ŚLĄSKI PRZEGLĄD STATYSTYCZNY
Silesian Statistical Review

Year 25, nr 23(29) ISSN 2449-9765

DOI: 10.15611/sps.2025.23.01

# Identification of Distinctive Structural Changes in Polish Senior Income (2016–2024)

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**Quote as:** Dębicka, J., Mazurek, E., & Stańczyk, E. (2025). Identification of Distinctive Structural Changes in Polish Senior Income (2016–2024). *Silesian Statistical Review*, *23*(29), 1–13.

JEL: J14; D31; C14

**Abstract:** Population ageing is reshaping European economies, including Poland, and calls for analytical approaches capable of identifying structural changes in income composition among older individuals. The aim of this article is to demonstrate the applicability of a method for detecting distinctive structural changes in income sources, using seniors aged 50 and over in Poland as an empirical example. The analysis is based on EU-SILC microdata for the years 2016, 2020, and 2024, combining a structural similarity test with an approach that identifies distinctive relative changes in income composition.

The application of the method shows that it captures income structure changes associated with both institutional and economic shocks, in particular the statutory retirement-age reform

implemented in 2017 and the COVID-19 pandemic. Among women aged 60–64, an increasing combination of pension income and earnings from work is observed, while men aged 65–69 display rising labour income despite formal retirement eligibility. During the pandemic period, the method reveals shifts in the relative importance of self-employment and selected social benefits, especially among older age groups and women, which are only partially reflected in standard similarity test results.

From a practical perspective, the proposed approach may be useful for analysing income structures of ageing populations and for identifying subtle but economically meaningful changes relevant to pension policy and labour market measures. By illustrating the method using the case of seniors' incomes in Poland, the study contributes to methodological discussions on the analysis of structural change in socio-economic research.

**Keywords:** population ageing, income structure, identification of distinguishing changes, EU-SILC, silver economy

## 1. Introduction

Population ageing is one of the most significant demographic challenges in contemporary Europe. This process results from the increasing life expectancy and persistently low fertility rates (European Commission, 2018; Eurostat, 2019). In Poland, demographic changes have led to a rapid increase in the number of older individuals. Between 2013 and 2023, the population in post-working age grew by more than 1.7 million, reaching 8.8 million persons and accounting for over 23% of the total population. At the same time, the share of less mobile persons within the working-age population rose from 37.2% to 39.4% (Statistics Poland, 2023a). These tendencies necessitate the adaptation of public policies, social security systems, and labour markets to the needs and capacities of older generations. In this context, the concept of the silver economy has gained increasing attention. It refers to economic activities aimed at meeting the needs of older individuals while recognising their role as active participants in economic life rather than solely as beneficiaries of social transfers (Szukalski, 2012; Zalega, 2016). Seniors, as consumers of goods and services, are increasingly perceived not only in terms of the burden they pose to pension systems but also as active market participants, investing their time, financial resources, and experience (European Commission, 2018).

Labour market activity among seniors in Poland remains below the EU average. LFS data show that between 2013 and 2023, the employment rate among persons aged 50+ increased from 31.6% to 35.0%, and among those aged 65+ from 4.6% to 6.0% (Eurostat, 2023a). By comparison, the EU average for the 50+ group stands at 38.0%. International analyses point to the so-called early retirement trap, i.e. a situation in which the structure of the pension system and economic incentives discourage continued labour market activity (Angelini et al., 2009; Calzavara et al., 2020; OECD, 2016).

Seniors do not constitute a homogeneous group. The literature distinguishes between the young-old (60–69), the middle-old (70–79), and the oldest-old (80+), although consumer research frequently applies the 50+ threshold (Stuart-Hamilton, 2006; Szczecińska, 2020). Income differentials among seniors arise from age, education level, and sources of livelihood. Disposable income is a key indicator of economic well-being, determining both the level and structure of consumption (Carroll, 1992; Zalega, 2016). Research indicates that seniors' incomes vary by age, being highest among those aged 50–59 and lowest among those aged 75–89 (Kusdianto & Samosir, 2023; O'Sullivan & Layte, 2011; Szczecińska, 2020). In Poland, households with individuals aged 60+ enjoy a higher *per-capita* income on average than those without seniors, but

they are characterised by a higher share of expenditures in total income (Statistics Poland, 2023b). Pensions remain the primary source of livelihood, with their significance increasing with age (Ebbinghaus, 2021; Li & Davies, 2022).

