Journal of Population Ageing
https://doi.org/10.1007/s12062-025-09481-0

Evolving Contributions of Various Income Sources to U.S. Income Inequality Across Age Groups

Christian Scharrer[1]

Received: 13 June 2024 / Accepted: 17 February 2025

Abstract

This paper studies the age-group-specific evolutions of inequality of total income among highly and less educated females and males at ages 26–85 from 2005 to 2018 in the United States. In particular, it presents time series of Gini coefficients and associated decompositions by different income components to highlight the contributions of different income sources to inequality in different age groups over time. The results indicate, among others, that especially an increasing number of individuals with zero incomes contributed to the observed increases of inequality among less educated females and males aged 26–45 and 26–55 after the Great Recession, respectively.

Keywords Inequality · Total income · Age groups · Gini coefficient

Introduction

The vast majority of studies on trends in income inequality focus on the total population of households, individuals, or tax units. However, individual income profiles follow a hump-shaped pattern over the life cycle and, in particular, differ by gender and education: Incomes are low at a young age, increase until middle age, and decrease at more advanced ages. See, for example, Attanasio et al. (1999); Bosworth et al. (2000), and Gourinchas and Parker (2002). The resulting inherent inequality contributes to the total inequality in a population and is a natural consequence of income differences between population subgroups at different life cycle stages, which can be justified to a certain extent in a society. Thus, we should also be more concerned about the evolution of inequality in different age groups to detect important changes in intra- and intergenerational inequality over time; as studied by Atkinson (1971); Deaton and Paxson (1994), or Heathcote et al. (2005). Moreover, population subgroups respond quite differently to economic shocks. For example, workers are better able to deal with higher economic risks by changing their labor supply and savings rates, whereas retirees can only adjust their savings rate. In contrast, the total income of young indi-

✉ Christian Scharrer
christian.scharrer@wiwi.uni-augsburg.de

[1] University of Augsburg, Department of Economics, Universitätsstraße 16, 86159 Augsburg, Germany

Published online: 26 February 2025

viduals mainly consists of labor income, whereas Social Security benefits, as well as asset and pension incomes, represent the primary income sources for elderly individuals. As a consequence, changes in income sources also have different impacts on the inequality of different age groups. For these reasons, it is also very important to study how age-specific inequality of total income evolves and how changes in different income sources contribute to the associated changes in inequality over time. The answers to these questions allow us to obtain a clearer and more accurate picture of inequality trends by age, which, in turn, affect the total inequality in a population, while they improve our understanding of income inequality and its sources.

To address these questions, I use data from the American Community Survey (ACS) and study the evolution of total income inequality in different age groups between 2005 and 2018. These age groups either comprise highly or less educated females or males at ages 26–85 split into 10-year age bins. Such empirical studies of heterogeneous agents are usually very difficult to implement because the sample sizes of most surveys tend to be much too small, which severely limits the validity of the results. In contrast, the ACS interviews more than 2.8 million individuals per year, such that its huge sample size allows to study the trends of total income inequality, measured by the Gini coefficient, of individuals by sex, educational level, and, in particular, age, simultaneously. Following Mookherjee and Shorrocks (1982); Lerman and Yitzhaki (1985), and Lambert and Aronson (1993), I decompose the corresponding trends of Gini coefficients by different income sources, where I also explicitly take the contribution of individuals with a total income of zero to inequality into account. The inclusion of a zero income component is particularly important because both this income component and higher contributions of wage incomes to inequality explain large parts of the observed increases of Gini coefficients among females and males in most young and prime age groups during and especially after the Great Recession (2007–2009). In contrast, asset incomes primarily increased the inequality of elderly individuals at ages 66–75 and 76–88 between 2005 and 2008, especially among less educated males and females. Thereafter, this income component, however, contributed to a lower level of inequality in these age groups, but the observed declines of Gini coefficients were only temporary. Its negative contributions to inequality faded and/or were increasingly outweighed by higher contributions of other income components, so the inequality increased again up to 2018.

The remainder of this paper is organized as follows. Section 2 briefly reviews the literature on which this paper builds. Section 3 describes the data used in this study. Section 4 outlines the decomposition of age-group-specific Gini coefficients and presents the corresponding results for females and males with high and low educational levels, before Sect. 5 concludes.

