# 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

https://orcid.org/0000-0001-5763-7545

The Finnish Centre for Pensions, Helsinki, Finland
INVEST Research Flagship Center, University of Turku, Finland

E-mail: ilari.ilmakunnas@etk.fi

## Abstract

The EU's at-risk-of-poverty threshold is set at 60% of national median disposable equivalent income. Changes in median income therefore shift the at-risk-of-poverty threshold, which is likely to affect at-risk-of-poverty rates for some population subgroups more than for others. However, there is only scarce research on how the choice of poverty threshold affects the overall picture of poverty trends. This study aims to find out whether there are typical patterns related to changes in age-specific at-risk-of-poverty rates. This is done by analysing how the size and direction of changes in at-risk-of-poverty rates vary between age groups. Furthermore, the aim is to establish how changes in age-specific at-risk-of-poverty rates are associated with changes in poverty thresholds, income and employment. The study uses EU-SILC microdata and focuses on the development of poverty rates in 30 European countries in the mid-2010s. The results show that, on average, older age groups have experienced larger changes in at-risk-of-poverty rates than children or the working-age population. The increases or decreases in old-age at-risk-of-poverty rates are typically in an opposite direction to those seen in working-age poverty. Furthermore, different poverty thresholds can give a different picture of poverty trends, especially for the older population. Lastly, increases in the employment rate and income tend to be associated with decreases in child and working-age poverty, but even an opposite pattern can be found for old-age poverty. Overall, the findings imply that especially for short periods of time, caution is warranted when drawing conclusions about changes in old-age at-risk-of-poverty rates.

**Keywords**: poverty, poverty measurement, Europe, EU-SILC, age differences

## Introduction

Poverty is one of the most researched and discussed problems in contemporary society, and the alleviation of poverty is among the main goals of the welfare state (Barr, 2012). 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 and Rottiers, 2011). Absolute poverty, on the other hand, indicates that an individual has less than a certain specified minimum (Goedemé and Rottiers, 2011).

Relative poverty thresholds are typically defined in terms of the distance from average household income. Measures using these thresholds are important in evaluating trends in economic disadvantage and the effectiveness of public policies. However, there is only little research on how these measures affect the overall picture of poverty trends. It is likely that linking the threshold with changes in average income affects poverty rates for some population subgroups more than for others. For instance, it is reasonable to assume that there are differences between age groups. Old-age poverty in particular can be sensitive to changes in the threshold: 1) the income level of elderly households is probably rather constant over time and 2) in many countries, the income of older individuals is often close to the poverty threshold (Iacovou, 2017).

This study focuses on the most widely used poverty measure in the 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 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. Another purpose is to find out how changes in age-specific poverty rates are associated with changes in poverty thresholds, income and employment. The analysis uses three age groups: children (0–17), the working-age population (18–64) and the older population (65+). It is based on EU-SILC microdata and focuses on the development of poverty rates around the mid-2010s in 30 European countries.

## 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 (e.g. 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 et al., 2012). In the EU, the threshold is set at 60% 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). This particular threshold was established 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 (AROP) 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 European Union (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' (e.g. Darvas, 2019; Nolan & Whelan, 2011).

Despite its popularity, accessibility, reasonability, and ease of use (Spicker, 2012), the AROP measure has its limitations. First, changes in median income – due to economic downturns, for example – can result in unexpected swings in poverty rates (e.g. Goedemé et al., 2014; Jenkins, 2020). Second, 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. Third, as the poverty threshold is based on median income, half of the population cannot be counted as poor (Spicker, 2012). Fourth, the choice of the distance to the median income is somewhat arbitrary (Nolan & Whelan, 2011). Fifth, the poverty rates produced by AROP do not necessarily highlight the differences between member states in living standards in a meaningful way (Guio, 2005). Sixth and finally, 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).

Changes in median income can move households across the AROP threshold without any real changes in living standards. While changes in thresholds 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. As changes in median income affect poverty thresholds, the choice is sometimes made to use so-called fixed poverty thresholds (Decancq et al., 2013). A 'fixed' (or anchored) poverty threshold refers to one that is kept constant in real terms. Often, a poverty threshold is calculated for a given year, and it is only adjusted for changes in prices for subsequent years. One weakness of fixed thresholds is that they make no direct reference to the level of living conditions that are common in society.

