.1	-2.8	2.6	2.1	6.7	0.5	-0.5
2. Contribution to changes in relative poverty among the elderly																						
2a. Public/Private mix of pensions	*-1.2*	*-9.0*	*-1.2*	*-0.9*	*0.9*	*4.4*	*-0.9*	*-28.1*	*-4.8*	*4.9*	*-1.9*	*4.2*	*-4.4*	*5.3*	*2.8*	*9.4*	*-4.4*	*6.9*	*1.2*	*1.2*	*-3.5*	*-0.9*
Public pensions	-1.3	-5.5	-1.1	-0.5	0.6	5.1	-0.3	-17.4	-3.9	-1.3	-1.2	2.3	-1.9	4.9	-1.6	-2.6	-2.8	3.9	0.6	0.1	-2.4	-1.3
Private pensions	0.1	-3.6	-0.1	-0.4	0.4	-0.7	-0.6	-10.7	-0.9	6.2	-0.7	1.9	-2.5	0.5	4.4	12.0	-1.6	3.0	0.6	1.1	-1.1	0.4
2b. Labour market factors	*2.6*	*-5.4*	*0.5*	*-0.5*	*0.6*	*-0.2*	*-2.3*	*-18.8*	*-1.9*	*8.2*	*-2.1*	*1.2*	*-2.3*	*4.2*	*4.3*	*17.9*	*3.5*	*2.3*	*-0.6*	*0.3*	*-2.7*	*0.4*
Household working status	0.1	0.1	-0.3	0.1	0.0	0.0	-0.5	0.4	0.0	0.6	-0.3	0.0	0.2	-0.1	0.1	.	.	0.8	-0.7	0.0	-1.2	0.0
Annual earnings	2.5	-5.5	0.8	-0.5	0.6	-0.2	-1.8	-19.2	-1.9	7.6	-1.8	1.2	-2.4	4.3	4.2	17.9	3.5	1.6	0.1	0.3	-1.5	0.5
2c. Demographic factors	*2.2*	*2.4*	*0.0*	*0.0*	*0.3*	*-0.3*	*0.3*	*3.6*	*-1.0*	*18.5*	*4.3*	*1.4*	*-0.7*	*3.4*	*-0.3*	*4.1*	*-0.1*	*2.0*	*0.3*	*0.0*	*-0.1*	*1.9*
Share of people above 75 years old	0.9	-0.1	-0.1	0.0	0.0	-0.2	0.0	2.3	-0.1	0.1	-0.7	0.1	-0.3	0.0	-0.4	2.1	-0.4	0.0	0.0	0.0	-0.2	0.1
Single household	0.5	-0.1	-0.1	0.0	0.1	-0.2	0.2	0.7	-1.0	0.0	-0.2	-0.1	-0.3	0.0	-0.2	1.5	-0.2	0.1	-0.1	0.1	0.0	0.0
University attendance of household head	0.7	2.6	0.2	0.1	0.3	0.1	0.1	0.6	0.1	18.3	5.2	1.4	-0.1	3.3	0.3	0.5	0.5	2.0	0.3	-0.1	.	1.7
Residual	-3.1	9.0	0.1	1.7	-1.9	-4.0	4.3	26.9	5.0	-30.7	-0.9	-6.3	6.7	-12.8	-6.5	-31.5	-1.9	-8.6	1.2	5.2	6.8	-2.0

Note: Information on education is not available for the United Kingdom; Information on working status is not available for Rominia and Solvakia.

4. Conclusion

Poverty in European countries has decreased over the last decades. To a large extent this is due to changes in income composition, labour market and demographic factors. Literature examining the links between the trend of decreasing poverty and its driving forces has mainly focused on poverty among the total or prime-age population. This study concentrated on the well-being of the elderly, providing information on the extent to which these factors contribute to the changes in poverty among the elderly in 21 European countries from around 1995 to around 2022.

During this period, the overall poverty among elderly in these countries decreased. By constructing counterfactual income distributions of the elderly, this study found that on average the majority of the decrease could be attributed to public and private pension benefits, especially public pension benefits, and to a lesser extent to changes in labor market factors consisting of household working status and annual earnings. Demographic factors played a positive role in changes in poverty among the elderly during the period and countries under study. Yet, the empirical analysis indicated that (on average across countries) higher poverty caused by demographic factors was offset by changes in the distribution of public and private pensions. The shift from public to private pensions has not appeared to create higher levels of poverty among the elderly.

The changes in poverty among the elderly were attributable to several factors. Public pensions have become more redistributive over time, except in France, Luxembourg, Spain and Sweden. Private pensions also contributed to lower poverty among the elderly in 2022 compared to 1995, except in France, Luxembourg, Poland, Romania, Spain and Sweden. With regard to labour market factors, changes in the distribution of earnings led to reduced poverty among the elderly in all countries under study except Poland, Romania and Sweden. In addition, the household working status

contributed to increasing poverty among the elderly in a lot countries, resulting in a positive effect of this factor in general. With respect to demographic factors, the share of people above 75 years old was associated with higher poverty in most countries but had a negative impact in Belgium, the Netherlands, Norway, Poland, Sweden and the United Kingdom. The share of elderly people living in a single family household also contributed to higher poverty except for those in Belgium, Luxembourg, Spain and Sweden. The university attendance of the household head contributed to higher poverty except Austria and Hungary. The decomposition results are generally robust applying different poverty lines although the results of household working status and annual earnings alterned in directions.

These results lead to the policy suggestion that tackling poverty among the elderly should focus on public and private pensions as well as labour market factors. Changes in the mix of public versus private pensions do not seem to result in higher poverty among the elderly but helped reduce it. However, these findings should be interpreted with caution since our decomposition approach only considered the partial equilibrium or static state rather than global equilibrium or the dynamic situation. Future work should shed more light on the poverty among the elderly, and improve the decomposition method to reduce the influence of alternative explanations, i.e. to minimize residuals.

Declarations of interest

None.

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