


ARTICLE

# The magnitude and direction of changes in age-specific at-risk-of-poverty rates: an analysis of patterns of poverty trends in Europe in the mid-2010s

Ilari Ilmakunnas<sup>1,2</sup> 

<sup>1</sup>The Finnish Centre for Pensions, Helsinki, Finland

<sup>2</sup>INVEST Research Flagship Center, University of Turku, Turku, Finland

Email: [ilari.ilmakunnas@etk.fi](mailto:ilari.ilmakunnas@etk.fi)

(Received 10 February 2022; accepted 15 March 2022)

## Abstract

The European Union's at-risk-of-poverty threshold is set at 60 per cent of national median disposable equivalent income. Changes in median income therefore shift the threshold, which is likely to affect at-risk-of-poverty rates. This effect is likely to vary across population subgroups due to, for instance, connectedness to the labour market. This exploratory study investigates whether there are typical patterns related to changes in age-specific at-risk-of-poverty rates. The study uses European Union Statistics on Income and Living Conditions microdata and focusses on the development of poverty rates in 30 European countries in the mid-2010s. Results show that especially the old-age poverty rates followed patterns that were different from those of child or working-age poverty rates. There were differences between age groups regarding both the magnitude and direction of at-risk-of-poverty rates. Additionally, the association between changes in at-risk-of-poverty rates and changes in poverty thresholds, income and employment significantly differs between the older population and the two other age groups.

**Keywords:** Poverty; poverty measurement; Europe; EU-SILC; age differences

## Introduction

The alleviation of poverty is among the main goals of the welfare state (Barr, 2012). It has been also argued that the existence of poverty can be seen as a measure of the effectiveness of social policies (Beckerman, 1979). However, there are various approaches to defining or measuring poverty. In the context of rich welfare states, the preference is to use a relative definition of poverty, which usually means having less than other members of society (Goedemé & Rottiers, 2011). Absolute poverty, on the other hand, indicates that an individual has less than a certain specified minimum (Goedemé & Rottiers, 2011).

Relative poverty thresholds are typically defined in terms of the distance from average household income. Measures using these thresholds are frequently used for evaluating trends in economic disadvantage and the effectiveness of public policies. However, it is likely that linking the threshold with changes in average income affects poverty rates for some population subgroups more than for others. This can occur due to two reasons: (1) some population subgroups are more connected to the labour market and can experience more year-to-year variation in income and (2) some population subgroups have, on average, income that is more close to the poverty threshold. This study focusses on age groups since it is reasonable to assume that there are differences between age groups regarding these factors.

This exploratory study focusses on the most widely used poverty measure in the European Union (EU) and investigates whether there are typical patterns related to changes in age-specific poverty rates. It is analysed whether the magnitude and direction of changes in at-risk-of-poverty (AROP) rates vary between age groups. Magnitude refers to the size of changes in poverty rates, and direction refers to either

a decrease or an increase in the poverty rate. Also, it is analysed how changes in age-specific poverty rates are associated with changes in poverty thresholds, income and employment. The aim is to seek for general tendencies regarding the changes in the poverty rates instead of inspecting the effects of, for instance, different welfare state policies. Illustrating general patterns deepens the understanding related to the poverty outcomes when the AROP measure is applied. The analysis uses three age groups: children (0–17), the working-age population (18–64) and the older population (65+). The study utilizes a large number of countries and multiple periods of different length. It is based on European Union Statistics on Income and Living Conditions (EU-SILC) microdata and focusses on the development of poverty rates in 30 European countries around the mid-2010s.

Since this study focusses on the AROP measure, the paper starts by discussing the history, background and strengths and limitations of the measure. This is followed by a discussion on why the risk of poverty varies between age groups and why the changes in the poverty threshold can have a larger impact for some age groups than for others. These are followed by sections on data and methods, results, and conclusions.

### Measuring relative monetary poverty

The EU defines poverty as follows: “*People are said to be living in poverty if their income and resources are so inadequate as to preclude them from having a standard of living considered acceptable in the society in which they live*” (European Commission, 2004). In other words, poverty is not only about meeting basic needs, but about exclusion from a minimum acceptable way of life. Overall, poverty is typically seen as a multidimensional social problem (Atkinson et al., 2002; Nolan & Whelan, 2011), and the literature uses a wide range of different poverty measures (eg. Atkinson et al., 2002; Kangas & Ritakallio, 1998). These measures often follow the most common definitions of poverty and concentrate on lack of resources. Consequently, based on access to resources and a calculation of a poverty threshold, households are classified as either poor or non-poor.

A single measure cannot capture all dimensions of poverty at the same time (Spicker, 2012). Nevertheless, most research uses a similar monetary poverty measure in which the threshold is calculated as the distance from average income (typically median). This can be described as a “floating” threshold (Decancq et al., 2013; Marx, Vandenbroucke, & Verbist, 2012). In the EU, the threshold is set at 60 per cent of national median disposable equivalent income. This indicator has a relative character because poverty is assessed in reference to the general or average level of prosperity of others in society (Goedemé & Rottiers, 2011). While considering the level of income of an average household as a basis for a poverty threshold has a long history (see Townsend, 1962), this particular threshold emerged in the UK after it was adopted by the UK as a target level in dealing with child poverty around the turn of the millennium (Spicker, 2012). The EU has since adopted this approach as well, calling it the “at-risk-of-poverty indicator” (Atkinson et al., 2002; Marlier et al., 2007). Since 2001, this indicator has been officially used to measure poverty and social inclusion in the EU (Atkinson et al., 2002; Marlier et al., 2007). It is also included in the composite measure used by the EU to evaluate the EU 2020 target regarding the number of individuals in “at risk of poverty or social exclusion” (eg. Nolan & Whelan, 2011).

Despite its popularity, accessibility, reasonability and ease of use (Spicker, 2012), the AROP measure has its limitations. First, it can be argued that there is a mismatch between the definition and measurement of poverty. Definitions of poverty refer to a widely accepted standard of living. AROP does not measure this standard (Spicker, 2012) but rather the living conditions prevailing in society. Second, as the poverty threshold is based on median income, half of the population cannot be counted as poor (Spicker, 2012). Third, the choice of the distance to the median income is somewhat arbitrary (Nolan & Whelan, 2011). Fourth, the poverty rates produced by AROP do not necessarily highlight the differences between member states in living standards in a meaningful way (Guio, 2005). Fifth, the measure does not take into account that economies of scale at the household level vary across the income distribution and across countries (Goedemé et al., 2019). Sixth and finally, changes in median income – due to economic downturns, eg. – can result in unexpected swings in poverty rates (eg. Goedemé,

Collado, & Meeusen, 2014; Jenkins, 2020). This is related to the fact that changes in median income can move households across the AROP threshold without any real changes in living standards.

This study gives new information on the last-mentioned notion. While changes in the poverty threshold probably only explain a small fraction of all poverty exits or entries, it is possible that for some population subgroups these changes have larger effects. This can result in some population subgroups experiencing, on average, larger changes in AROP rates. In addition to the magnitude, also the direction of changes in the rates can differ due to this reason: for instance, if the median income increases due to economic and employment growth, and there are population subgroups that are not necessarily affected by this growth and have, on average, a low level of income.

### **Income structure and risk of poverty varies between age groups**

This study considers that there can be important differences between age groups regarding the effects of so called “floating” poverty thresholds. The most important reasons are related to the differences in the connectedness to the labour market, income structure and the level of income. The most notable differences can be expected to be found between old-age individuals and other age groups.

There is a long tradition of research that explores poverty during different stages of life. According to Rowntree’s (1901) path-breaking study on poverty in York, the risk of poverty was highest during childhood, when building a family, and in old age. It was lower during youth and after the children had left home. Subsequently, there has been a universal decline in poverty among older people, and the highest rates of poverty are now reported for young adults (Ebbinghaus, Nelson, & Nieuwenhuis, 2019; Kangas & Palme, 2000; OECD, 2019). In most OECD countries, the old-age income poverty rate is now lower than for the population as a whole (Ebbinghaus, Nelson, & Nieuwenhuis, 2019). Previously, the lowest poverty rates were reported for the working-age population (OECD, 2014).