**Risk of poverty varies between 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 et al., 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 et al., 2019). Previously, the lowest poverty rates were reported for the working-age population (OECD, 2014).

The various stages of life have their own characteristics that are associated with the risk of poverty. 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 et al., 2018) and single mother poverty (Van Lancker et al., 2015). The socio-demographic characteristics associated with child poverty are single parenthood, a large family, low education and lack of employment (Gornick & Jäntti, 2012; TARKI, 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 et al., 2009). Overall employment trends are obviously important, but so too is the question of which households benefit from rising employment (Cantillon, 2011). The generosity of social transfers also has a bearing on the matter (Cantillon, 2011; Jacques & Noël, 2021). Jobless and one-person households have a particularly high poverty risk (Lelkes et al., 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). Thus, 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. 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 et al., 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**

This section sets out the research questions (RQ) of the study. Expectations are assigned for each research question based on the characteristics of the AROP measure and different age groups.

RQ1: *Do age groups differ in terms of the size of changes in AROP rates?*

It is expected that, on average, changes in old-age AROP rates are greater than changes in child or working-age AROP rates.

RQ2: *Can age-group-specific patterns be detected in the direction of changes in* AROP *rates?*

It is expected that age groups show different patterns in the direction of changes in their AROP rates, and that differences will be seen particularly between the older population and the two other age groups.

RQ2: *What role do changes in poverty thresholds have in explaining age group differences in poverty trends?*

It is expected that the use of fixed poverty thresholds affects especially the picture of trends in old-age poverty.

RQ4: *How are the development of the employment rate and income associated with changes in poverty rates across age groups?*

It is expected that child and working-age AROP rates follow the development of the employment rate and income in the total population, but that this is not the case with old-age AROP rates. It is, however, expected that changes in income in each age group are associated with changes in the corresponding AROP rates.

## Data and methods

The analyses are based on EU-SILC (European Union Statistics on Income and Living Conditions) microdata. These data include information on income, poverty and living conditions.[1] 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 through 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.[2] 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 focuses 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.

Both floating and fixed poverty thresholds were used. The floating AROP threshold was set at 60% of national median disposable equivalent income. This threshold was used unless otherwise specified. In addition, a floating 50% threshold and a fixed threshold were used. 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 equivalize income, i.e. to adjust the income of households of different size.[3]

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.

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% confidence interval of the difference in rates, a statistically significant change was concluded.[4] EU-SILC is a sample survey and therefore it was

[1] 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 et al., 2020).
[2] Malta was not included in the analyses due to inaccuracies related to age variables.
[3] 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.
[4] 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 et al., 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 four 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

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, for example, changes in population subgroups' population shares and poverty rates (e.g. Marx et al., 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 focuses 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 et al., 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 (%) change in 25$^{th}$ percentile or median income of the total population or a given age group between 2018 and baseline year.

and between 2015 and 2018). Furthermore, the 95% confidence intervals have not considered that the poverty threshold was estimated based on the data.

## Results

*Level and changes in poverty rates among age groups*

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. Children had the highest AROP rates in 13 countries, while old-age rates were the highest in 12 countries. The working-age population had the highest AROP rate only in three countries.[5] The highest AROP rates were the old-age AROP rates in Estonia, Latvia and Lithuania. These rates were close to or over 40%.

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 conflicts with the finding that average changes in income were typically smaller among older individuals (see Appendix figure 1). 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, eight regarding child poverty and six regarding the working-age population. Between 2013 and 2018, there were 18 statistically significant changes regarding the older population and eight regarding both children and working-age individuals. Thus, there were more countries where the change in the old-age AROP rate was statistically significant than countries where it was not.