Literature

In their seminal paper, Piketty and Saez (2003) provide empirical evidence that the pretax income shares of the top 10 percent followed a U-shaped pattern in the US over the last century. Moreover, according to their latest data covering the years 1913–

2018, these shares further increased.[1] For example, with respect to market income, excluding government transfers and capital gains, the shares of the top 10 percent rose from 42.23% in 2001 to 47.78% in 2018. Specifically, the associated academic and public debates intensified after the publication of Capital in the Twenty-First Century by Piketty (2014). The book also presents historical data consistent with the pioneering works of Kuznets and Jenks (1953) and Atkinson and Harrison (1978). These data show that the concentrations of income and wealth have increased during the last decades. Furthermore, Saez and Zucman (2020) found that the annual growth of pretax income was very unevenly distributed between 1980 and 2018. The average annual growth rate amounted to only 0.2% up to the 50th percentile, whereas adults at the very top of the income distribution faced explosive growth rates. These findings have been supported by many other studies. Kuhn et al. (2020) show, for example, that the share of total household income accruing to the top 10 percent increased from 34.5% in 1950 to 47.5% in 2016, while the Gini coefficient of total household income rose from 0.44 to 0.58 over the same period. Moreover, Hoffmann et al. (2020) find that the standard deviations of labor and total income for both females and males strongly increased between 1975 and 2018.

In addition to the aforementioned studies, this paper primarily builds on works by Lerman and Yitzhaki (1985); Hungerford (2020), and Zewde and Crystal (2021). Lerman and Yitzhaki (1985) show that the contributions of a given income source to the overall inequality of total income is given by the product of the respective Gini coefficient of this income source, its share in total income, and its correlation with the rank of total income. In the corresponding empirical part, they use data from the March Current Population Survey and find that wage incomes of family heads explained approximately 59% of total inequality in 1980. Hungerford (2020) uses longitudinal data provided by the Health and Retirement Study at the University of Michigan and investigates the evolution of income inequality between 1994 and 2012 with respect to the HRS 1931–41 birth cohort. In contrast to many other studies, for example Deaton and Paxson (1994); Crystal and Waehrer (1996), or Crystal et al. (2016), he finds that the Gini coefficients of total income remained relatively constant and fluctuated only weakly around an average value of 0.49 as this cohort aged. Moreover, he shows that Social Security benefits and other transfers were able to decrease the inequality among the elderly because these income sources accounted for 38% of total income but only explained 11% of total inequality in 2012. Zewde and Crystal (2021) create a pseudopanel with data from the Survey of Consumer Finances and show that the Gini coefficients of size-adjusted household income of cohorts in their primary working years (Generation-X and Baby Boomers) increased between 2007 and 2016. In contrast, the inequality among younger millennials who were aged 18–27 in 2007 and 27–36 in 2016 decreased over this period.

Data

I use data from the 1-year public use micro-data sample of the ACS provided by the Integrated Public Use Microdata Series (IPUMS) USA, see Ruggles et al. (2021).

[1] Source: https://eml.berkeley.edu/~saez/ (accessed December 6, 2022).

The ACS is the largest household survey in the US and has been fully implemented by the US Census Bureau since 2005. This survey provides annual social, economic, housing, and demographic data about more than 2.8 million individuals. For that reason, its large sample size allows us to study the evolution of total income inequality among individuals simultaneously by age, sex, educational level, and several income components over time.

In this paper, I define the total income of an individual as the sum of six income components: wage and salary income (WI), business and farm income (BI), Social Security benefit income (SSBI), asset income (AI),[2] retirement income (RI) from pensions excluding Social Security, and other income (OI) from sources not included in the previously mentioned income types.[3] Table 1 provides the detailed definitions of these income sources.

Moreover, to ensure the comparability of these income components over time, I restrict my analysis to the 2005–2018 ACS samples,[4] For confidentiality reasons, some income components (the variables INCWAGE, INCBUS00, INCINVST, INCRETIR, and INCOTHER in Table 1) with values above the 99.5th percentile in the state of residence are top-coded as the state's mean of values above the threshold. Note that top-coding generally limits the examination of income distributions. Larrimore et al. (2008) and Burkhauser et al. (2011) show, however, that cell-mean series, which provide the mean income of all top-coded individuals, alleviate this problem. In particular, Larrimore et al. (2008) calculate Gini coefficients of total household income with data from the March Current Population Survey for the years 1976 to 2007, when the total income is also top-coded by income source. On page 116, they conclude that cell-mean series provide "a consistent way of capturing inequality as measured using the internal data". For this reason, I do not trim the samples with respect to, for example, the top 1 percent.

