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Age-specific income trends in Europe: The role of employment, wages, and social transfers

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Age-specific income trends in Europe: The role of employment, wages, and social transfers

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Abstract

This study analyses age-specific differences in income trends in nine European countries. Based on data from National Accounts and the European Union Statistics on Income and Living Conditions, we quantify age-specific changes in income between 2008 and 2017 and decompose these changes into employment, wages, and public transfer components. Results show that income of the younger age groups stagnated or declined in most countries since 2008, while income of the older population increased. The decomposition analysis indicates that the main drivers of the diverging trends are higher employment among the older population and a strong increase in public pensions, especially for women.

Keywords: Generational Economy, Income, Intergenerational Equity

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1 Introduction

Income of young adults fell behind the income of the older population in most European countries between 2008 and 2017, even in countries where employment rates among the young increased (Eurostat, 2020d,c). However, previous research has put little emphasis on extent and the causes of age-specific differences in income trends. The limited evidence focuses on equivalised household income and shows that income of households with children and young adults stagnated or decreased in most of Europe after the financial crisis, while it increased for the older population (Chen et al., 2018; Wittgenstein Centre, 2020). While employment is identified as an important explanation of the age-specific changes in income, other factors have rarely been studied directly. Chen et al. (2018) suggests that beside employment, public transfers are important drivers of generational disparities in income.

Knowledge about age-specific income trends and their determinants is necessary to understand central economic and demographic developments. After the financial crisis, poverty rates increased or stagnated at high level among young adults and family households in many countries. By contrast, poverty rates among older adults declined during the same period (Eurostat, 2020b). Such developments require attention, because the economic situation of young adults is a crucial determinant if and when they found a family and the number of children they have. Consequently, their deteriorating economic situation is among the explanations for decline in fertility in several European countries (Matysiak et al., 2020; IMF, 2018; Goldstein et al., 2013). The COVID-19 pandemic, in addition to population ageing, will further increase pressure on young generations in the years to come. It is thus of utmost importance to study the drivers of income changes at each life-stage to understand their relation with social, economic and demographic developments.

Employment is particularly important for the understanding of age-specific differences in income trends, most notably in Southern Europe. Between 2008 and 2017, employment rates of the 15-39-year-old decreased by 9 percentage-points in Italy, Greece, and Spain, while employment among the population aged 40-59 increased (Eurostat, 2020c). In addition, young people find themselves increasingly entrapped in insecure and temporary work (Barbieri et al., 2019; Garibaldi and Taddei, 2013). This strong deterioration of employment opportunities for the young is found to be reinforced by labour market institutions that generate a pronounced duality in the labour markets: the older, permanent employees are strongly protected, while the insecurity due to a flexibilisation of the labour market has been entirely placed on young cohorts (Barbieri, 2011; Chauvel and Schröder, 2014). Employment of the young also decreased in many Western and Northern European countries, however, to a much lesser degree than in Southern Europe. By contrast, in most Central and Eastern European (CEE) countries employment increased for young adults, and even more so for older working age adults (Eurostat, 2020c). In all European countries except the three Baltic countries, Iceland, and Switzerland the change of employment rates in percentage points was more favourable for the population 40-59, compared to the population 15-39. Remarkable are the differences by gender, with a much stronger increase in employment rates of women compared to men.

Although employment is an important driver of income trends, it does not entirely explain the unequal

developments in income across ages. For example, equivalised income of the population aged 65+ increased by five per cent in Italy and seven per cent in Spain, yet without associated increases in employment Eurostat (2020d). This suggests that in addition to employment, changes in wages and public transfers are important components to consider when analysing the underlying causes of diverging income trends across age groups. Chen et al. (2018), for example, suggests that in addition to labour market developments, the design of social protection is an important dimension to consider, since it potentially guards the income of older persons while offering little assistance to young individuals.

Despite the important implications of age-specific income trends for societal and demographic development, no previous research, to our knowledge, has systematically analysed these changes in a comparative manner for Europe. Moreover, it remains unclear how employment, wages and public transfers contribute to changes in income across different generations in the previous decades. Our study aims at closing these gaps by addressing the following research questions based on data from the European system of Accounts (ESA) and the European Statistics on Income and Living Conditions (EU-SILC):

1. How did aggregate per-capita income and its components change between 2008 and 2017?
2. How do these changes differ between age groups?
3. What drives age-specific income trends: changes in employment, wages, or transfer income?

The countries included in the analysis are Austria, Estonia, Greece, France, Italy, Poland, Slovenia, Spain, and Sweden. These nine countries provide information on individual net income in EU-SILC from 2008 to 2017, which is ex-ante harmonised and thus ideal for comparative income studies. We focus on individual income rather than household income, since the latter potentially hides age-specific changes when various generations live in the same household. Moreover, the set of countries represent different welfare regimes and various economic developments during the observed period.