[5] 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 rates and changes in at-risk-of-poverty rates during three time periods in European countries, percentage points. Source: EU-SILC, own calculations.*

| 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** |
| **NL** | 13.1 | 14.0 | 10.8 | -1.3 | 0.3 | 0.8 | -0.9 | 1.6 | **5.2** | 0.5 | **3.1** | **5.3** |
| **NO** | 13.2 | 14.3 | 7.8 | -0.6 | 1.3 | -0.5 | 1.9 | 1.3 | -1.1 | 2.7 | **2.8** | -1.9 |
| **PL** | 13.0 | 15.2 | 15.5 | -1.0 | -0.4 | **1.7** | **-9.4** | -2.5 | **3.4** | **-10.2** | **-1.6** | **3.3** |
| **PT** | 19.0 | 16.7 | 17.7 | -1.7 | -1.4 | 0.7 | **-5.8** | **-2.1** | 0.7 | **-5.5** | -1.8 | **3.1** |
| **RO** | 32.0 | 21.2 | 22.8 | 0.0 | -0.5 | **3.1** | -6.0 | -2.1 | **3.5** | -2.5 | -0.7 | **8.1** |
| **RS** | 28.8 | 24.0 | 21.1 | -1.7 | -1.7 | -0.2 | -2.3 | **-3.3** | 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 | **-2.7** | -1.3 | 1.1 | **-3.2** | -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 | **2.3** | **4.3** | 1.2 | **2.7** | **5.1** | **2.2** | **2.7** |

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

Table 2 provides a more detailed analysis of 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 illustrates the mean change in the AROP rate. In all three time periods, as expected, the old-age AROP rate showed 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 5.4 percentage points between 2013 and 2018. In other words, the longer the period, the greater the changes in AROP rates. However, no increase was seen in the three-year and five-year periods for either children or the working-age population.

Since changes in older individuals' income are typically smaller than in other age groups, the larger changes observed in the AROP rates must be explained by other factors. Possible explanations include that 1) the level of poverty has an association with the size of changes, 2) some countries have experienced particularly large changes in old-age AROP rates (outliers) and 3) the level or changes in the poverty threshold have a larger effect in the older population. Table 2 sheds light on these competing explanations.

The second set of rows describes changes in AROP rates in relative terms (%). 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 also indicates that there is more variation in the changes in old-age AROP rates than in the child or working-age AROP rates. 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. 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. Additionally, the median of relative changes was the highest among older individuals in all three time periods. 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 final stage was to analyse the role of poverty thresholds. Using a floating 50% threshold has 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% of the national equivalized median income (Appendix figure 2).

Fixed poverty thresholds produce a different picture of age group differences in the magnitude of changes. When fixed poverty thresholds were used, children were found to experience the largest changes in poverty rates. However, when the changes were examined in relative terms, the age group differences were rather small. The size of changes in the working-age and older population seemed to be quite similar. All in all, the larger changes in old-age poverty rates also seem to be related to the development of the poverty threshold.

*Table 2. Summary statistics of changes in poverty rates in 2018–2017, 2018–2015 and 2018–2013. Source: EU-SILC, own calculations.*

| | Change in poverty rate 2018–2017 | | | Change in poverty rate 2018–2015 | | | Change in poverty rate 2018–2013 | | |
|---|---|---|---|---|---|---|---|---|---|
| | 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 |
| *Coefficient of variation* | *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 |
| *Coefficient of variation* | *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 |
| *Coefficient of variation* | *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 |
| *Coefficient of variation* | *1.1* | *0.7* | *1.0* | *0.6* | *0.8* | *1.2* | *0.8* | *1.0* | *1.4* |
| Mean change in pp., fixed threshold | 2.5 | 1.8 | 1.7 | 6.3 | 4.3 | 4.4 | 6.5 | 4.1 | 5.0 |
| Median change in pp., fixed threshold | 2.3 | 1.7 | 1.5 | 5.3 | 4.2 | 3.0 | 4.2 | 2.9 | 3.7 |
| *Coefficient of variation* | *0.7* | *0.8* | *0.8* | *0.7* | *0.6* | *0.9* | *0.8* | *0.9* | *0.9* |
| Mean % change, fixed threshold | 12.8 | 11.2 | 10.7 | 30.2 | 26.3 | 26.3 | 32.9 | 26.4 | 33.1 |
| Median % change, fixed threshold | 11.7 | 11.2 | 7.3 | 28.5 | 24.9 | 26.8 | 29.7 | 19.9 | 28.3 |
| *Coefficient of variation* | *0.7* | *0.7* | *0.8* | *0.7* | *0.6* | *0.7* | *0.8* | *0.9* | *0.8* |