Generally speaking, families with and without children are not equally well off in terms of the disposable income that is needed for adequate social participation (Penne et al., 2020). This ties in with the important role of social transfers in tackling both child (Bárcena-Martin, Blanco-Arana, & Perez-Moreno, 2018) and single mother poverty (Van Lancker, Ghysels, & Cantillon, 2015). The socio-demographic characteristics associated with child poverty are single parenthood, a large family, low education and lack of employment (Gornick & Jäntti, 2012; TÁRKI, 2010).

The extent of unemployment or economic inactivity and their distribution across households is important in assessing the poverty risk of working-age individuals (Lelkes, Medgyesi, & Tóth, 2009). Overall employment trends are obviously important, but so too is the question of which households benefit from rising employment (Cantillon, 2011). Additionally, there is an important interplay between employment trends and relative monetary poverty thresholds since increases in employment increase median income making it more difficult for individuals to escape poverty (eg. Marx, Vandenbroucke, & Verbist, 2012). The generosity of social transfers also has a bearing on the poverty risk of working-age individuals (Cantillon, 2011; Jacques & Noël, 2021). Jobless and one-person households have a particularly high poverty risk (Lelkes, Medgyesi, & Tóth, 2009).

One of the main characteristics of older individuals is their withdrawal from paid employment and transitioning into retirement. Retirement brings a substantial reduction in labour force activity, a reduced level of income and a lower likelihood of income fluctuations. The most common statutory retirement age in the EU is 65 years (European Commission, 2015). Economic fluctuations can have a smaller effect on the actual living standards of the older population than on younger age groups because older households have a smaller number of members who are in the work force. However, with respect to the rates of monetary poverty, the effects can be, in fact, larger since the income of older individuals is often close to the poverty threshold (Iacovou, 2017). Women, the low educated, those from a migration background and those living in a single-adult household are among the subgroups with a higher risk of old-age poverty (Ebbinghaus, Nelson, & Nieuwenhuis, 2019). The differences in old-age poverty between European countries are also linked with differences in pension systems, such as the role of minimum income provision of public pension systems (Ebbinghaus, 2021).

## Research questions

Considering the characteristics of the AROP measure and the factors that relate to age groups' level of income and income development, this exploratory study addresses following research questions:

- *Can age-group-specific patterns be detected in the magnitude and direction of changes in AROP rates?*
- *What role do changes in poverty thresholds have in explaining age group differences in poverty trends?*
- *How are the development of the employment rate and income associated with changes in poverty rates across age groups?*

## Data and methods

### Data

The analyses are based on EU-SILC microdata. These data include information on income, poverty and living conditions.<sup>1</sup> EU-SILC covers all EU countries as well as a number of countries participating on a voluntary basis.

This research analyses poverty development from 2013 to 2018, a period for which EU-SILC provides the most comprehensive country coverage. The results of this study are based on information from 30 countries.<sup>2</sup> The financial crisis around 2008–2012 caused some substantial year-on-year changes in poverty rates in Europe, but this economically turbulent period has no major effect on the results reported here. The focus of analysis was on changes happening during the periods 2017–2018, 2015–2018 and 2013–2018. This study focusses on these periods because during a short period of time changes in the poverty threshold can be expected to have more influence on households' poverty status. Additionally, the inclusion of multiple periods makes it possible to monitor changes occurring during periods of different length and reduces the impact of the baseline year on the results. Overall, these periods were characterized by relatively steady economic growth in Europe. For the sake of simplicity, the analyses were restricted to three age groups: children (0–17), working-age (18–64) and older people (65+). These represent the most studied age groups in previous research.

### Measures of poverty and statistical methods

Both floating and fixed poverty thresholds were used. The floating AROP threshold was set at 60 per cent of national median disposable equivalent income. This threshold was used unless otherwise specified. In addition, a floating 50 per cent threshold and a fixed threshold were used. A “fixed” (or anchored) poverty threshold refers to one that is kept constant in real terms. In the case of fixed thresholds, the first step was to calculate a floating poverty threshold, and this threshold was then adjusted for changes in prices for subsequent years. Poverty rates calculated using a fixed poverty threshold in 2018 were compared to the AROP rates from the baseline year (2013/2015/2017). A so-called modified OECD scale was used to equalise income, ie. to adjust the income of households of different size.<sup>3</sup>

To analyse the magnitude of changes in poverty rates in different age groups, the changes were illustrated in both absolute (percentage points) and relative (percentages) terms. Relative changes take into account that the absolute size of changes could be associated with level of poverty. The changes were also analysed using absolute values as one of the aims was to illustrate whether there are age group differences in the size of changes in poverty rates regardless of the direction (decrease or increase) of the change. The changes were also analysed using the coefficient of variation.

<sup>1</sup>The EU-SILC income reference period is the year prior to the survey year. For example, the poverty thresholds calculated for 2018 are based on income information for 2017. There are two exceptions: income information for Ireland considers the last 12 months prior to the survey, and for the UK it refers to the year of the survey (Mack, Lange, & Ponomarenko, 2020).

<sup>2</sup>Malta was not included in the analyses due to inaccuracies related to age variables.

<sup>3</sup>The modified OECD scale assigns a weight of 1 to the first adult in the household, 0.5 to all other adults, and 0.3 to each child under the age of 14.

This study also analysed the statistical significance of changes in age groups' AROP rates. First, the standard error for the difference in AROP rates was calculated using information on the standard errors of cross-sectional poverty rates. If zero was not included in the 95 per cent confidence interval of the difference in rates, a statistically significant change was concluded.<sup>4</sup> EU-SILC is a sample survey and therefore it was necessary to take account of the survey design in order to obtain correct standard errors for each country and each year. New variables for primary sampling units and strata were used in the estimation to obtain correct standard errors (Goedemé, 2013).

Furthermore, it was studied whether changes in age groups' AROP rates move the total population AROP rate in the same direction. The contribution of changes in age groups' AROP rates to the changes in the total population AROP rate was examined using a shift-share analysis. Shift-share analysis is a simple decomposition method for distinguishing the roles of, eg., changes in population subgroups' population shares and poverty rates (eg. Marx, Vandenbroucke, & Verbist, 2012). The shift-share decomposition can be carried out because the AROP measure is additively decomposable: the rate is the weighted sum of the different subgroups' rates. Since this research focusses on analysing changes over time, changes in one component (age groups' population share or AROP rate) between two time points was multiplied by the average value of the other component. These coefficients illustrate the contribution of changes in population shares and AROP rates for each age group.

Pearson's correlation coefficients were used to analyse how poverty rates calculated using floating and fixed poverty thresholds are associated. A comparison of these rates yields information on how changes in poverty thresholds explain changes in poverty rates over time (Goedemé, Collado, & Meeusen, 2014). Furthermore, correlation coefficients were used to investigate how changes in the employment rate and income are associated with changes in poverty rates. Information on annual employment rates for 15–64-year-olds was derived from Eurostat (Eurostat, 2021). A change in the employment rate refers to the percentage point change between 2018 and baseline year. Employment rates were matched with each country's income reference period in EU-SILC. A change in income refers to a relative (per cent) change in 25th percentile or median income of the total population or a given age group between 2018 and baseline year.

## Results

### *Changes in age groups' median income*

A reasonable starting point for analysing the magnitude and direction of changes in age-specific AROP rates is to inspect whether there are differences in the average changes in disposable income between age groups. One could expect that there would be a positive association between changes in income and changes in the standard of living (eg. poverty). Figure 1 illustrates the average change in per cent in each age groups' median equivalent disposable income. Absolute values for changes were used since the interest was in the size of changes. The estimates are averages of the three periods analysed in this study (2017–2018, 2015–2018, 2013–2018). Incomes were adjusted for inflation.

The general pattern is that the average changes in income were typically smaller among older individuals. Typically, the difference between the older population and the two other age groups was significant. Only in Switzerland and Italy, changes in income were notably higher among older people than among children or the working-age population. If there were notable differences between children and the working-age population, children were the group with the largest increases in income. Additionally, there was a number of countries where all three age groups experienced rather similar income development.