Our paper is divided into three parts, in line with our three research questions. First, we measure total, non-age-specific changes in income and public redistribution between 2008 and 2017, using aggregate economic ESA data. Aggregate data are more comprehensive and reliable than survey-based data and thus constitute a benchmark for comparing and verifying the survey-based results. Second, we analyse age-specific changes in income between 2008 and 2017, using micro-level EU-SILC data. In the third part of the paper, we decompose the age-specific changes in income into its main components, thereby identifying how changes in employment, wages and social benefits affect age-specific income trends.

2 Data and Methodology

2.1 Aggregate income in the European System of Accounts

Data from ESA provide detailed information on the level and type of household sector income as well as on public redistribution (for a detailed description of ESA see European Commission, 2013).

The annual sector accounts are available from the Eurostat database (Eurostat, 2020a). Our focus is on four quantities: (1) primary income before public redistribution, (2) payments of taxes and social contributions, (3) receipt of social benefits, and (4) disposable income. Taken together, these four quantities together summarize changes in total income, the extent of public redistribution, and its consequence for disposable income. For comparison, we also consider GDP per capita and its changes, because it is the most common measure of economic development.

1. *Primary income* in ESA measures income that is generated by direct participation in the production process, before any payment of taxes or social contributions. The largest component of primary income of the household sector is the compensation of employees, which consist of all types of remuneration for work, including social contributions paid by employers. Furthermore, primary income includes asset income, such as interest, dividends, the return to owners of unincorporated enterprises and owner-occupied housing.
2. The *income tax ratio* measures income taxes relative to primary income and thus serves as an indicator of the total size of public redistribution. For calculating the income tax ratio, we combine several quantities from ESA and information on the tax structure (European Commission, 2019). In particular, our definition takes into account taxes on production, taxes on income and wealth as well as social contributions. Taxes paid on public transfers such as pensions are not included, because national variations in taxation systems could bias cross-country comparisons. The concept differs from the more common tax-to-GDP ratio, since our goal is not the measurement of the total tax burden, but to capture all direct taxes that are paid out of primary income. Consequently, taxes on products are not included in the income tax ratio, because they constitute part of consumption expenditure and affect disposable income only indirectly.
3. The *benefit ratio* is calculated as the ratio of total cash benefits from the government to primary income of households. It serves as an indicator of the importance of public redistribution via cash transfers. In ESA, the largest type of benefits are social benefits, including pensions, unemployment benefits, family allowances and other type of social benefits. To be consistent with our definition of the tax ratio, we measure benefits net of taxes and social contributions that are paid on these benefits. In addition, the benefit ratio includes other current transfers from government sector to households.
4. *Disposable income* is an indicator of economic wellbeing of households. It is calculated as primary income less taxes plus cash benefits and represents the income of households that can be used for consumption and saving.

2.2 Age-specific income in EU-SILC

The age-specific analysis of income changes is based on EU-SILC data. We distinguish three age-groups: the young working age population at age 20-39, the older working age population at age 40-59, and the elderly population aged 60+. We decided for 20-year age groups to have sufficient observations for reliable estimates when distinguishing also by type of income and gender. Ages 20-39 coincide with the life stage of early labour market career, family formation and childbearing. The

age group 40-59 consists mainly of persons that made their family decisions already, who do not have care responsibilities for small children, and who are active on the labour market. The age border of 60 corresponds to actual retirement age in most countries; thus, the age-group 60+ captures therefore mainly the group of retirees. For each of the three age groups we calculate the changes in age-specific mean income in real terms between 2008 and 2017. Means are required by the decomposition analysis. However, we also provide estimates of changes in median income as well as the first and the third quartile in Appendix A-1.

All income components are assigned to individuals, also components that are given at household level in EU-SILC, including family benefits, imputed rents, asset income and income of persons younger than 16. Family benefits are assigned to the parents of the economically dependent children in the household. Since parental leave benefits as part of total family benefits are targeted at the person taking over most of the care responsibilities, we distribute family benefits within couples according to the inverse share of their labour income. If one of the partners has no income because of the engagement in care work, this partner is assumed to receive all family benefits. Imputed rent is regarded as a type of asset income and assigned to the household members that report to be responsible for the accommodation. Asset income is assumed to be equally shared among all adults in the household.⁴ The personal income of persons below 16 is assigned to the 15-year-old members, or the oldest child in case there are no 15-year-old present in the household.

We want to emphasize, however, that the assumptions for the distribution of household level income have little effect on the level and change of age-specific income. First, income at household level accounts for less than 20 percent of total income, with imputed rents as largest component. Second, the age group of recipients of household-level income can be identified unambiguously in most households. An alternative allocation of household-level income to all adults in equal shares resulted in negligible differences in the total changes of income. The same is true for gender-specific results with the exception of Poland, where an increase in the monetary support of families resulted in an increase of income among the 20-39-year-old. Hence, the gender-specific results for Poland depend on how this increased benefits are allocated within a couple.