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

Next, it is analysed whether patterns can be detected in the direction of changes in 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 analysis and are presented in the appendix (Appendix tables 1 and 2), 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. The opposite direction of these changes means that the magnitude of a change in the total population AROP rate is reduced. Between 2015 and 2018, the directions of changes in working-age and old-age poverty were the same in only five 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. Changes in child AROP rates did not have a similar relationship compared to the development of AROP rates in other age groups.

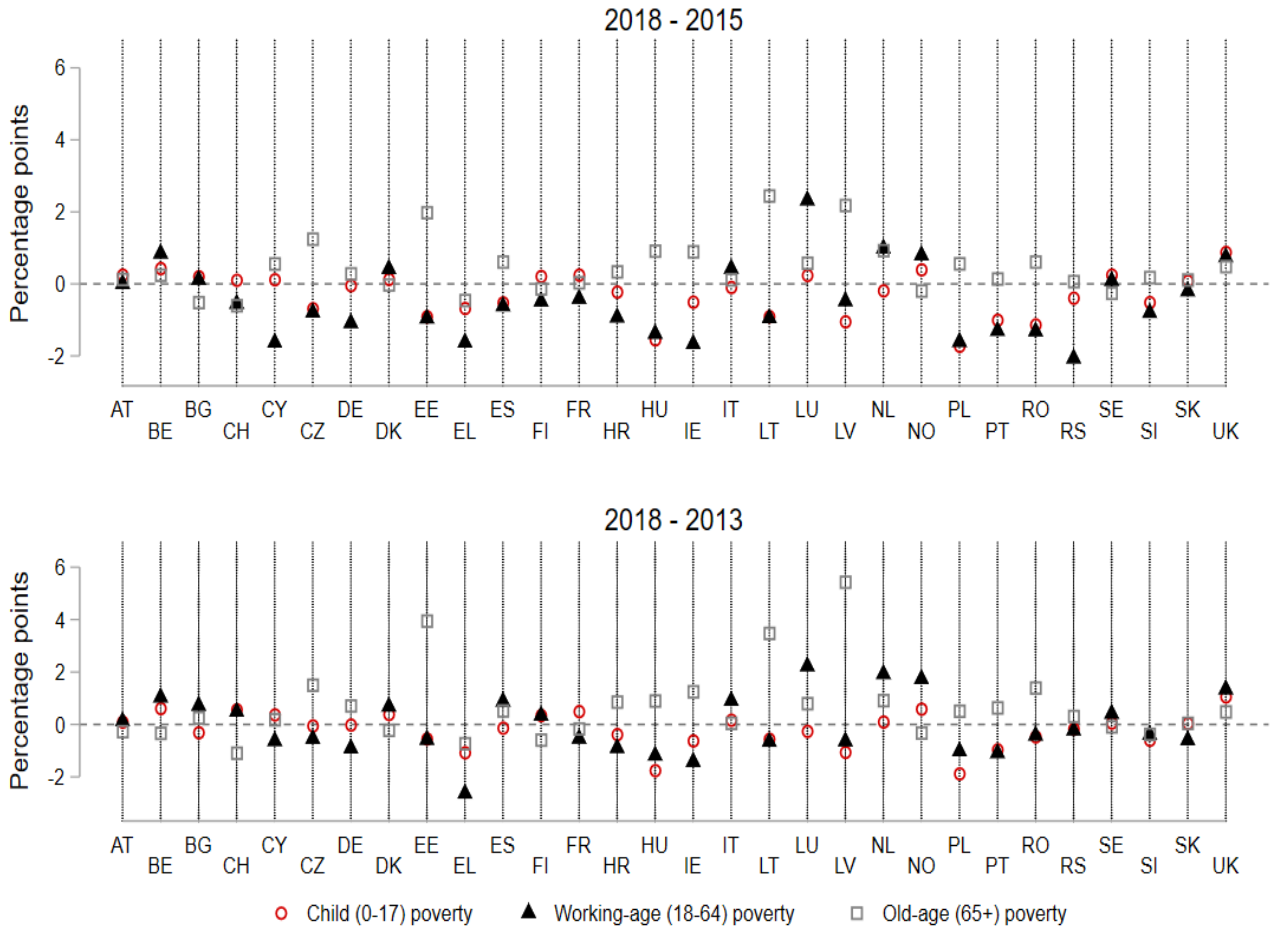


*Figure 1. Contribution of changes in age groups' at-risk-of-poverty rates to the total population at-risk-of-poverty rate in 2015–2018 and 2013–2018. Source: EU-SILC, own calculations.*

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. This analysis sheds more light on how the choice of threshold affects the direction of changes in poverty rates. The general conclusions were similar if the floating poverty threshold was set at 50% of median rather than 60% (Appendix table 3).

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 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, as expected, that the picture emerging of trends in old-age poverty can be rather different depending on the measure applied.

*Table 3. Pairwise correlations between changes in poverty rates using floating and fixed poverty thresholds. Source: EU-SILC, own calculations.*

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

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

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

Table 4 examines how changes in the employment rate and income are associated with changes in poverty rates. Both the floating AROP threshold and the fixed poverty threshold were used. Changes in income (median and 25$^{th}$ percentile) were calculated for both the total population and each age group. The findings of Table 4 were similar when the floating poverty threshold was set at 50% of median (Appendix table 4).

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. However, 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 was expected since an increase in median income makes it more difficult particularly for older individuals to escape 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).

When incomes increase among children or in the working-age population, there is a tendency for the 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.

*Table 4. Pairwise correlations between changes in employment and income and changes in poverty rates (floating 60% of median income threshold and fixed threshold). Source: EU-SILC, own calculations.*

| 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*** | |
| | Ch. in 25th percentile income (old-age) | | | 0.161 | | | -0.882*** |