<sup>4</sup>Calculations of the statistical significance of poverty rates assumed independence of samples between years for each country. This is because there is a critical difference between EU-SILC waves in sample design variables (Goedemé, Collado, & Meeusen, 2014). EU-SILC has a rotational design in which the cases in the sample are partially the same between consecutive years. An individual is included in the sample for a maximum of 4 years (4-year rotational design). For this reason, calculations of the statistical significance of changes in poverty rates can be somewhat conservative (regarding changes occurring between 2017 and 2018 and between 2015 and 2018). Furthermore, the 95 per cent confidence intervals have not considered that the poverty threshold was estimated based on the data.

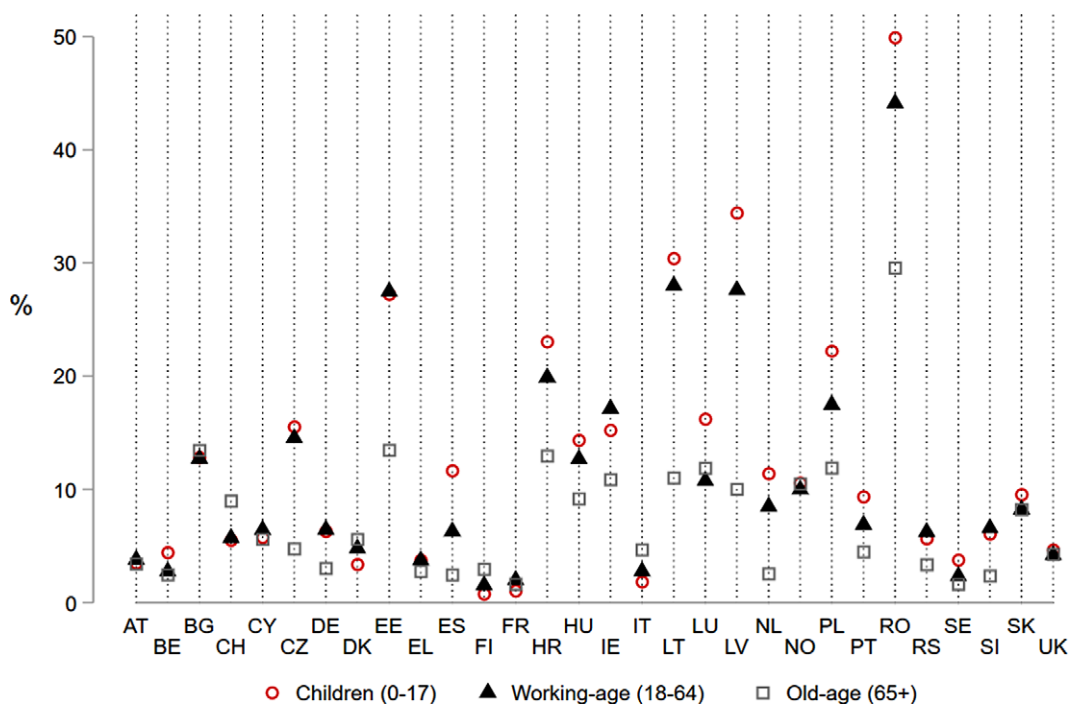


Figure 1. Average change in age groups' median income during three time periods (2017–2018, 2015–2018, 2013–2018), %. Source: EU-SILC.

### Level and changes in poverty rates among age groups

Next, the poverty rates and trends are analysed. The first set of columns in Table 1 illustrates the AROP rates for all three age groups in 2018. There are significant age differences in these rates in European countries, but no uniform pattern can be detected. The working-age population had the highest AROP rate only in three countries.<sup>5</sup> Children had the highest AROP rates in approximately same number of countries as the old-age population. The highest AROP rates were the old-age AROP rates in Estonia, Latvia and Lithuania (38–46 per cent).

Table 1 also illustrates the changes in AROP rates and their statistical significance ( $p < 0.05$ ) for the periods 2017–2018, 2015–2018 and 2013–2018. The largest changes in AROP rates were clearly related to old-age poverty. This is somewhat paradoxical considering that average changes in income were typically smaller among older individuals (Figure 1). Between 2013 and 2018, the increase in old-age AROP rates was 18–28 percentage points in the Baltic countries. In the Czech Republic, Ireland and Romania, the increase was around 8–9 percentage points. With respect to child poverty, large changes were observed in Hungary and Poland where the AROP rate decreased by 10 percentage points.

The older population stands out also when the statistical significance of the changes is analysed. Between 2017 and 2018, statistically significant changes were only seen for old-age AROP rates (nine countries). In the periods 2015–2018 and 2013–2018, statistically significant changes were found for all age groups. However, there were again notably more statistically significant changes in old-age AROP rates. Between 2015 and 2018, there were 14 statistically significant changes regarding old-age poverty, 8 regarding child poverty and 6 regarding the working-age population. Between 2013 and 2018, there were 18 statistically significant changes regarding the older population and 7 regarding both children and working-age individuals.

Table 2 focusses on the magnitude of changes in poverty rates. Given that the interest here was solely with the size of changes and not with their direction, the analysis used absolute values. The first row

<sup>5</sup>For Poland and Hungary an age group with the highest AROP rate was not assigned since the difference between groups was less than 0.5 percentage points.



**Table 1.** Age groups' at-risk-of-poverty (AROP) rates and changes in at-risk-of-poverty rates during three time periods in European countries, percentage points.

Country	AROP rate in 2018			Change in AROP rate 2018–2017			Change in AROP rate 2018–2015			Change in AROP rate 2018–2013		
	Children	Working-age	Old-age	Children	Working-age	Old-age	Children	Working-age	Old-age	Children	Working-age	Old-age
AT	19.2	13.0	13.9	0.1	−0.5	1.0	1.4	0.0	0.7	0.5	0.2	−1.5
BE	20.1	15.1	16.6	1.7	0.0	0.7	2.1	1.4	1.4	3.0	1.7	−1.9
BG	26.6	18.2	29.2	−2.6	−0.7	−2.8	1.2	0.2	−2.5	−1.8	1.1	1.3
CH	19.0	11.0	23.1	1.0	−0.9	−2.8	0.6	−0.9	−3.5	3.1	0.8	−6.4
CY	17.3	13.4	21.4	0.9	−0.8	−0.1	0.6	−2.5	4.1	1.9	−1.0	1.4
CZ	11.0	7.7	14.2	−0.6	−0.2	3.5	−3.7	−1.3	6.8	−0.2	−0.9	8.4
DE	14.6	15.4	18.4	−0.2	−0.5	1.1	−0.2	−1.7	1.4	−0.1	−1.5	3.5
DK	11.0	14.5	8.9	1.0	0.2	0.2	0.7	0.7	−0.1	1.9	1.1	−1.1
EE	15.2	16.4	46.3	−1.3	0.1	5.1	−4.8	−1.5	10.5	−2.9	−0.9	21.9
EL	22.7	19.8	11.6	−1.8	−1.9	−0.8	−3.9	−2.7	−2.1	−6.1	−4.3	−3.5
ES	26.8	21.8	15.6	−1.6	0.1	0.8	−2.9	−1.0	3.3	−0.7	1.4	2.9
FI	11.1	11.9	13.2	0.8	0.3	0.9	1.1	−0.8	−0.6	1.8	0.6	−2.9
FR	19.9	12.7	8.2	0.9	−0.1	0.4	1.2	−0.7	0.2	2.3	−0.9	−0.9
HR	19.7	16.4	28.1	−1.7	−0.5	−0.5	−1.2	−1.5	1.8	−2.1	−1.4	4.7
HU	13.8	13.4	9.8	−1.0	−0.9	0.7	−8.9	−2.1	5.2	−10.0	−1.8	5.2
IE	15.8	13.3	20.1	−1.2	−1.9	5.3	−1.9	−2.8	6.7	−2.4	−2.4	9.5
IT	26.2	20.5	15.3	−0.2	0.2	−0.3	−0.5	0.7	0.5	1.0	1.5	0.2
LT	23.9	18.0	37.7	−1.8	−0.9	4.3	−5.0	−1.5	12.7	−3.0	−1.1	18.2
LU	22.7	18.4	12.1	−0.1	−0.4	0.4	1.2	3.5	4.2	−1.2	3.4	5.9
LV	17.5	17.8	45.7	−0.9	0.3	5.9	−5.7	−0.8	11.1	−5.9	−1.0	28.2