2.3 Decomposition of income changes

Changes in mean income during the 2008-2017 period are decomposed to identify the role of employment, wages and public transfers. This analysis is solely based on income and employment data in EU-SILC. The degree of employment is measured by the number of months a person was in employment during the income reference period; being employed for twelve months is considered as full employment. We distinguish between three income components: Total income (Y) is the sum of income from employment (YL), public benefits (YB) and other income (YO). The sub-components of other income are comparably small, which is the reason for combining them into a single category. For each age group i , we decompose the change in total income between 2008 and 2017 into changes

⁴Adult persons are defined as all individuals older than 34. A person between age 16 and 35 is counted adult only if he or she is in employment, focusing on domestic work, or if there are only persons below age 35 who are not in employment in the household.

of its components, with Δ referring to changes in percent of total income in 2008.

$$\Delta Y_i = \Delta YL_i + \Delta YB_i + \Delta YO_i \quad (1)$$

Furthermore, we decompose the changes in income from employment into changes in employment rates and changes in income per employed person. Income from employment can be written as product of income per employed person in each age group (yl_i) and the employment rate (l_i).

$$YL_i = yl_i * l_i \quad (2)$$

The change in income from employment can then be decomposed into the changes of the two components, based on their relative contributions: $\Delta YL_i = \Delta yl + \Delta l_i$

An analogous approach is used for income from public transfers, for which we assume that they are directed to the non-employed population. We decompose the changes in public benefits into changes in the share of non-employed persons (Δn_i , with $n_i = 1 - l_i$) and changes in benefits per non-employed person (Δyb_i). This decomposition aims mainly at identifying the contributions of employment and of pension benefits per retiree to the income trend for the population 60+.

3 Results

3.1 Changes in aggregate income

The financial crisis and the sovereign debt crisis had a much stronger effect on income of the household sector than indicated by changes in GDP. While GDP per capita declined from 2008 to 2017 only in Greece and Italy (Column 1 in Table 1), per capita primary income of households declined in six out of the nine analysed countries (Column 2). The decline was most pronounced in Greece with 32 per cent, and in Italy and Spain with a decline of more than 10 per cent. Primary income decreased slightly in Austria, France and Slovenia and slightly increased in Poland. Only households in Estonia and Sweden had considerably more income per capita in 2017 than in 2008 with an increase by about 15 per cent.

The extent of public redistribution increased in all nine countries during the period 2008-2017. The tax ratio stagnated in Spain and Sweden, and increased in the other countries (Column 3 of Table 1), with the highest increase of 7 per cent in Greece. Part of the higher taxes were used to finance increasing cash transfers; the benefit ratio increased in all analysed countries. This increase of social benefits relative to primary income was most pronounced in Italy with an increase of 5 percentage points, and in France and Spain with an increase of 4 percentage points. The changes in the tax ratio and the benefit ratio measure mainly the redistribution within the household sector, with a small effect on the household sector as a whole. Therefore, changes in disposable income follow largely the changes in primary income. Disposable income of the household sector increased in Estonia, Poland and Sweden and declined in the other six countries.

Table 1: Real income per capita, taxes and benefits and their change during the 2008 - 2017 period (in 2018 prices)

	(1)	(2)	(3)	(4)	(5)
			Income		
	GDP	Primary	tax	Benefit	
	per	income	ratio	ratio	Disposable
Country	capita	(PI)	(% of PI)	(% of PI)	income
2017 -Values					
AT	42,817	27,203	38	28	24,394
EE	18,955	10,897	32	24	10,021
EL	16,542	10,580	33	28	10,040
ES	25,244	16,321	32	24	15,075
FR	34,712	23,491	45	33	20,683
IT	28,919	19,870	36	26	17,940
PL	12,452	7,690	30	25	7,284
SE	49,177	30,025	38	23	25,515
SI	21,283	12,871	35	27	11,796
Changes 2008-2017					
	(%)	(%)	(%-points)	(%-points)	(%)
AT	2	-3	2	2	-2
EE	15	16	1	1	17
EL	-24	-32	7	3	-35
ES	0	-10	0	4	-7
FR	3	-1	4	4	-1
IT	-7	-14	3	5	-12
PL	11	2	1	2	4
SE	8	15	0	1	17
SI	1	-3	1	3	-2

Source: Authors' own calculations based on the ESA 2010 annual sector accounts.

3.2 Age-specific changes

The analysis of income changes by age reveals large disparities (Table 2). Income of the 20-39-year old declined in five of the nine analysed countries. Only in Estonia it increased by more than 5 per cent. The income trends were more favourable for the older working age population, where only in Greece, Italy and Spain income per capita declined. However, the gains in income were concentrated in the population 60+, with absolute gains in all countries except Greece. Even in Greece the decline in income was much less for the population 60+ compared to the prime working age population. Income of the elderly population increased also in Italy and Spain, despite the strong declines in the working age population. It increased strongly in Austria, France, Sweden and Slovenia, while income of the working age population merely stagnated with a change of 4 percent or less over the whole period from 2008 to 2017.