An important complement to income analysis is the study of wage satisfaction and pay inequality. Pay satisfaction is a factor influencing both individual productivity and the achievement of organisational goals. Its determinants include the real wage level, wage growth dynamics, social comparisons, remuneration systems, and personality traits (Wang, 2018). Studies show, for example, that personality traits, including locus of control, individualism, or risk aversion, may influence preferences for specific pay structures (Wang, 2018). From a gender perspective, numerous studies document persistent pay inequalities between women and men, which remain significant even after controlling for age, tenure and occupational characteristics. Empirical evidence, as provided by Lin et al. (2021), based on the case of vascular surgeons in the United States, shows that women earn, on average, less than men despite having comparable professional profiles. Such disparities have long-term consequences, leading to lower lifetime earnings, reduced pension contributions and a higher risk of poverty in old age. Relatedly, Lips and Lawson (2009) highlight the so-called motherhood penalty, referring to wage losses associated with career interruptions and constraints linked to child-rearing. At the same time, research suggests that the magnitude and structure of pay inequalities vary across occupations and employment settings. Carvajal et al. (2019) demonstrate that although overall gender pay gaps are relatively small, then distinct "pockets of inequality" persist among older workers with long tenure and in specific institutional contexts. This suggests that wage inequality should be analysed not only in terms of average differences but also in relation to structural heterogeneity across population subgroups.

Including wage inequality in the analysis of seniors' incomes is therefore justified both substantively and methodologically, as accumulated earnings differences constitute an important mechanism underlying observed structural changes in income sources in later life, for age, tenure, and specialisation. These inequalities have long-term consequences, including lower pension contributions and a higher risk of poverty among women in old age. Lips and Lawson (2009) emphasise the so-called motherhood penalty, referring to the wage reductions experienced by women raising children, associated with lower declared readiness to sacrifice family time for work. The aim of the article is to analyse changes in the structure of personal gross income among individuals aged 50 and over in Poland in the years 2016–2024, with particular attention to differences by age group and sex. Although there is extensive literature on population ageing and pension systems, there is still a lack of micro-level research for Poland that tracks significant changes in the structure of seniors' gross disposable income over time, broken down by age and gender. This study aims to fill this gap using its own research tool and EU-SILC microdata.

## 2. Methodological Framework

The study is based on data from Eurostat, European Union Statistics on Income and Living Conditions (EU-SILC) for research proposal RPP 40/2024-EU-SILC entitled: Unmet Social Needs: Diagnosis and Action; Subtitles: An Attempt to Identify Unmet Household Needs; Profiling of Households with Unmet Financial Need. The responsibility for all conclusions drawn from the data lies entirely with the authors.

The time frame of the analysis covers the years 2016, 2020, and 2024, which enables the identification of both trends preceding the outbreak of the COVID-19 pandemic and its initial effects on the income situation of seniors. The sample included individuals aged 50 and over. The

50+ threshold was adopted as the analytical cut-off in order to capture both those at the final stage of professional activity and those already economically inactive, which is consistent with approaches in research on the so-called *silver economy* (Szukalski, 2012; Zalega, 2016).

The main variable in the analysis was gross disposable income, within which detailed sources of income were distinguished (see Table 1).

Table 1. Gross personal income components

| Gross personal income components | EU-SILC survey | Variable description |
|---|---|---|
| Hired work | PY010G | Gross employee cash or near-cash income |
| Self--employment | PY050G | Gross cash benefits or losses from self-employment; including royalties |
| Old-age benefits | PY100G | Gross cash income received by a person upon reaching retirement age. These are usually various types of pensions – both public and private. |
| Survivors' benefits | PY110G | Gross income from benefits paid to persons who have lost a family member (usually a spouse or parent) and who meet the conditions for receiving a survivor's pension or similar benefit. |
| Sickness benefits | PY120G | Cash benefits received by a person in the event of temporary incapacity for work due to illness. These benefits are intended to replace lost income during the period of illness, but do not apply to long-term disability (pension). |
| Sisability benefits | PY130G | Cash benefits granted to individuals due to permanent (or long-term) incapacity for work caused by illness, accident, or disability. These are income replacement benefits for individuals who, due to their health, are unable to work for an extended period but have not yet reached retirement age. |
| Other | PY021G<br>+PY080G<br>+PY090G<br>+PY140G | Company car,<br>+ pension from individual private plans<br>+ unemployment benefits<br>+ education-related allowances |

Source: based on EU-SILC survey (Eurostat, 2022).