Table 1. Continued

Country	AROP rate in 2018			Change in AROP rate 2018–2017			Change in AROP rate 2018–2015			Change in AROP rate 2018–2013		
	Children	Working-age	Old-age	Children	Working-age	Old-age	Children	Working-age	Old-age	Children	Working-age	Old-age
NL	13.1	14.0	10.8	−1.3	0.3	0.8	−0.9	1.6	<b>5.2</b>	0.5	<b>3.1</b>	<b>5.3</b>
NO	13.2	14.3	7.8	−0.6	1.3	−0.5	1.9	1.3	−1.1	2.7	<b>2.8</b>	−1.9
PL	13.0	15.2	15.5	−1.0	−0.4	<b>1.7</b>	<b>−9.4</b>	−2.5	<b>3.4</b>	<b>−10.2</b>	−1.6	<b>3.3</b>
PT	19.0	16.7	17.7	−1.7	−1.4	0.7	<b>−5.8</b>	<b>−2.1</b>	0.7	<b>−5.5</b>	−1.8	<b>3.1</b>
RO	32.0	21.2	22.8	0.0	−0.5	<b>3.1</b>	−6.0	−2.1	<b>3.5</b>	−2.5	−0.7	<b>8.1</b>
RS	28.8	24.0	21.1	−1.7	−1.7	−0.2	−2.3	<b>−3.3</b>	0.4	−0.9	−0.4	1.7
SE	19.3	15.9	14.6	0.7	1.2	−1.1	1.2	0.2	−1.3	0.3	0.7	−0.4
SI	11.6	12.4	18.3	−1.2	−0.2	1.9	<b>−2.7</b>	−1.3	1.1	<b>−3.2</b>	−0.6	−2.2
SK	20.5	11.3	6.4	0.6	−0.2	−0.6	0.5	−0.3	0.8	0.2	−0.9	0.4
UK	24.0	16.9	19.3	2.7	1.4	<b>2.3</b>	<b>4.3</b>	1.2	<b>2.7</b>	<b>5.1</b>	<b>2.2</b>	<b>2.7</b>

Note: The poverty threshold was set at 60% of national median disposable equivalent income. Bolded changes were statistically significant at the level of  $p < 0.05$ .

Source: EU-SILC.



**Table 2.** Summary statistics of changes in poverty rates in 2017–2018, 2015–2018 and 2013–2018.

	Change in poverty rate 2017–2018			Change in poverty rate 2015–2018			Change in poverty rate 2013–2018		
	Children	Working-age	Old-age	Children	Working-age	Old-age	Children	Working-age	Old-age
Mean change in pp., floating threshold (AROP, 60%)	1.1	0.7	1.7	2.8	1.5	3.3	2.8	1.4	5.3
Median change in pp., floating threshold (AROP, 60%)	1.0	0.5	0.9	1.9	1.3	2.3	2.2	1.1	3.0
<i>Coefficient of variation</i>	0.6	0.8	1.0	0.9	0.6	1.0	0.9	0.7	1.2
Mean % change, floating threshold (AROP, 60%)	5.9	4.1	9.2	13.2	8.9	25.1	14.0	9.6	41.1
Median % change, floating threshold (AROP, 60%)	6.2	2.9	7.8	10.2	8.8	13.5	12.6	7.5	20.7
<i>Coefficient of variation</i>	0.5	0.8	0.9	0.8	0.6	1.2	0.8	0.7	1.1
Mean change in pp., floating threshold (50%)	1.5	0.7	1.3	2.7	1.2	2.7	2.4	1.1	3.9
Median change in pp., floating threshold (50%)	1.3	0.5	0.7	2.4	1.1	1.3	1.9	0.8	1.9
<i>Coefficient of variation</i>	0.8	0.8	1.2	0.7	0.8	1.5	0.8	0.9	1.5
Mean % change, floating threshold (50%)	14.1	7.0	16.6	21.7	11.6	39.4	21.4	11.8	74.5
Median % change, floating threshold (50%)	10.3	5.7	10.7	21.5	11.8	20.5	17.3	7.4	30.1
<i>Coefficient of variation</i>	1.1	0.7	1.0	0.6	0.8	1.2	0.8	1.0	1.4

Note: The figures are based on analyses using absolute values of changes in poverty rates.

Source: EU-SILC.

illustrates the mean change in the AROP rate. In all three time periods, the old-age AROP rate showed, on average, greater changes than either the child or working-age poverty rates. The second largest changes were recorded for child AROP rates. Old-age AROP rates changed by an average of 1.7 percentage points between 2017 and 2018; by 3.3 percentage points between 2015 and 2018; and by 5.3 percentage points between 2013 and 2018. In other words, the longer the period, the greater the changes in old-age AROP rates. However, no increase was seen between the 3- and 5-year periods for either children or the working-age population. When the AROP rates were analysed in relative terms (per cent), changes in old-age poverty were again larger than changes in child or working-age poverty, which means that the pattern is not explained by the level of rates.

Since the mean can be affected by outliers, it is useful to use other measures as well. The coefficient of variation – a measure of dispersion that takes into account the level – also indicates that there is indeed more variation in the changes in old-age AROP rates than in the child or working-age AROP rates. Yet, when the median of the change in rates was examined, the changes in old-age poverty were still higher but the differences between the groups became smaller. Additionally, the median of relative changes was the highest among older individuals in all three time periods. Though, the median of changes in the AROP rate was approximately at the same level among children and in the older population during the 2017–2018 period. All in all, it seems that the very large changes observed in the AROP rates for some countries (especially the Baltic countries) does affect the overall picture, but the consideration of outliers does not seem to remove the pattern of the older population being more prone to larger changes in AROP rates.

The use of a floating 50 per cent threshold gives information on the role of poverty thresholds. The threshold had some effect on the picture. The main results were that (1) the median change was the highest among children in 2017–2018 and 2015–2018, while in the 2013–2018 period the change for children was similar to that in the older population; (2) there was substantial variation as a result of some countries experiencing very large changes in old-age poverty rates; and (3) the median of relative change was the largest in the older population in the period 2013–2018, while the changes were at roughly the same level for children and the older population in the other two periods. These findings imply that the greater magnitude of the changes in old-age AROP rates is related to the level of the threshold. This is in line with older individuals more often having an income that is around 50–60 or 60–70 per cent of the national equivalised median income (Figure A1).

Previous analyses have focused on the magnitude of changes in AROP rates. Next, it is analysed whether patterns can be detected in the direction of changes in age-specific AROP rates. Figure 2 illustrates the contribution of changes in age groups' AROP rates to the total population AROP rate for the two longest time-periods: 2015–2018 and 2013–2018. The estimates are based on a shift-share decomposition analysis and are presented in the appendix (Tables A1 and A2), including estimates for the contribution of the changes in population shares.

The most typical pattern is that an increase in working-age AROP rates is associated with a decrease in old-age AROP rates, and vice versa. Between 2015 and 2018, the directions of changes in working-age and old-age poverty were the same in only 5 countries out of 30. Additionally, there were two countries where the changes in old-age poverty did not affect the total population poverty rate. Between 2013 and 2018, the direction of changes in AROP rates was similar in 7 countries. Consequently, in both periods old-age and working-age AROP rates developed in opposite directions in over two-thirds of the countries. The opposite direction of these changes means that the magnitude of a change in the total population AROP rate is reduced. Changes in child AROP rates did not have a similar relationship compared to the development of AROP rates in other age groups.