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Table 2: Mean individual net income by age
Individual net income in 2017 (2018 prices)

Country	Age 20-39	Age 40-59	Age 60+	Total
AT	21,913	30,665	25,188	26,240
EE	11,402	12,285	7,558	10,456
EL	6,557	10,744	10,042	9,307
ES	12,438	18,845	17,725	16,610
FR	21,564	31,371	30,642	28,089
IT	12,826	21,339	21,015	18,913
PL	6,600	7,621	6,542	6,924
SE	24,172	34,380	25,711	28,118
SI	11,565	15,243	12,119	13,087

Change in real net income 2008 - 2017 in %

Country	Age 20-39	Age 40-59	Age 60+	Total
AT	-1	1	11	3
EE	17	28	7	17
EL	-43	-38	-24	-34
ES	-18	-8	8	-4
FR	-4	1	8	3
IT	-17	-9	4	-5
PL	5	2	1	2
SE	4	16	14	12
SI	1	4	7	4

Source: Eurostat, EU-SILC cross-section data for 2009 and 2018
(income reference years 2008 and 2017)

The overall pattern of absolute and relative income losses of the young are similar across the whole income distribution. However, mean values can be strongly influenced by large incomes, it changes may not be representative for individuals in the middle or at the bottom end of the distribution. We therefore present changes by quartiles in the Appendix, Section A-1. While the overall findings

hold across the income distribution, we observe strong a pronounced decline of the first quartile among young adults in Greece, Italy and Spain. This decline can be explained by an increase of the share of persons with a low level of employment and low income to more than one quarter of the population and hence encompasses the first quartile of the income distribution in 2017.

Differences between ESA and EU-SILC data are due to the fact that EU-SILC captures only part of the income of households. These differences are described in detail in Appendix A-2. In particular, asset income is poorly captured in EU-SILC with the exception of France. The aggregate data from ESA shows that in Austria, Italy and Slovenia, the decline in income per capita was largely the result of a decline in asset income, which explains the stronger increase or lower decline of income in EU-SILC compared to ESA. Furthermore, changes in the survey may also affect age-specific income. The large increase in income of the working age population in Estonia is partly the result of a better estimation of labour income in EU-SILC; the estimates in 2017 were much closer to the ESA values than in 2008. Furthermore, the huge decline in labour income in Greece may be overstated, since EU-SILC captured a lower part of total labour income in 2017, while the coverage of social benefits increased.

A challenge in an EU-SILC-based analysis is the estimation of standard errors. First, the data lacks sample design variables to calculate the correct standard errors due to sampling. Second, further random errors are introduced through imputation and re-weighting of the data (Goedemé, 2013), which is particular problematic for variables with a high share of imputed values, such as asset income. We calculated the standard errors for the age-specific estimates of income changes using the method suggested by Goedemé (2013) and Trindade and Goedemé (2016), and report the results in Section A-3 in the Appendix. The standard errors are particularly high in France, which can be explained by the high coverage of unequally-distributed asset income and the consequent much higher dispersion of total income. However, a large part of the income data is imputed and not sampled. Treating the data as if it would emerge from a random sample overestimates the standard errors. So far we are not aware of methodology that enable the estimation of standard errors and confidence intervals of variables with a large share of imputed data. To evaluate our point estimates of income we carefully compare them with the more reliable aggregate data.

3.3 Age-specific changes by gender

The increase in average income in old age is mainly explained by the increase in female labor force participation, which increased substantially in the last decades. As a consequence, women earn more and receive higher pensions than in the past, visible in the strong increase in income of women aged 60+ (Table 3). Although the change was much less pronounced for men, also income of men in the age group 60+ increased, compared to the working age population. Exceptions are Estonia and Poland, where the income of the older population increased less than the income of the working age population.

Table 3: Changes in mean net income by age and gender

Country	Men			Women		
	Age 20-39	Age 40-59	Age 60+	Age 20-39	Age 40-59	Age 60+
AT	-1	0	6	1	4	16
EE	11	29	6	24	26	8
EL	-41	-41	-28	-44	-34	-19
ES	-22	-14	4	-12	1	12
FR	-8	-1	2	2	5	14
IT	-19	-12	3	-15	-4	5
PL	0	1	-5	10	2	5
SE	1	15	12	8	18	17
SI	3	2	2	-2	7	12

Source: EU-SILC cross-section data

3.4 Decomposition of income changes

Most of the age-specific differences in income trends can be explained through changing employment rates (Δl) and an increase in transfer income for the age group 60+ (ΔYB). Despite huge cross-country differences in the extent of income changes, we observe several common patterns. In all countries, employment among the older working age population and the population 60+ increased, which is mainly the result of higher female employment and later retirement for both genders. Higher employment among older age groups reduced the share of pension receivers (Δn) and should have reduced the share of pensions in total income. Instead, in almost all countries this effect was offset by an increase in benefits per retiree (Δyb). Higher employment is the main reason for increasing income of the older working age population aged 40-59; higher employment together with the increase in benefits per retiree is the explanation for the increasing income of the population 60+.