| 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*** |
| 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*** |

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

## Conclusions

The EU's poverty threshold is set at 60% of national median disposable equivalent income. Changes in median income will likely have a greater impact on poverty rates in some population subgroups than others. This study analysed how the magnitude and direction of 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. The analyses were conducted using EU-SILC survey data describing the development of poverty rates around the mid-2010s. The focus was on short-term changes because during a short period of time changes in the poverty threshold can be expected to have more influence on households' poverty status.

The results showed that on average, older individuals experience greater changes in AROP rates than children or working-age individuals. In addition, changes in AROP rates were more often statistically significant in older individuals. This conflicts with the result that the older population experiences smaller changes in income. This pattern was not fully explained by the level of poverty or outliers. 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.

These findings have important implications. There are clear cross-national tendencies with respect to changes in age-specific AROP rates. Also, the distinctive features of changes in age groups' AROP rates have the effect of suppressing the changes in total population poverty 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 can be problematic if poverty rates are used for policy evaluation or if targets are set on the basis of total population poverty rates. 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). These findings are in line with previous research which indicates that 'poverty line effects' can be substantial even over relatively short periods of time (Goedemé et al., 2014).

This study has some limitations. The period under investigation was marked by economic growth. Especially when median income decreases, AROP rates can develop unexpectedly among children and in the working-age population. It is likely that there are individual countries where the poverty trends seen during the time periods under study are mainly explained by policy changes. Conclusions about the development of poverty in a single country should therefore be drawn with caution. 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. Nonetheless, future research should seek to establish whether and how policies explain changes particularly in old-age poverty.

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% of median threshold have similar associations with economic trends. The unexpected development of AROP rates during economic downturns is also problematic. Indeed, fixed poverty thresholds should be used alongside floating ones. 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). 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).