The analysis also included demographic and socio-economic variables: gender, age, and employment status. The analysis was conducted in three steps: first, income structures were compared across years; second, structural similarity was assessed using a test; third, distinctive relative changes in income composition were identified.

Let us consider statistical units forming populations $X$ and $Y$, respectively. Each unit is characterised by a specific statistical feature ($SF$), which can take on $k$ distinct variants (values or classes). Accordingly, we define the following vectors:

$$\omega(\boldsymbol{x}) = (\omega(x_1), \omega(x_2), \dots, \omega(x_k)) , \quad (1)$$

$$\omega(\boldsymbol{y}) = (\omega(y_1), \omega(y_2), \dots, \omega(y_k)) . \quad (2)$$

These vectors represent the basic structural composition of populations X and Y, respectively. In the context of public statistics, $\omega(x_i)$ and $\omega(y_i)$ are interpreted as structural indicators, reflecting the relative proportions of each class within the population.

A central issue in structural analysis is the evaluation of similarity between two statistical populations based on their respective structures. This comparison is typically conducted using

distance measures between the vectors $\omega(\boldsymbol{x})$ and $\omega(\boldsymbol{y})$. One such measure is the Bray-Curtis distance, which serves as the basis for defining the structural similarity index $\omega_p$ , given by:

$$\omega_p = \sum_{i=1}^{k} min\{\omega(x_i), \omega(y_i)\}. \quad (3)$$

A non-parametric test introduced by Sokołowski (1993) enables the assessment of structural similarity between two statistical populations. The test is based on the similarity index $\omega_p$, defined in equation (3), and formulated under the following hypotheses:

H0: the similarity of the studied structures is random (structures are dissimilar);

H1: the similarity of the studied structures is non-random (the structures are similar).

Statistical tests often face limitations in detecting gradual or subtle changes, which restricts their effectiveness in analysing changes in structural phenomena. To overcome this problem, we use an approach introduced by Dębicka and Mazurek (2025), which allows for the identification and interpretation of significant structural changes, especially those driven by dominant factors (regardless of whether the tests showed that the structures are similar or not). This method builds upon the similarity index of structures (3). The approach involves calculating relative changes (differences) $r_i$ for each class within the structure. Classes for which $r_i \in [-1,1]$ are considered to exhibit no distinctive change, whereas classes with $r_i$ values outside this range are classified as structurally distinctive.

The depth of these changes can be assessed by interpreting the absolute value $|r_i|$, which reflects the magnitude of deviation from structural stability. The interpretation of $|r_i|$ is as follows:

- (1, 1.10) – statistically insignificant change,
- [1.10, 1.25] – barely distinctive change,
- [1.25, 1.40) – moderately distinctive change,
- [1.40, 1.60] – highly distinctive change,
- Above 1.60 – huge distinctive change.

As with any survey-based analysis, the results are subject to limitations related to self-reported income data and the cross-sectional nature of EU-SILC.

## 3. Changes in the Structure of Personal Gross Income Sources

The study aims to examine the structure and diversity of individual income sources contributing to disposable income, taking into account gender differences. To evaluate the impact of the Covid-19 pandemic, disposable income structures of income sources from three reference years are compared: 2016 (pre-pandemic), 2020 (during the pandemic), and 2024 (post-pandemic recovery). Although standard statistical tests may indicate overall structural similarity between years, the application of a dedicated method for identifying distinctive differences allows for a more nuanced understanding of subtle but relevant changes in income composition. These differences are interpreted not as outliers, but as structurally significant changes that may signal broader socio-economic transformations within and across the structure of personal gross income.

The analysis starts by examining the structure of individual sources of gross disposable income by age groups of people 50+. Figure 1 illustrates the income structures of individual groups across the analysed years of 2016, 2020, and 2024. When comparing the income patterns of different age groups for both men and women during these years, similar patterns are visible, as shown in Figure 1.