Changes in income per employee (Δy_l) are an important driver for changes in income of the working age population. The decline in the income of the young working age population in Greece, Italy and Spain is a combined effect of lower employment rates and lower income per employee. The decline for the older working age population is mainly due to lower income per employee. Likewise, income of the working age population increased in Sweden and Estonia mainly because of higher income. In Poland income of the young working age increased because of higher benefits.

In general, the other income components (YO) constitute a small part of household income and explain a small part of the income changes with the exception of France and Estonia. In France, this pattern reflects the decline in asset income, a income component which is much better captured in France, compared to other countries. The results for Estonia have to be taken with a grain of salt. The decline in other income is mainly due to a decline in imputed rents in EU-SILC, which we regard unrealistic in its extent and at odds with aggregate data from ESA.

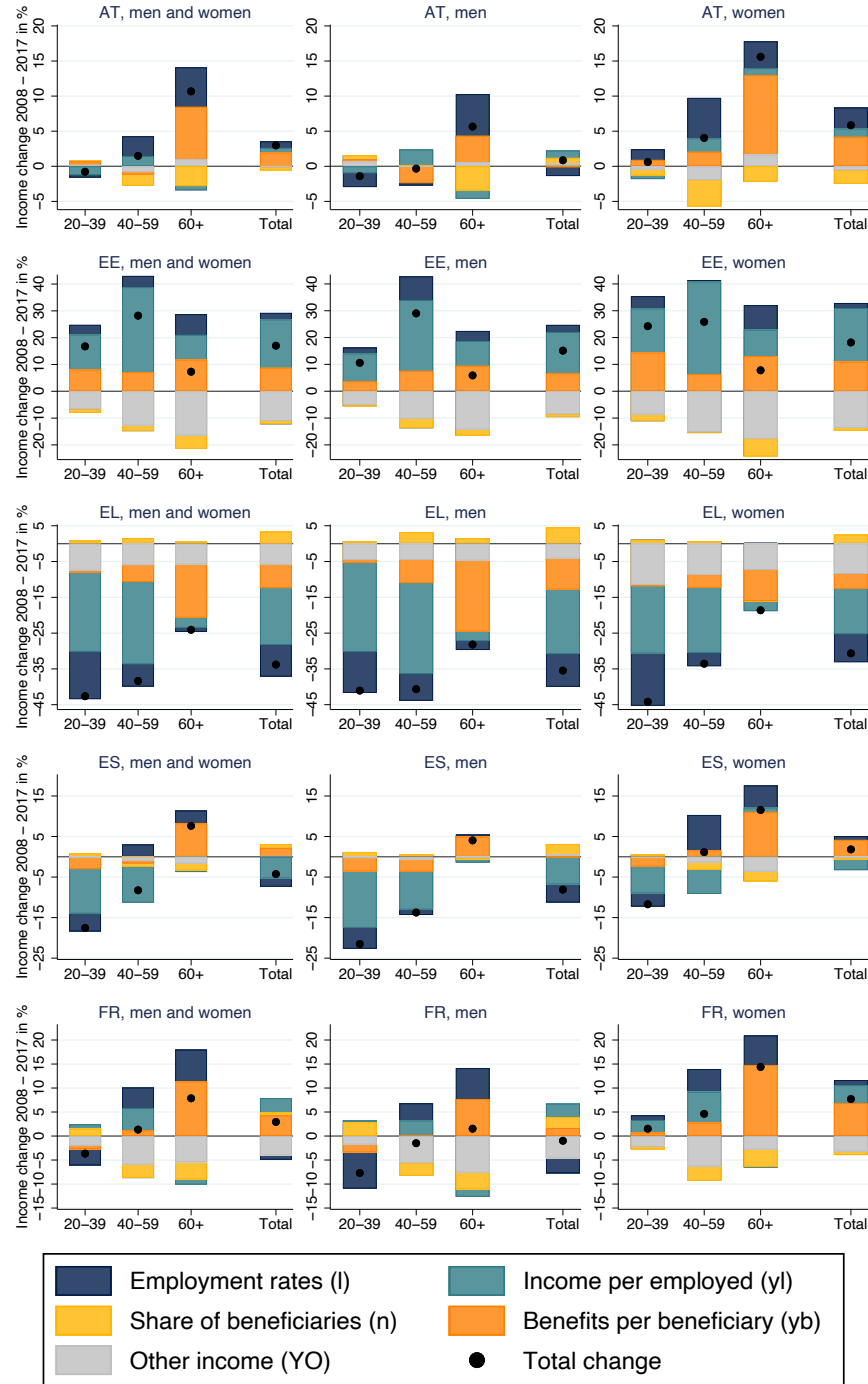


Figure 1: Decomposition of income changes by age

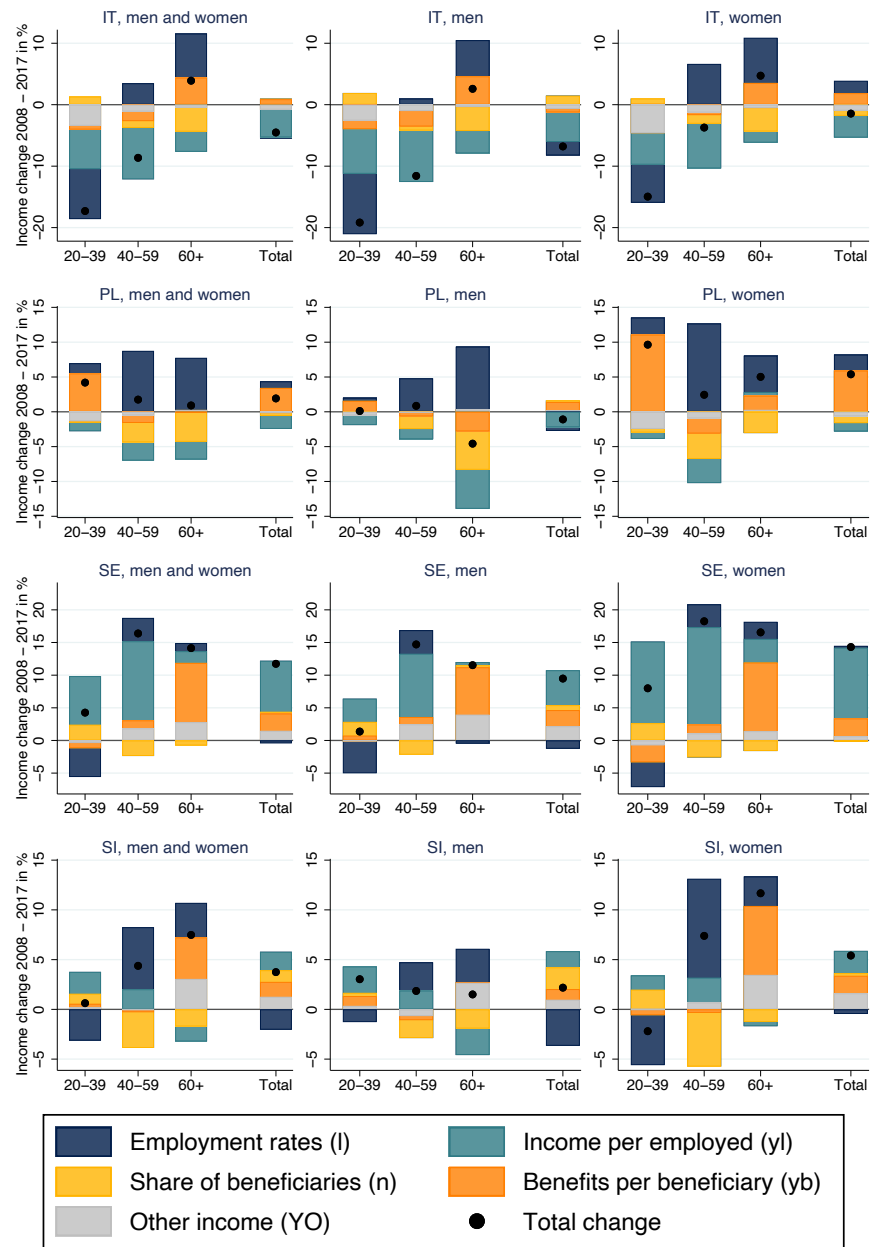


Figure 1: Decomposition of income changes by age

4 Conclusion

Our study reveals large differences in age-specific income trends in all nine countries analysed. Although the extent of age-specific differences varies greatly across countries, we nevertheless observe common patterns.