The next analysis sheds more light on how the choice of threshold affects the direction of changes in poverty rates. Table 3 illustrates the pairwise correlations between changes in poverty rates based on fixed and floating poverty thresholds in each of the three age groups. The changes in poverty rates calculated using floating and fixed thresholds were positively and statistically significantly associated both among children and in the working-age population. This implies that the two measures give a rather uniform view about poverty trends. The correlation coefficients were highest when analysing the changes between 2015 and 2018: 0.87 for children and 0.74 for the working-age population. In the older

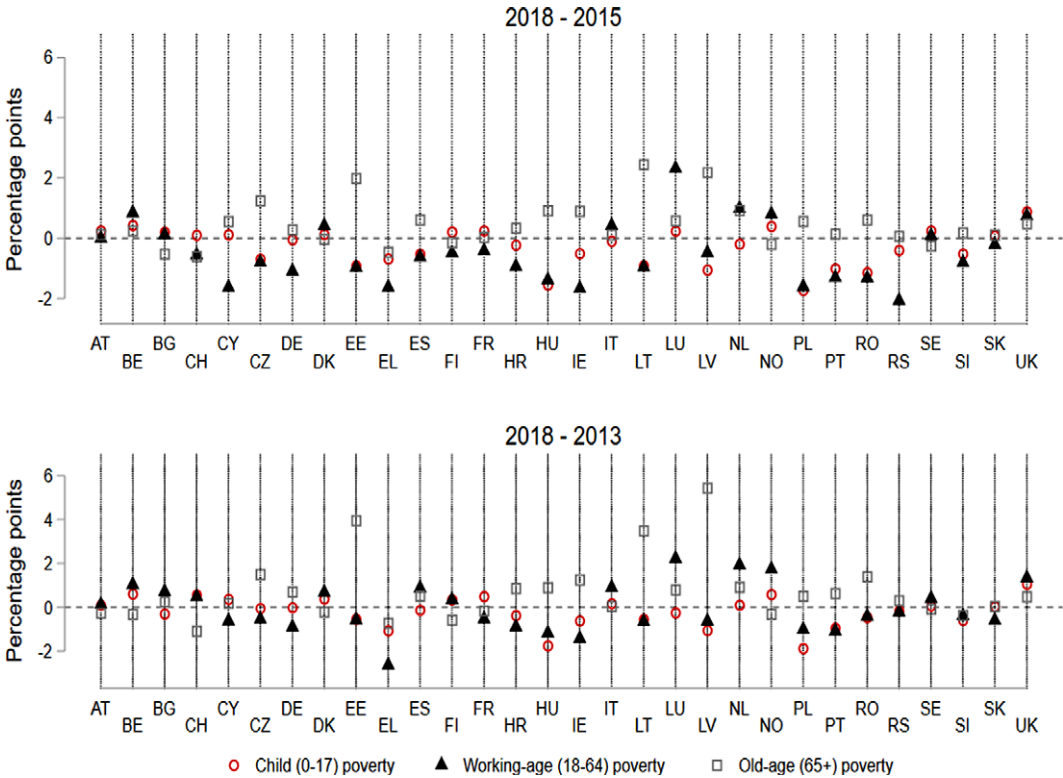


Figure 2. Contribution of changes in age groups' at-risk-of-poverty rates to the total population at-risk-of-poverty rate in 2015–2018 and 2013–2018. Source: EU-SILC.

population, the changes in poverty rates were either not associated or negatively associated. The correlation coefficient was  $-0.36$  for changes between 2013 and 2018, indicating that the picture emerging of trends in old-age poverty (decrease or increase) can be rather different depending on the measure applied. The general conclusions were similar if the floating poverty threshold was set at 50 per cent of median rather than 60 per cent (Table A3). These findings highlight the importance of the choice of a poverty threshold when analysing changes in the risk of old-age poverty.

**Association between changes in employment and income and poverty rates**

Lastly, it is examined how changes in the employment rate and income are associated with changes in poverty rates (Table 4). This analysis gives information on whether changes in AROP rates correspond with changes in economic trends and the standard of living. Both the floating AROP threshold and the fixed poverty threshold were used. Changes in income (median and 25th percentile) were calculated for both the total population and each age group. The findings were similar when the floating poverty threshold was set at 50 per cent of median (Table A4).

Changes in the total population's income (either median or 25th percentile income) were negatively associated with changes in child or working-age AROP rates. Though, the associations between changes in median income and changes in AROP rates for the working-age population in 2017–2018 and 2013–2018 and for children in 2017–2018 were not statistically significant. On the other hand, increases in income in the middle or bottom of the total population's income distribution tend to be associated with increases in the AROP rate in the older population. This can be explained by an increase in median income making it more difficult particularly for older individuals to avoid poverty. Similarly, an increase in the employment rate was negatively associated with AROP rates among children and in the working-age population, while in the older population there was no association or a positive association (2013–2018 period).

**Table 3.** Pairwise correlations between changes in poverty rates using floating and fixed poverty thresholds.

Period	Variables	Change in poverty rate, fixed threshold (children)	Change in poverty rate, fixed threshold (working-age)	Change in poverty rate, fixed threshold (old-age)
Change between 2017 and 2018	Change in poverty rate, floating AROP threshold (children)	0.672***		
	Change in poverty rate, floating AROP threshold (working-age)		0.709***	
	Change in poverty rate, floating AROP threshold (old-age)			-0.185
Change between 2015 and 2018	Change in poverty rate, floating AROP threshold (children)	0.868***		
	Change in poverty rate, floating AROP threshold (working-age)		0.738***	
	Change in poverty rate, floating AROP threshold (old-age)			-0.359
Change between 2013 and 2018	Change in poverty rate, floating AROP threshold (children)	0.764***		
	Change in poverty rate, floating AROP threshold (working-age)		0.591**	
	Change in poverty rate, floating AROP threshold (old-age)			-0.364*

Source: EU-SILC.

\*\*\* $p < 0.001$ .

\*\* $p < 0.01$ .

\* $p < 0.05$ .

When incomes increase among children or in the working-age population, there is a tendency for these groups' AROP rate to decrease. However, unexpected positive associations were found between income development and the AROP rate in the older population. The associations between changes in older individuals' median income and changes in their AROP rate were statistically significant for the periods 2015–2018 and 2013–2018, while the association between changes in older individuals' 25th percentile income and changes in their AROP rate was statistically significant in the period 2013–2018. As for the older population, the associations were stronger between changes in median income and changes in the AROP rate than between changes in the 25th percentile income and changes in the AROP rate. Among children and in the working-age population, the associations between changes in the 25th percentile income and changes in the AROP rate were stronger.

Fixed poverty thresholds yielded a much more uniform picture of the associations between employment or income development and changes in poverty rates. Furthermore, all associations were statistically significant and stronger than when using a floating AROP threshold. The main finding was that all associations were negative: increases in the employment rate or income (either in the total population or a specific age group) tend to be associated with decreases in poverty rates. Additionally, changes in the age group's 25th percentile income showed a stronger association with changes in the poverty rate than other income variables in all age groups.

## Conclusions

The poverty threshold is commonly set at 60 per cent of national median disposable equivalent income. It can be expected that linking the threshold with changes in average income affects poverty rates for some population subgroups more than for others. This study analysed how the magnitude and direction of

**Table 4.** Pairwise correlations between changes in employment and income and changes in poverty rates (floating at-risk-of-poverty (AROP) threshold and fixed threshold).