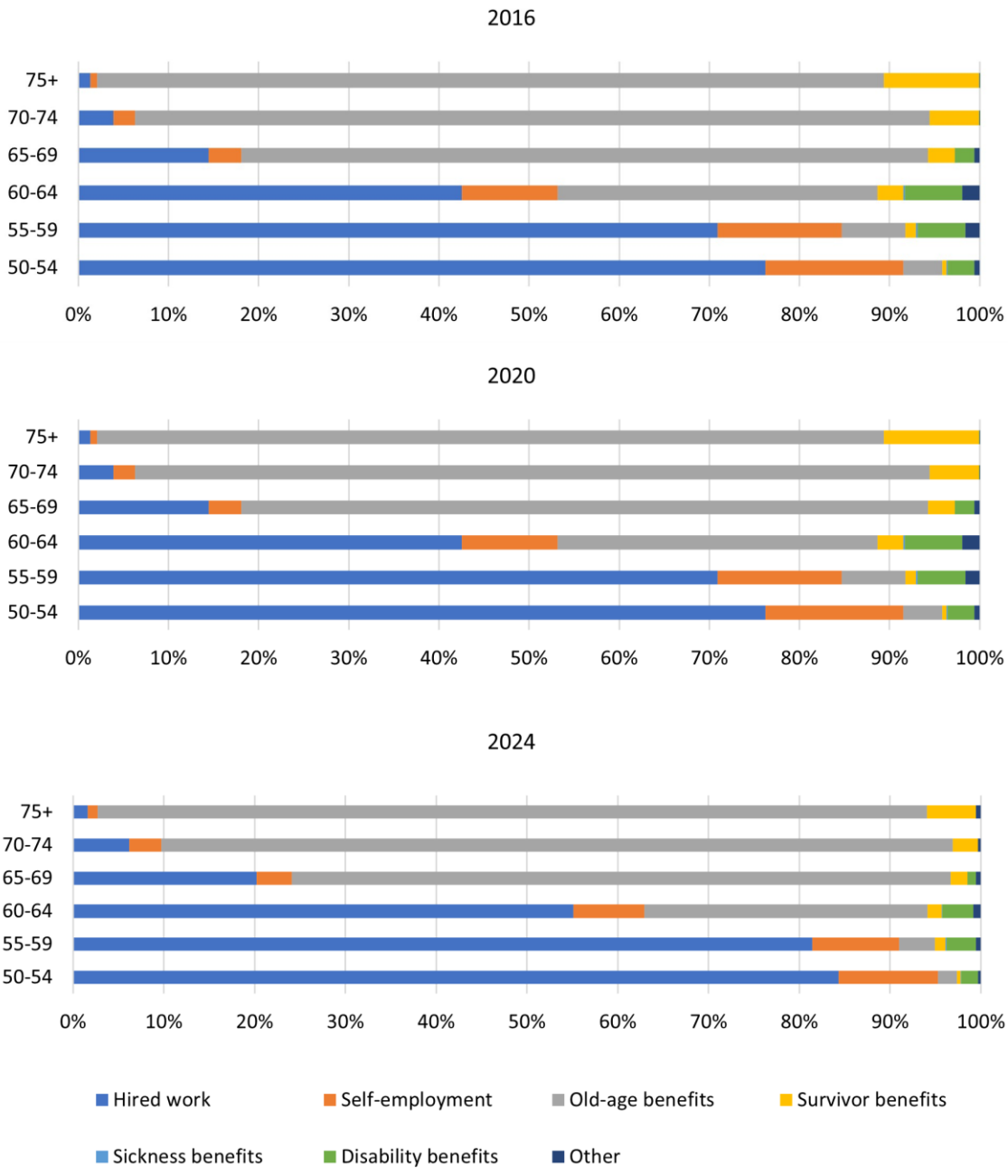


Figure 1. Structure of individual sources of gross disposable income by age groups

Source: authors' own elaboration based on the individual database (EU-SILC).

The income structures for the same age groups (total, for both men and women) remain similar across the years 2016, 2020, and 2024. The COVID-19 pandemic did not significantly affect these structures at the 0.01 significance level, as evidenced by the data presented in Table 2.

A statistically significant difference, however, is observed only when comparing the age-specific income structures of men aged 60–64 between 2016 and 2024, with significance at the 0.05 level (highlighted in grey in Table 2).