In most countries, the period 2008-2017 is characterized by a stagnation or decline in the income of households and an increase in public sector redistribution. While GDP per capita decreased only in Greece and Italy between 2008 and 2017, income per capita decreased in six out of the nine analysed countries. Only in Estonia and Sweden, income increased significantly with about 15 percent over the whole period. During the period from 2008 to 2017, income taxes relative to primary income increased in seven of nine countries and stagnated in two, while benefits relative to primary income increased in all countries.

The age group 20-39 lost income relative to older age groups in all countries except Estonia and Poland. In five out of nine countries, the young lost even in absolute terms. The differences in age-specific income trends are particularly high in Southern Europe. In Italy and Spain, mean income in the population at age 20-39 declined by about 17 percent and for the older working age population at age 40-59 by about eight percent. By contrast, income increased for the elderly population aged 60+. In Greece, income declined for all age groups, but less for the older populations. In Austria, France, Slovenia and Sweden, mean income of the population 20-39 merely stagnated, while it increased strongly for the population aged 60 and older.

A decomposition analysis revealed that the main drivers of these age-specific differences in income trends are (i) a decline or stagnation of employment rates and income of the 20-39-year-old, (ii) an increase in employment in the older age groups 40-59 and 60+, and (iii) a strong increase in benefits for the population 60+. The increase in employment and income among older population is mainly due to a increased labour force participation and higher pensions for women.