Period	Variables	Change in poverty rates, floating AROP threshold			Change in poverty rates, fixed threshold		
		Children	Working-age	Old-age	Children	Working-age	Old-age
Change between 2017 and 2018	Ch. in employment rate	−0.584***	−0.405**	0.084	−0.467***	−0.398**	−0.317*
	Ch. in median income (population)	−0.279	−0.292	0.602***	−0.828***	−0.851***	−0.747***
	Ch. in 25th percentile income (population)	−0.367**	−0.412**	0.474***	−0.887***	−0.890***	−0.775***
	Ch. in median income (children)	−0.393**			−0.861***		
	Ch. in median income (working-age)		−0.277			−0.833***	
	Ch. in median income (old-age)			0.288			−0.773***
	Ch. in 25th percentile income (children)	−0.437**			−0.853***		
	Ch. in 25th percentile income (working-age)		−0.535***			−0.934***	
Change between 2015 and 2018	Ch. in employment rate	−0.618***	−0.644***	0.293	−0.599***	−0.664***	−0.419**
	Ch. in median income (population)	−0.663***	−0.427**	0.651***	−0.893***	−0.873***	−0.753***
	Ch. in 25th percentile income (population)	−0.698***	−0.563***	0.517***	−0.918***	−0.918***	−0.741***
	Ch. in median income (children)	−0.669***			−0.893***		
	Ch. in median income (working-age)		−0.447**			−0.874***	
	Ch. in median income (old-age)			0.398**			−0.725***
	Ch. in 25th percentile income (children)	−0.747***			−0.911***		
	Ch. in 25th percentile income (working-age)		−0.602***			−0.940***	
	Ch. in 25th percentile income (old-age)			0.223			−0.757***

Table 4. *Continued*

Period	Variables	Change in poverty rates, floating AROP threshold			Change in poverty rates, fixed threshold		
		Children	Working-age	Old-age	Children	Working-age	Old-age
Change between 2013 and 2018	Ch. in employment rate	−0.606***	−0.469***	0.468***	−0.609***	−0.570***	−0.336*
	Ch. in median income (population)	−0.477***	−0.280	0.800***	−0.869***	−0.877***	−0.718***
	Ch. in 25th percentile income (population)	−0.550***	−0.386**	0.716***	−0.915***	−0.919***	−0.728***
	Ch. in median income (children)	−0.523***			−0.872***		
	Ch. in median income (working-age)		−0.302*			−0.874***	
	Ch. in median income (old-age)			0.453**			−0.791***
	Ch. in 25th percentile income (children)	−0.647***			−0.922***		
	Ch. in 25th percentile income (working-age)		−0.421**			−0.914***	
	Ch. in 25th percentile income (old-age)			0.325*			−0.834***

Source: EU-SILC.

\*\*\* $p < 0.001$ .\*\* $p < 0.01$ .\* $p < 0.05$ .

changes in poverty rates vary between age groups in European countries and how these changes are shaped by changes in poverty thresholds, income and employment. This study was exploratory with an aim to seek for general tendencies regarding changes in poverty rates among age groups. The analyses were conducted using EU-SILC survey data describing the development of poverty rates around the mid-2010s.

The results showed that on average, older individuals experienced greater changes in AROP rates than children or working-age individuals. This pattern was not fully explained by the level of poverty or outliers. In addition, changes in AROP rates were more often statistically significant in older individuals. The finding of greater changes of old-age AROP rates is somewhat paradoxical considering the result that the older population experienced on average smaller changes in income. Also, it was found that changes in old-age AROP rates typically move in the opposite direction to changes in working-age poverty.

While changes in poverty rates show a positive relationship among children and in the working-age population when calculated using fixed and floating thresholds, this does not hold for the older population. Furthermore, increases in the employment rate and income tend to be associated with decreases in child and working-age poverty. However, even an opposite pattern can be found for the older population. When a fixed poverty threshold was used, a negative association was found in all age groups between employment and income changes and changes in poverty rates. In other words, unless a fixed poverty threshold is used, the positive income (or employment) development does not necessarily correspond with the development of old-age poverty rates. An important contributing factor for the trends of old-age poverty is that older individuals have income more often just below or above the poverty threshold than other age groups.

There seem to be clear cross-national tendencies with respect to changes in age-specific AROP rates. Also, the opposite direction of changes in old-age and working-age AROP rates has the effect of suppressing the changes in total population AROP rates. Population ageing means that over time, the impact of the older population on the total population AROP rate is set to increase. The distinctive nature of changes in old-age poverty rates should be considered when AROP rates are used for policy evaluation. For instance, it has been argued that the AROP measure itself partially explains why European poverty rates did not decline during the 2000s (Jenkins, 2020). Measures with a more absolute character showed a stronger association with national economic performance and greater cross-national heterogeneity (Jenkins, 2020). The findings are in line with previous research which indicates that “poverty line effects” can be substantial even over relatively short periods of time (Goedemé, Collado, & Meeusen, 2014).

This study has some limitations. The period under investigation was marked by economic growth. Especially when median income suddenly decreases due to economic downturns, AROP rates can develop unexpectedly across all age groups. It is likely that there are individual countries where the poverty trends seen during the time periods under study overlap with important policy changes. It is unlikely, however, that the general patterns found in this study can be fully explained by similar policies being adopted across Europe at the same time. Due to the exploratory nature of the study, only the general patterns of poverty trends were inspected. Nonetheless, future research should seek to consider the “poverty line effects” of various policies.

The results of this study have implications for future research. Since many older individuals’ have incomes close to the poverty threshold, it makes sense to consider the use of several floating thresholds – although this study showed that measures using a 50 or 60 per cent of median threshold have similar associations with economic trends. Additionally, fixed poverty thresholds should be used alongside floating ones. This would be useful particularly for gaining a more precise picture on changes in the economic situation of the older population. Yet, it is important to note that floating thresholds take into account the social and economic situation in the society in which individuals live and as such are essentially a relatively poverty measure. However, the threshold does not necessarily reflect what is considered a generally acceptable living standard (Goedemé & Rottiers, 2011). Thus, there is a need for monetary poverty measures that are more closely aligned with definitions of poverty and that are more



likely to follow countries' economic performance, such as measures based on reference budgets (see Penne et al., 2016).

**Disclosure statement.** The author declares that there is no conflict of interest.

**Funding.** This research was funded by the Academy of Finland Flagship Programme (decision number: 320162).

**Notes on contributors.** Ilari Ilmakunnas obtained a PhD from the University of Turku in 2019. Currently he is working as a senior researcher at the Finnish Centre for Pensions and is also a visiting researcher at the INVEST Research Flagship Center, University of Turku. His research focuses on poverty and its measurement, economic disadvantage, social assistance reciprocity and social security.