Table 2. Structure similarity test results for personal gross income sources by age group and sex

| Age group | Coefficient of similarity of structures between years | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | TOTAL | | | MALES | | | FEMALES | | |
| | 2016 vs 2020 | 2020 vs 2024 | 2016 vs 2024 | 2016 vs 2020 | 2020 vs 2024 | 2016 vs 2024 | 2016 vs 2020 | 2020 vs 2024 | 2016 vs 2024 |
| 50–54 | 0.977 | 0.977 | 0.919 | 0.932 | 0.962 | 0.898 | 0.948 | 0.986 | 0.945 |
| 55–59 | 0.953 | 0.953 | 0.895 | 0.940 | 0.942 | 0.885 | 0.937 | 0.965 | 0.912 |
| 60–64 | 0.949 | 0.949 | 0.875 | 0.870 | 0.926 | 0.798 | 0.909 | 0.940 | 0.921 |
| 65–69 | 0.963 | 0.963 | 0.939 | 0.970 | 0.947 | 0.933 | 0.965 | 0.973 | 0.939 |
| 70–74 | 0.968 | 0.968 | 0.962 | 0.990 | 0.963 | 0.957 | 0.951 | 0.972 | 0.945 |
| 75+ | 0.982 | 0.982 | 0.948 | 0.988 | 0.989 | 0.989 | 0.938 | 0.970 | 0.910 |

Note: The table reports test statistic values for the Structure Similarity Test (for significance level 0.01 the critical region $(0.8098,+\infty)$; for significance level 0.05 the critical region $(0.7473,+\infty)$) comparing the structure of personal disposable gross income by age groups and sex in Poland in 2016, 2020 and 2024.

Source: authors' own elaboration.

Therefore, an additional analysis was conducted to identify whether any distinctive relative differences could be observed despite the overall structural similarity (see Table 3).

Table 3. Distinctive relative changes in the structure of personal gross income sources

| Age group | TOTAL | | | MALES | | | FEMALES | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2020 vs 2016 | 2024 vs 2020 | 2024 vs 2016 | 2020 vs 2016 | 2024 vs 2020 | 2024 vs 2016 | 2020 vs 2016 | 2024 vs 2020 | 2024 vs 2016 |
| 50–54 | **1.81** | **1.94** | **1.85** | **2.19** | **1.31** | **1.79** | **1.40** | **-1.19** | **2.01** |
| 55–59 | **2.28** | **1.88** | **2.50** | **1.78** | **1.58** | **1.67** | **1.40** | **2.78** | **1.97** |
| 60–64 | **2.88** | **1.43** | **2.90** | **1.49** | **1.86** | **1.61** | **2.06** | **-1.27** | **2.28** |
| 65–69 | **1.96** | **1.15** | **1.58** | **-1.29** | | **1.65** | **1.39** | **1.47** | **1.42** |
| 70–74 | **-1.25** | **-1.24** | **-1.18** | **1.52** | | **-1.34** | | **-1.82** | **-2.44** |
| 75+ | | **-2.32** | **-1.27** | **2.48** | | **-1.88** | | **-1.99** | **-1.16** |

Note: The table shows distinctive relative differences between the sources' structure of personal disposable gross income in Poland in 2016, 2020, and 2024. The colour indicates the source of income, i.e., **hired work**, **self-employment**, **old-age benefits**, **survivor benefits**, and **disability benefits**.

Source: authors' own elaboration.

Within the age groups in which income from hired work constitutes the main source of earnings (individuals aged 50–64, see Figure 1), the COVID-19 pandemic period was marked by a significant increase in the share of this income source in the overall income structure. This rise was particularly pronounced in the entire population of the analysed age group, where the change was classified as a huge distinctive change. The most notable instance was the difference between 2024 and 2020, assessed as highly distinctive (1.43). Among men, the share of hired work also increased, with the scale of change, depending on the period and specific age group, ranging between huge and highly distinctive. In the case of women, the situation was less straightforward. In the 50–54 age group, a barely distinctive decline in the share of disability benefits was observed in 2024 compared with 2020 (–1.19). This development most likely reflected improved labour market activity after the pandemic, a reduction in the inflow of new benefits, a relative increase in income from other sources (hired work, self-employment), as well as more effective rehabilitation and reintegration measures. This phenomenon can be interpreted as the "crowding out" of disability pensions from the income system of this group by more active forms of employment, consistent with labour market policy directions and ageing strategies in Poland.