In summary, this paper revealed important intergenerational disparities in the development of individual income, especially in countries that were hit hard during the previous financial crisis. These findings are crucial with regard to the current COVID-19 pandemic, with its unprecedented societal and economic consequences. For many young Europeans, the pandemic adds to their already precarious economic situation. Knowledge about age-specific income trends may help to find better and generationally balanced answers to economic crises.

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References

- Barbieri, P. (2011). Italy: No country for young men (and women): The italian way of coping with increasing demands for labour market flexibility and rising welfare problems. In *Globalized labour markets and social inequality in Europe*, pages 108–145. Springer.
- Barbieri, P., Cutuli, G., Luijkx, R., Mari, G., and Scherer, S. (2019). Substitution, entrapment, and inefficiency? cohort inequalities in a two-tier labour market. *Socio-Economic Review*, 17(2):409–431.
- Chauvel, L. and Schröder, M. (2014). Generational inequalities and welfare regimes. *Social Forces*, 92(4):1259–1283.
- Chen, T., Hallaert, J.-J., Pitt, A., Qu, H., Queyranne, M., Rhee, A., Shabunina, A., Vandenbussche, J., and Yackovlev, I. (2018). *Inequality and Poverty across Generations in the European Union*. International Monetary Fund.
- European Commission (2013). European system of accounts: Esa 2010. Technical report, European Union.
- European Commission (2019). *Taxation Trends in the European Union: Data for EU-Member States, Iceland and Norway*. Luxembourg: Publications Office of the European Union, 2019.
- Eurostat (2020a). Data: Annual Sector Accounts (ESA 2010), non-financial transactions. Table `nasa_10_nf_tr`.
- Eurostat (2020b). Data: At-risk-of-poverty rate by poverty threshold, age and sex - EU-SILC and ECHP surveys. Table `[ilc_li02]`.
- Eurostat (2020c). Data: Employment rates by sex, age and citizenship (%). Table `[lfsa_ergan]`.
- Eurostat (2020d). Data: Mean and median income by age and sex - EU-SILC and ECHP surveys. Table `[ilc_di03]`.
- Garibaldi, P. and Taddei, F. (2013). Italy: A dual labour market in transition.
- 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.
- Goldstein, J., Kreyenfeld, M., Jasilioniene, A., and Örsal, D. D. K. (2013). Fertility reactions to the “great recession” in europe: Recent evidence from order-specific data. *Demographic Research*, 29:85–104.
- IMF (2018). World economic outlook 2018: Challenges to steady growth. Technical report, International Monetary Fund.
- Matysiak, A., Sobotka, T., and Vignoli, D. (2020). The Great Recession and fertility in Europe: A sub-national analysis. *European Journal of Population*, pages 1–36.

- Törmälehto, V.-M. (2019). Reconciliation of eu statistics on income and living conditions (eu-silc) data and national accounts. *Eurostat working papers*.
- Trindade, L. Z. and Goedemé, T. (2016). Notes on updating the eu-silc udb sample design variables 2012-2014. Technical report.
- Wittgenstein Centre (2020). European Demographic Datasheet 2020. Available at: www.populationeurope.org.

5 Appendix

A-1 Age-specific income changes: percentiles

Table A-1: Net income and its changes 2008 - 2017, 1st Quartile

Change in real net income 2008 - 2017 in %				
Country	Age 20-39	Age 40-59	Age 60+	Total
AT	2	4	11	6
EE	13	21	-1	3
EL	-89	-43	-9	-39
ES	-49	-2	14	-13
FR	-8	4	10	3
IT	-47	-10	3	-16
PL	36	9	3	15
SE	1	15	12	9
SI	-5	4	9	5

Source: Eurostat, EU-SILC

Table A-2: Median net income and its changes 2008 - 2017

Change in real net income 2008 - 2017 in %				
Country	Age 20-39	Age 40-59	Age 60+	Total
AT	3	2	10	4
EE	23	28	-6	14
EL	-50	-33	-16	-28
ES	-24	-7	9	-4
FR	-2	1	10	3
IT	-26	-7	7	-3
PL	16	10	3	9
SE	6	18	12	12
SI	2	6	6	4

Source: Eurostat, EU-SILC

Table A-3: Net income and its changes 2008 - 2017, 3rd Quartile

Change in real net income 2008 - 2017 in %				
Country	Age 20-39	Age 40-59	Age 60+	Total
AT	0	-1	10	2
EE	20	32	6	24
EL	-38	-38	-22	-31
ES	-11	-8	9	-1
FR	-1	2	8	2
IT	-11	-8	6	-3
PL	6	1	2	2
SE	6	18	17	15
SI	1	5	5	4