## References

- Atkinson, T., Cantillon, B., Marlier, E., & Nolan, B. (2002). *Social indicators: The EU and social inclusion*. Oxford: Oxford University Press.
- Bárcena-Martin, E., Blanco-Arana, C. M., & Perez-Moreno, S. (2018). Social transfers and child poverty in European Countries: Pro-poor targeting or pro-child targeting? *Journal of Social Policy*, 47(4), 739–758.
- Barr, N. (2012). *Economics of the welfare state*. Oxford: Oxford University Press.
- Beckerman, W. (1979). *Poverty and the impact of income maintenance programmes*. Geneva: International Labour Office.
- Cantillon, B. (2011). The paradox of the social investment state: Growth, employment and poverty in the Lisbon era. *Journal of European Social Policy*, 21(5), 432–449.
- Decancq, K., Goedemé, T., Van Den Bosch, K., & Vanhille, J. (2013). The evolution of poverty in the Europe Union: Concepts, measurement and data. In B. Cantillon & F. Vandebroucke (Eds.), *Reconciling work and poverty reduction: How successful are European welfare states?* Oxford: Oxford University Press.
- Ebbinghaus, B. (2021). Inequalities and poverty risks in old age across Europe: The double-edged income effect of pension systems. *Social Policy & Administration*, 55(3), 440–455. <https://doi.org/10.1111/spol.12683>
- Ebbinghaus, B., Nelson, K., & Nieuwenhuis, R. (2019). Poverty in old age. In B. Greve (Ed.), *Routledge international handbook of poverty*. London: Routledge.
- European Commission. (2004). *Joint report on social inclusion 2004*. Luxembourg: Office for Official Publications of the European Communities.
- European Commission. (2015). *The 2015 ageing report. Economic and budgetary projections for the 28 EU Member States (2013–2060)*. European Economy No. 3/2015. Luxembourg: Publications Office of the European Union.
- Eurostat. (2021). *Employment rates by sex, age and citizenship (%)*. [https://ec.europa.eu/eurostat/databrowser/view/lfsq\\_ergan/default/table?lang=en](https://ec.europa.eu/eurostat/databrowser/view/lfsq_ergan/default/table?lang=en)
- Goedemé, T. (2013). How much confidence can we have in EU-SILC? Complex sample designs and the standard error of the Europe 2020 poverty indicators. *Social Indicators Research*, 110(1), 89–110.
- Goedemé, T., Collado, D., & Meeusen, L. (2014). *Mountains on the move: Recent trends in national and EU-wide income dynamics in old and new EU Member States*. Herman Deleeck Centre for Social Policy, University of Antwerp. (ImPRovE Working Papers No 14/05).
- Goedemé, T., Penne, T., Hufkens, T., Karakitsios, A., Bernát, A., Franziskus, A., Simonovits, B., Álvarez, E. C., Kanavitsa, E., Parcerisas, I. C., Romani, J. R., Mäkinen, L., Matsaganis, M., Arlotti, M., Kopasz, M., Szivós, P., Ritakallio, V.-M., Kazepov, Y., Van Den Bosch, K. & Storms, B. (2019). What does it mean to live on the poverty threshold? Lessons from reference budgets. In Bea Cantillon, T. Goedemé, & J. Hills (Eds.), *Decent incomes for all: Improving policies in Europe* (pp. 13–33). Oxford: Oxford University Press.
- Goedemé, T., & Rottiers, S. (2011). Poverty in the enlarged European Union. A discussion about definitions and reference groups. *Sociology Compass*, 5(1), 77–91.
- Gornick, J. C., & Jäntti, M. (2012). Child poverty in cross-national perspective: Lessons from the Luxembourg Income Study. *Children and Youth Services Review*, 34(3), 558–568.
- Guio, A.-C. (2005). *Material Deprivation in the EU*. Eurostat. (Statistics in Focus 21/2005).
- Iacovou, M. (2017). Household structure, income poverty and subjective hardship. In A. B. Atkinson, A.-C. Guio, & E. Marlier (Eds.), *Monitoring social inclusion in Europe. 2017 edition* (pp. 89–102). Luxembourg: Publications Office of the European Union.
- Jacques, O., & Noël, A. (2021). Targeting within universalism, *Journal of European Social Policy*, 31(1), 15–29. <https://doi.org/10.1177/0958928720918973>
- Jenkins, S. P. (2020). Perspectives on poverty in Europe. Following in Tony Atkinson's footsteps. *Italian Economic Journal*, 6(1), 129–155.

**Kangas, O., & Palme, J.** (2000). Does social policy matter? Poverty cycles in OECD countries. *International Journal of Health Services*, 30(2), 335–352.

**Kangas, O., & Ritakallio, V.** (1998). Different methods—different results? Approaches to multidimensional poverty. In H. Andreß (Ed.), *Empirical Poverty Research in a Comparative Perspective* (pp. 167–203). Aldershot: Ashgate.

**Lelkes, O., Medgyesi, M., & Tóth, I. G.** (2009). The factors affecting the risk of poverty and inequalities in income distribution. In T. Ward, O. Lelkes, H. Sutherland, & I. G. Tóth (Eds.), *European inequalities: Social inclusion and income distribution in the European Union* (pp. 45–76). TÁRKI Social Research Institute Inc., Budapest.

**Mack, A., Lange, B., & Ponomarenko, V.** (2020). *Harmonization of Income Data in EU-SILC. Update of GESIS Paper 2015/18*. GESIS – Leibniz-Institut für Sozialwissenschaften. (GESIS Papers No. 2020/05).

**Marlier, E., Atkinson, A. B., Cantillon, B., & Nolan, B.** (2007). *The EU and social inclusion: Facing the challenges*. Bristol: The Policy Press.

**Marx, I., Vandenbroucke, P., & Verbist, G.** (2012). Can higher employment levels bring down relative income poverty in the EU? Regression-based simulations of the Europe 2020 target. *Journal of European Social Policy*, 22(5), 472–486. <https://doi.org/10.1177/0958928712456577>

**Nolan, B., & Whelan, C. T.** (2011). *Poverty and deprivation in Europe*. Oxford: Oxford University Press.

**OECD.** (2014). *Income Inequality Update—June 2014*.

**OECD.** (2019). *Pensions at a Glance 2019: OECD and G20 Indicators*. Paris: OECD Publishing. <https://doi.org/10.1787/b6d3dcfc-en>

**Penne, T., Hufkens, T., Goedemé, T., & Storms, B.** (2020). To what extent do welfare states compensate for the cost of children? The joint impact of taxes, benefits and public goods and services. *Journal of European Social Policy*, 30(1), 79–94.

**Penne, T., Parcerisas, I. C., Mäkinen, L., Storms, B., & Goedemé, T.** (2016). *Can reference budgets be used as a poverty line?* Herman Deleeck Centre for Social Policy – University of Antwerp. (ImPROVE Discussion Paper No. 16/05).

**Rowntree, S.** (1901). *Poverty: A study of town life*. London: Macmillan and Co.

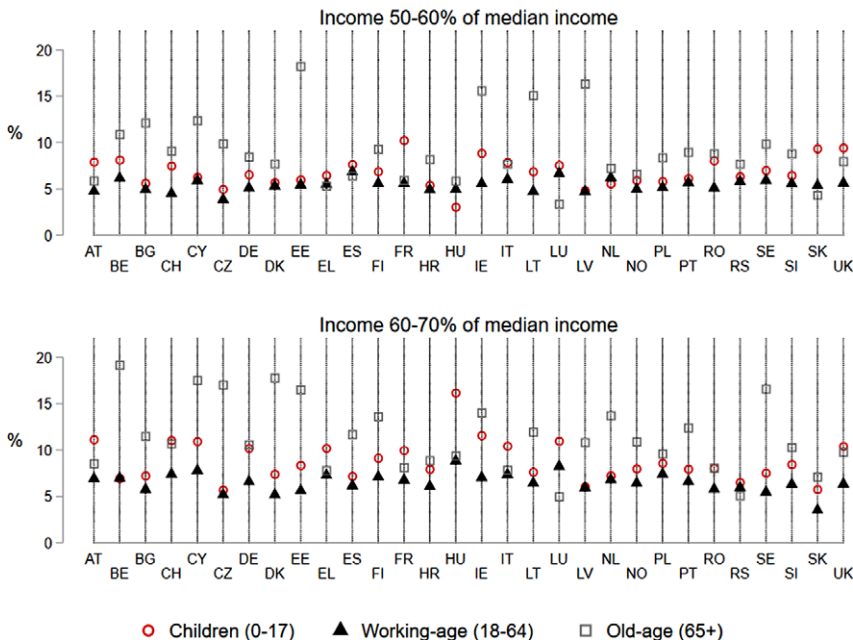
**Spicker, P.** (2012). Why refer to poverty as a proportion of median income? *Journal of Poverty and Social Justice*, 20(2), 163–175.

**TÁRKI.** (2010). *Child poverty and child wellbeing in the European Union. Report prepared for the DG employment, social affairs and equal opportunities (unite E.2) of the European Commission*. TÁRKI Social Research Institute Inc., Budapest.

**Townsend, P.** (1962). The meaning of poverty. *The British Journal of Sociology*, 13(3), 210–227.

**Van Lancker, W., Ghysels, J., & Cantillon, B.** (2015). The impact of child benefits on single mother poverty: Exploring the role of targeting in 15 European countries. *International Journal of Social Welfare*, 24(3), 210–222.

APPENDIX



**Figure A1.** Share of individuals with equivalised disposable income 50–60 per cent and 60–70 per cent of the median of national equivalent disposable income in three age groups, 2018, %. *Source:* EU-SILC.

**Table A1.** Contribution of changes in population shares and at-risk-of-poverty (AROP) rates of three age groups to change in the total population poverty rate in 2018–2015, shift-share decomposition analysis, percentage points.