At the same time, among women aged 60–64, the transition to retirement is evident, in line with the statutory retirement age for women in Poland (60 years). In this group, in 2020 compared with 2016, a huge distinctive change (2.06) in the share of old-age benefits in the income structure was recorded. However, in the period 2020–2024, a moderately distinctive decline in the share of these benefits (–1.27) was observed, driven by increasing labour market participation after the pandemic. Some women, despite eligibility for retirement, may have continued working, particularly given labour shortages and broader socio-economic changes. This decline does not imply a reduction in pension amounts, but rather that employment and self-employment incomes became a more significant component of total earnings. These shifts reflect women's adaptation to new economic conditions in the post-pandemic period, as well as the consequences of labour market policies and demographic trends.

In the older age groups (65+), for whom old-age benefits constitute the main income source (see Figure 1), the observed changes were less unambiguous. Depending on the analysed period, gender, and specific age group, declines in the shares of old-age benefits, survivor benefits, and disability benefits were noted, alongside increases in self-employment income. This indicates a more diversified adaptation of older individuals to changing economic conditions during 2020––2024. Although the analysis revealed dynamic changes in the structure of income sources depending on gender and age, it is necessary to further examine the extent to which these structures differed between women and men in each of the reference years (2016, 2020, and 2024). Such an analysis would provide a deeper understanding of gender-specific factors relevant to social policy and the labour market.

Table 4. Coefficient of similarity of structures between women and men

| Age group | Year | | |
|---|---|---|---|
| | 2016 | 2020 | 2024 |
| 50–54 | 0.86 | 0.87 | 0.91 |
| 55–59 | 0.84 | 0.87 | 0.89 |
| 60–64 | **0.68** | **0.57** | **0.59** |
| 65–69 | 0.77 | 0.81 | 0.79 |
| 70–74 | 0.89 | 0.94 | 0.94 |
| 75+ | 0.82 | 0.88 | 0.90 |

Note: Test statistic values for the Structure Similarity Test (for significance level 0.01 the critical region $\left(0.8098, +\infty\right)$; for significance level 0.05 the critical region $\left(0.7473, +\infty\right)$) comparing the sources' structure of personal disposable gross income by age groups between women and men in Poland.

Source: authors' own elaboration.

The non-parametric statistical test for structural similarity rejects the hypothesis of dissimilarity between the income source structures of women and men in favour of the alternative hypothesis of similarity for individuals in the pre-retirement age group (50–54 years) and the 70+ age group. Statistically significant differences between men and women are observed in the 60–64 age group at the 0.05 significance level (cf. bolded statistic values in Table 4), and in the 65–69 age group at the 0.01 significance level in both 2016 and 2024 (cf. grey shaded cells in Table 4). Notably, during the pandemic year (2020), the structures of gross income sources for men and women were statistically indistinguishable.

Building on the results of the structural similarity test, the next step of our analysis aims to identify which specific income sources contribute most to the observed differences between men and women in various age groups. Even in age cohorts, where the overall structures appear statistically similar (e.g., ages 50–54 and 70+), we seek to uncover distinctive changes within the

income structure that may reveal gender-specific dynamics. This approach enables a more nuanced interpretation of income composition and allows us to detect subtle yet meaningful divergences that are not captured by aggregate structural similarity alone.

Table 5. Distinctive relative differences comparing the sources' structure of personal disposable gross income between women and men in Poland

| Age group | Year | | |
|---|---|---|---|
| | 2016 | 2020 | 2024 |
| 50–54 | **1.59** | **1.30** | **1.59** |
| 55–59 | | **1.18** | **1.27** |
| 60–64 | **1.53** | **1.52** | **1.31** |
| 65–69 | **1.19** | **1.09** | **1.11** |
| 70–-74 | **1.55** | **2.15** | **1.45** |
| 75+ | **1.11** | **1.28** | **1.18** |

Note: The colour indicates the source of income, i.e., **hired work**, **old-age benefits**, and **survivor benefits**.

Source: authors' own elaboration.