Source: Eurostat, EU-SILC

A-2 Explaining the difference between aggregate income in ESA and EU-SILC

Table A-4 compares EU-SILC and ESA data by measuring the share of aggregate income that is covered in EU-SILC by type of income (coverage ratio, CR). Furthermore, it shows the change of the CR between 2008 and 2017. In general, wages and social benefits are similar in both surveys. Differences between ESA and EU-SILC are mainly due to large differences are observed for asset income (Törmälehto, 2019). The CR increased considerably in Austria, Italy and France. In Austria and Italy this increase can be explained with the decline in asset income. Because only a small part of asset income is captured in EU-SILC, the decline in this component increases the share of total income that is captured. In both countries the CR of employment income and social benefits actually decreased. In France, where asset income may be over-covered by EU-SILC (Törmälehto, 2019), the increase in the total CR is explained by an increase in the CR of both employment income and social benefits. In Estonia the coverage of income from employment and of social benefits increased, but not the coverage of total income. In Estonia we observe a unrealistic, strong decline of imputed rents in EU-SILC, reducing the coverage of total income. In Greece the CR of employment income decreased strongly (-14 per cent), while the CR of social benefits increased by 10 per cent.

Table A-4: The coverage ratio of EU-SILC over time: aggregate income in ESA compared to EU-SILC

Country	2017 coverage ratio (CR)			Change CR 2008 - 2017		
	Total income	Employment income	Social benefits	Total income	Employment income	Social benefits
AT	86	98	83	5	-1	0
EE	82	101	72	0	12	10
EL	74	75	77	1	-14	10
ES	88	89	84	1	1	5
FR	99	91	86	5	4	5
IT	86	97	87	6	-3	-2
PL	74	91	75	-1	2	0
SE	85	110	83	-4	-1	-6
SI	86	82	87	3	-2	0

A-3 Standard errors of income changes

Table A-5: Standard errors of income changes

Standard errors of the estimated income changes 2008-2017				
Country	Age 20-39	Age 40-59	Age 60+	Total
AT	2.2	2.8	2.0	1.4
EE	2.7	2.0	1.3	1.3
EL	4.2	6.4	4.2	3.5
ES	2.5	3.2	2.4	1.9
FR	4.2	6.8	10.0	6.4
IT	3.1	5.4	4.6	4.1
PL	2.2	1.9	2.2	1.5
SE	1.6	2.8	2.4	1.4
SI	1.6	1.6	1.6	0.9

A-4 Data for decomposition analysis

Table A-6: Decomposition of income changes 2007-2008

	Total net income (?Y)	Employ- ment income (?YL)	Public transfers (?YB)	Other income (?YO)	Employ- ment (?l)	Inc. per empl. (?yl)	Non- empl. (?n)	Transfers per non- empl. (?yb)
Austria								
Age 20-39	-1	-2	1	0	0	-1	0	0
Age 40-59	1	4	-2	-1	3	1	-2	0
Age 60+	11	5	5	1	6	-1	-3	7
Total	3	2	1	0	1	1	-1	2
Estonia								
Age 20-39	17	17	7	-7	4	13	-1	8
Age 40-59	28	36	5	-13	4	32	-2	7
Age 60+	7	17	7	-16	8	9	-5	12
Total	17	20	8	-11	3	18	-1	9
Greece								
Age 20-39	-43	-35	0	-7	-13	-22	1	-1
Age 40-59	-38	-29	-3	-6	-6	-23	2	-5
Age 60+	-24	-4	-14	-6	-1	-3	1	-15
Total	-34	-25	-3	-6	-9	-16	3	-7
Spain								
Age 20-39	-18	-15	-2	0	-4	-11	1	-3
Age 40-59	-8	-6	-2	-1	3	-9	-1	-1
Age 60+	8	3	7	-2	3	0	-2	8
Total	-4	-7	3	0	-2	-5	1	2
France								
Age 20-39	-4	-2	1	-2	-3	1	2	-1
Age 40-59	1	9	-2	-6	4	5	-3	1
Age 60+	8	6	8	-5	7	-1	-4	11
Total	3	2	5	-4	-1	3	1	4
Italy								
Age 20-39	-17	-15	1	-3	-8	-6	1	-1
Age 40-59	-9	-5	-3	-1	3	-8	-1	-2
Age 60+	4	4	0	0	7	-3	-4	4
Total	-5	-5	1	-1	0	-5	0	1
Poland								
Age 20-39	4	0	5	-1	1	-1	0	6
Age 40-59	2	6	-4	-1	9	-3	-3	-1
Age 60+	1	5	-4	0	7	-3	-4	0
Total	2	-1	3	0	1	-2	0	3
Sweden								
Age 20-39	4	3	2	0	-4	7	2	-1
Age 40-59	16	16	-1	2	4	12	-2	1
Age 60+	14	3	8	3	1	2	-1	9
Total	12	7	3	1	0	8	0	3
Slovenia								
Age 20-39	1	-1	1	0	-3	2	1	0
Age 40-59	4	8	-4	0	6	2	-4	0
Age 60+	7	2	2	3	3	-2	-2	4
Total	4	0	3	1	-2	2	1	1