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**APPENDIX**

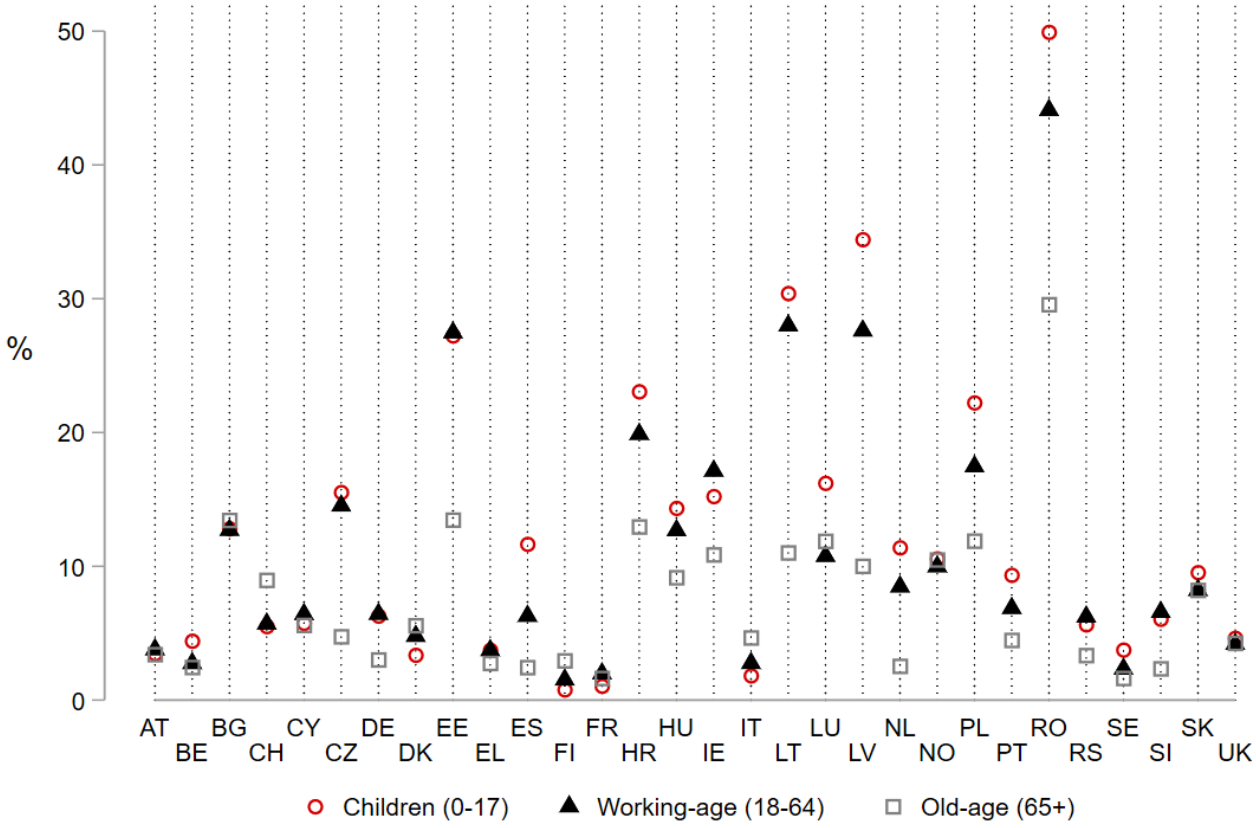


*Figure A1. Average change in age groups' median income during three time periods (2017–2018, 2015–2018, 2013–2018), %. Source: EU-SILC, own calculations.*


*Figure A2. Share of individuals with equivalized disposable income 50–60% and 60–70% of the median of national equivalent disposable income in three age groups, 2018, %. Source: EU-SILC, own calculations.*

*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, percentage points. Source: EU-SILC, own calculations.*

| 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 |

*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, percentage points. Source: EU-SILC, own calculations.*

| 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 |

*Table A3. Pairwise correlations between changes in poverty rates using floating (50% of median income) and fixed poverty thresholds. Source: EU-SILC, own calculations.*

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

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

*Table A4. Pairwise correlations between changes in employment and income and changes in poverty rates (floating 50% of median income threshold). Source: EU-SILC, own calculations.*

| 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 25th 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 |
| 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 |

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