In the 50–59 age groups, a trend can be observed whereby the share of income derived from hired work is higher in women's income structure than in men's (with the sole exception of the 55–59 group in 2016, where this pattern was not observed). In contrast, among individuals aged 60–69, differences in the composition of gross income sources stem from the fact that women retire earlier than men. This is particularly evident in the 60–64 age group, where the share of old-age benefits in women's income structure is markedly higher than in that of men (since 2017, the statutory retirement age in Poland has been 60 for women and 65 for men).

In the 70+ age groups, women record a substantially higher share of survivor benefits in their income structure compared to men. This is undoubtedly the result of widowhood (as women live longer than men) as well as the pension entitlement rules in Poland, according to which a person entitled to both an old-age pension and a survivor benefit may receive only one of them, the higher one, or the one of their choice. Consequently, the gender differences in this income source may also be explained by the fact that women, on average, receive lower pensions compared to survivor benefits after a deceased spouse.

## 4. Discussion

The obtained results are broadly consistent with earlier studies on ageing and income composition, which suggest the growing importance of mixed income strategies that combine pensions and labour income among older individuals (OECD, 2025; Ebbinghaus, 2021). The observed gender differences reflect well-documented inequalities accumulated over the life course, including differences in wages, career interruptions and statutory retirement age. At the same time, the results extend existing research by showing how these patterns evolved in Poland during a period marked by institutional change and the COVID-19 pandemic. The analysis covered the period 2016–2024, during which two key events shaped changes in the structure of income sources: the reform of the statutory retirement age in 2017 (impact observed in the 2016–2020 comparison) and the COVID-19 pandemic (effects evident in both the 2016–2020 and 2020–2024 comparisons). Between 2016 and 2017, Poland implemented a reform extending the statutory retirement age to 67 for both men and women. However, as of 1 October 2017, the previous

thresholds were reinstated: 60 years for women and 65 for men. This reform directly affected the income structure of individuals aged 60–64 – a group that, under the previous system, would still have been active in the labour market but now became entitled to pension benefits. This particularly concerned women. Notably, between 2020 and 2024, the income from hired work in this group increased significantly (+2.06), despite the formal possibility of retirement, suggesting that many women remained in the labour market, possibly due to financial considerations or insufficient pension capital.

A similar pattern was observed among men aged 65–69, where, despite reaching retirement age, a notable increase in employment income was recorded (+1.65). This indicates a combination of work and pension benefits, reflecting men's adaptation to the system by retiring formally while continuing economic activity.

The pandemic exerted a strong influence on income structures, especially among older persons and women. For women, the changes were linked to a decline in old-age benefits and survivor benefits, while for men they involved an increase in self-employment income and a decrease in disability benefits. Among women aged 55–59, a substantial increase in self-employment income was noted in 2024 compared to 2020 (+2.78), likely reflecting pandemic-induced constraints in wage employment and a shift toward self-employment as an alternative livelihood strategy.

Among women aged 70–74 and 75+, significant declines in old-age and survivor benefits were observed (e.g., –2.44 in old-age pensions among women 70–74 between 2024 and 2016). This may be explained by institutional rules effective until 2024, whereby individuals entitled to both an old-age pension and a survivor benefit could receive only one benefit, the higher or chosen one. Thus, the decline in old-age benefits often implied that many women opted for survivor benefits, which themselves decreased substantially between 2020 and 2024 (–1.99). At the same time, the relative share of pensions and survivor benefits fell due to rising income from other sources such as self-employment, civil contracts, social transfers (e.g., housing allowances, senior benefits), or savings and investments. High inflation in 2022–2023, which reduced the real value of pensions despite indexation, further amplified this effect.

Among men aged 65–69, a moderately distinctive decrease in disability benefits was recorded in 2020 compared to 2016 (–1.29). This can be attributed to the pandemic, which restricted access to medical and administrative services, leading to fewer disability assessments and thus lower benefit incidence. Moreover, men in this age group often transition from disability pensions to old-age pensions (Statistics Poland, 2021), or refrain from applying for disability status if their health allows continued employment (Rybak, 2025). For men aged 70+, a marked increase in self-employment income was observed in 2020 compared to 2016 (+1.52 and +2.48), reflecting a combination of labour market pressures, favourable tax and contribution exemptions for self-employed pensioners, and the ability to leverage professional expertise and networks in consulting or advisory roles.