Country	Population share (children)	Population share (working-age)	Population share (old-age)	AROP rate (children)	AROP rate (working-age)	AROP rate (old-age)
AT	0.1	0.1	-0.1	0.3	0.0	0.1
BE	-0.1	-0.1	0.1	0.4	0.8	0.2
BG	0.1	-0.3	0.3	0.2	0.1	-0.5
CH	0.0	-0.1	0.1	0.1	-0.6	-0.6
CY	-0.1	-0.2	0.4	0.1	-1.6	0.6
CZ	0.1	-0.2	0.2	-0.7	-0.8	1.2
DE	0.0	0.0	0.0	0.0	-1.1	0.3
DK	-0.1	0.0	0.1	0.1	0.4	0.0
EE	0.1	-0.2	0.3	-0.9	-1.0	2.0
EL	-0.1	-0.1	0.1	-0.7	-1.6	-0.5
ES	0.0	-0.2	0.1	-0.5	-0.6	0.6
FI	0.0	-0.2	0.2	0.2	-0.5	-0.1
FR	0.0	-0.1	0.1	0.3	-0.4	0.0
HR	-0.1	-0.1	0.3	-0.2	-0.9	0.3
HU	0.0	-0.4	0.2	-1.5	-1.4	0.9
IE	-0.1	-0.1	0.1	-0.5	-1.7	0.9
IT	-0.2	-0.1	0.1	-0.1	0.4	0.1
LT	-0.1	-0.2	0.4	-0.9	-1.0	2.5
LU	-0.4	0.1	0.1	0.2	2.3	0.6
LV	0.2	-0.3	0.2	-1.0	-0.5	2.2
NL	-0.1	0.0	0.1	-0.2	1.0	0.9
NO	-0.1	0.0	0.1	0.4	0.8	-0.2
PL	0.0	-0.3	0.2	-1.7	-1.6	0.6
PT	-0.1	-0.1	0.2	-1.0	-1.3	0.1
RO	0.0	-0.2	0.2	-1.1	-1.3	0.6
RS	0.0	-0.5	0.3	-0.4	-2.1	0.1
SE	0.1	-0.1	0.0	0.3	0.1	-0.3
SI	0.0	-0.2	0.2	-0.5	-0.8	0.2
SK	0.1	-0.2	0.1	0.1	-0.2	0.1
UK	0.1	-0.1	0.1	0.9	0.7	0.5

Source: EU-SILC.

**Table A2.** Contribution of changes in population shares and at-risk-of-poverty (AROP) rates of three age groups to change in the total population poverty rate in 2018–2013, shift-share decomposition analysis, percentage points.

Country	Population share (children)	Population share (working-age)	Population share (old-age)	AROP rate (children)	AROP rate (working-age)	AROP rate (old-age)
AT	-0.1	0.1	-0.1	0.1	0.1	-0.3
BE	-0.1	-0.1	0.2	0.6	1.0	-0.3
BG	0.3	-0.5	0.5	-0.3	0.7	0.3
CH	-0.1	-0.1	0.3	0.6	0.5	-1.1
CY	-0.1	-0.2	0.3	0.4	-0.6	0.2
CZ	0.1	-0.3	0.2	0.0	-0.5	1.5
DE	0.0	0.0	0.1	0.0	-0.9	0.7
DK	-0.1	-0.1	0.2	0.4	0.7	-0.2
EE	0.1	-0.5	0.8	-0.5	-0.6	4.0
EL	-0.1	-0.3	0.2	-1.1	-2.6	-0.7
ES	0.0	-0.3	0.2	-0.1	0.9	0.5
FI	-0.1	-0.3	0.4	0.4	0.3	-0.6
FR	-0.1	-0.2	0.2	0.5	-0.5	-0.2
HR	-0.3	-0.2	0.6	-0.4	-0.9	0.9
HU	0.0	-0.3	0.2	-1.8	-1.2	0.9
IE	-0.1	-0.1	0.2	-0.6	-1.4	1.3
IT	-0.2	-0.1	0.2	0.2	0.9	0.1
LT	-0.2	-0.2	0.4	-0.6	-0.7	3.5
LU	-0.8	0.4	0.1	-0.3	2.2	0.8
LV	0.3	-0.5	0.4	-1.1	-0.6	5.4
NL	-0.2	-0.1	0.2	0.1	1.9	0.9
NO	-0.3	0.1	0.2	0.6	1.7	-0.3
PL	0.0	-0.4	0.4	-1.9	-1.0	0.5
PT	-0.2	-0.2	0.3	-1.0	-1.1	0.6
RO	0.0	-0.4	0.4	-0.5	-0.4	1.4
RS	-0.1	-0.6	0.5	-0.2	-0.2	0.3
SE	0.1	-0.2	0.1	0.1	0.4	-0.1
SI	0.0	-0.3	0.5	-0.6	-0.4	-0.4
SK	0.1	-0.3	0.1	0.0	-0.6	0.1
UK	0.1	-0.2	0.2	1.1	1.3	0.5

Source: EU-SILC.

**Table A3.** Pairwise correlations between changes in poverty rates using floating (50% of median income) and fixed poverty thresholds.

Period	Variables	Change in poverty rate, fixed threshold (children)	Change in poverty rate, fixed threshold (working-age)	Change in poverty rate, fixed threshold (old-age)
Change between 2017 and 2018	Change in poverty rate, floating threshold (50%) (children)	0.864***		
	Change in poverty rate, floating threshold (50%) (working-age)		0.710***	
	Change in poverty rate, floating threshold (50%) (old-age)			-0.118
Change between 2015 and 2018	Change in poverty rate, floating threshold (50%) (children)	0.884***		
	Change in poverty rate, floating threshold (50%) (working-age)		0.752***	
	Change in poverty rate, floating threshold (50%) (old-age)			-0.195
Change between 2013 and 2018	Change in poverty rate, floating threshold (50%) (children)	0.765***		
	Change in poverty rate, floating threshold (50%) (working-age)		0.568**	
	Change in poverty rate, floating threshold (50%) (old-age)			-0.025

Source: EU-SILC.

\*\*\**p* < 0.001.

\*\**p* < 0.01.

**Table A4.** Pairwise correlations between changes in employment and income and changes in poverty rates (floating 50% of median income threshold).

Period	Variables	Children	Working-age	Old-age
Change between 2017 and 2018	Change in employment rate	-0.349*	-0.362**	0.106
	Change in median income (population)	-0.242	-0.072	0.402**
	Change in 25 <sup>th</sup> percentile income (population)	-0.359*	-0.246	0.266
	Change in median income (children)	-0.319*		
	Change in median income (working-age)		-0.148	
	Change in median income (old-age)			0.068
	Change in 25th percentile income (children)	-0.529***		
	Change in 25th percentile income (working-age)		-0.272	
	Change in 25th percentile income (old-age)			-0.016

**Table A4.** *Continued*

Period	Variables	Children	Working-age	Old-age
Change between 2015 and 2018	Change in employment rate	-0.644***	-0.700***	0.139
	Change in median income (population)	-0.621***	-0.362**	0.557***
	Change in 25th percentile income (population)	-0.707***	-0.523***	0.419**
	Change in median income (children)	-0.666***		
	Change in median income (working-age)		-0.396**	
	Change in median income (old-age)			0.340*
	Change in 25th percentile income (children)	-0.759***		
	Change in 25th percentile income (working-age)		-0.546***	
	Change in 25th percentile income (old-age)			0.180
Change between 2013 and 2018	Change in employment rate	-0.584***	-0.446**	0.338*
	Change in median income (population)	-0.417**	-0.188	0.738***
	Change in 25th percentile income (population)	-0.514***	-0.297	0.649***
	Change in median income (children)	-0.445**		
	Change in median income (working-age)		-0.209	
	Change in median income (old-age)			0.419**
	Change in 25th percentile income (children)	-0.598***		
	Change in 25th percentile income (working-age)		-0.320*	
	Change in 25th percentile income (old-age)			0.292

Source: EU-SILC.

\*\*\**p* < 0.001.

\*\**p* < 0.01.

\**p* < 0.05.

**Cite this article:** Ilmakunnas, I. (2022). The magnitude and direction of changes in age-specific at-risk-of-poverty rates: an analysis of patterns of poverty trends in Europe in the mid-2010s. *Journal of International and Comparative Social Policy* 38: 71–91. <https://doi.org/10.1017/ics.2022.2>