Gender differences in the structure of gross income sources are clearly age-dependent. Among those aged 50–59, women derive a higher share of their income from hired work, which may reflect their greater presence in the public sector, reliance on stable employment, and legal protection before retirement. In the 60–64 age group, women's income structure is dominated by pensions, owing to the lower statutory retirement age. In the 70+ population, women exhibit a significantly higher share of survivor benefits than men, driven by higher life expectancy and lower personal pensions, making survivor benefits a more favourable option. This reflects not only demographic differences but also long-term structural inequalities in the labour market, including lower wages and career interruptions related to caregiving.

## 5. Conclusions and Implications

Although standard statistical tests did not reveal significant differences in income sources structure, in most cases, the applied approach to identifying distinctive structural changes (Dębicka & Mazurek, 2025) proved useful in capturing subtle but economically meaningful shifts. In particular, the analysis shows that the statutory retirement-age reform introduced in 2017 was associated with noticeable changes in income composition, especially among women aged 60–64. Despite gaining entitlement to old-age benefits, a substantial share of women in this group remained economically active, which is reflected in an increased contribution of hired work to their income structure. By contrast, the period covering the COVID-19 pandemic was characterised by more pronounced changes in income patterns. Between 2020 and 2024, an increased role of self-employment can be observed, particularly among men, alongside a declining relative importance of selected social benefits, especially in older female age groups. These developments underscore persistent gender differences in income composition and suggest that women's income structures may be more sensitive to both institutional changes in the benefit system and fluctuations in labour market conditions. Such differences are likely related to demographic factors, including higher female life expectancy, as well as institutional and socio-economic characteristics, such as lower average pension entitlements and a higher concentration of women in less stable forms of employment.

The results point to the relevance of analysing income structures in an ageing society from both an institutional and a gender perspective. Population ageing, prolonged labour market participation among older individuals and increasing diversification of income sources highlight the importance of institutional arrangements that account for heterogeneity in life-course trajectories, without prejudging specific policy solutions.

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# Identyfikacja wyróżniających się zmian w strukturze dochodów polskich seniorów (2016–2024)

**Streszczenie:** Starzenie się społeczeństwa zmienia kształt gospodarek europejskich, w tym polskiej, i wymaga podejścia analitycznego umożliwiającego identyfikację zmian strukturalnych w strukturze dochodów osób starszych. Celem niniejszego artykułu jest wykazanie przydatności metody wykrywania wyróżniających zmian strukturalnych w źródłach dochodów na przykładzie osób w wieku 50 lat i starszych w Polsce. Analiza opiera się na mikrodanych EU-SILC za lata 2016, 2020 i 2024, łącząc test podobieństwa strukturalnego z podejściem identyfikującym wyróżniające się względne zmiany w strukturze dochodów.

Zastosowanie tej metody pokazuje, że pozwala ona uchwycić zmiany w strukturze dochodów związane zarówno z wstrząsami instytucjonalnymi, jak i gospodarczymi, w szczególności z reformą ustawowego wieku emerytalnego wprowadzoną w 2017 r. oraz pandemią COVID-19. Wśród kobiet w wieku 60–64 lat obserwuje się rosnący udział dochodów z emerytur i zarobków z pracy, podczas gdy mężczyźni w wieku 65–69 lat wykazują rosnący wskaźnik dochodów z pracy pomimo formalnego uprawnienia do emerytury. W okresie pandemii metoda ta ujawnia zmiany we względnym znaczeniu samozatrudnieniu oraz wybranych świadczeń socjalnych, zwłaszcza wśród starszych grup wiekowych i kobiet, które są jedynie częściowo odzwierciedlone w standardowych wynikach testu podobieństwa.

Z praktycznego punktu widzenia proponowane podejście może być przydatne do analizy struktur dochodów starzejącej się populacji oraz do identyfikacji subtelnych, ale istotnych ekonomicznie zmian mających znaczenie dla polityki emerytalnej i środków dotyczących rynku pracy. Ilustrując tę metodę na przykładzie dochodów seniorów w Polsce, badanie wnosi wkład w dyskusję metodologiczną na temat analizy zmian strukturalnych w badaniach społeczno-ekonomicznych.

**Słowa kluczowe:** starzenie się społeczeństwa, struktura dochodów, identyfikacja wyróżniających zmian strukturalnych, EU-SILC, srebrna gospodarka