Furthermore, I use the Gini coefficient as a measure of total income inequality and decompose it into several income components. Thus, I follow many other studies, for example Mussini (2013) or Hungerford (2020), and drop individuals reporting at least

[2] Note that the ACS does not provide data on realized capital gains. However, Piketty and Saez (2003) point out on page 6 that "realized capital gains are not an annual ow of income (in general, capital gains are realized by individuals in a lumpy way) and form a very volatile component of income with large aggregate variations from year to year depending on stock price variations." For that reason, the exclusion of capital gains is only a minor point of criticism, which is also present in many other studies. See, for example, Burkhauser et al. (2012); Alvaredo et al. (2013), or Hoffmann et al. (2020).

[3] This definition of total income implies that it coincides with the total income variable INCTOT provided by IPUMS USA. Moreover, the associated questions in the ACS questionnaire refer to the previous 12 months.

[4] The ACS 2019 revised a retirement income question to include a more detailed instruction that resulted in an increase in reported retirement income. Moreover, in 2020, the COVID-19 pandemic disrupted the data collection process. Therefore, the US Census Bureau released the 2020 ACS 1-year data products with experimental weights that limit temporal comparisons. See the website "Changes to the Retirement Income Question" and "Census Bureau Releases Experimental 2020 American Community Survey 1-Year Data", *US Census Bureau* www.census.gov/programs-surveys/acs/technical-documentation/user-notes/2020-01.html and www.census.gov/newsroom/press-releases/2021/experimental-2020-acs-1-year-data.html (accessed April 27, 2022).

Table 1 Income Sources of Total Income (the variables in parenthesis in the right column denote the original IPUMS variables)

Income Source	Definition
Wage and salary income (WI)	pretax wage and salary income including commissions, bonuses, or tips (INCWAGE)
Business and farm income (BI)	pretax self-employment income from a business, professional practice, or farm, including proprietorships and partnerships (INCBUS00)
Social Security benefit income (SSBI)	pretax income from Social Security pensions, survivors benefits, or permanent disability insurance, as well as US government Railroad Retirement insurance payments (INCSS)
Asset income (AI)	pretax income from an estate or trust, interest, dividends, royalties, and rents received (INCINVST)
Retirement income (RI)	pretax retirement, survivor, and disability pension income, other than Social Security (INCRETIR)
Other income (OI)	sum of pretax income from public assistance programs (INCWELFR), Supplemental Security Income (INCSUPP) and other sources of income (INCOTHER) like Veterans' payments, unemployment compensation, child support, or alimony, excluding lump sum payments such as money from an inheritance or the sale of a home

one negative value in the above income groups.[5] In addition, I exclude individuals living in group quarters or in households containing 10 or more people because the ACS disguises the age of these persons due to confidentiality concerns. To keep the analysis traceable and to facilitate visual interpretations in the figures hereinafter, I focus on individuals aged 26–85 years and divide each sample into six 10-year age groups. Finally, I define individuals with a high educational level as holding a college degree or higher, while individuals with a low educational level (LE) are those holding a high school diploma or below.

Evolution of Gini Coefficients

One of the most established measures of income inequality is the Gini coefficient that ranges from zero to one if only nonnegative incomes are taken into account. A Gini coefficient of zero represents perfect equality, i.e., everyone receives the same income. In contrast, a Gini coefficient of one implies perfect inequality with only one person receiving the total income in a population. Section 4.1 explains the decomposition of the Gini coefficient used in this study before Sects. 4.2 and 4.3 present the associated

[5] The inclusion of incomes with negative values may lead to Gini coefficients larger than one, which violate the normalization principle with respect to comparisons over time. Therefore, Chen et al. (1982) and Berrebi and Silber (1985) propose a reformulation of the Gini coefficient that ensures comparability between distributions with and without negative incomes. Manero (2017), however, notes that the Gini decomposition formula by Lerman and Yitzhaki (1985), which I present in the next section, is inappropriate, if negative income values are taken into account.

results for highly and less educated females and males with respect to the 2005–2018 ACS samples.

Gini Decomposition

Lambert and Aronson (1993); Mookherjee and Shorrocks (1982), and Bhattacharya and Mahalanobis (1967) show that the Gini coefficient G of total income Y can be decomposed into

$$G = G_B + \sum p_k a_k G_k + R. \tag{1}$$

The term G_B denotes the between-groups Gini coefficient, in which every income in every subgroup is replaced by its respective subgroup mean. The variables p_k and a_k represent the population and income share of subgroup k, respectively. The Gini coefficient within subgroup k is denoted by G_k, and R is a residual that is equal to zero if the subgroup income ranges do not overlap. In this study, I split the population into two subgroups: subgroup $k = 1$ consists of individuals whose total income is equal to zero ($Y = 0$) and subgroup $k = 2$ represents individuals with positive total income ($Y > 0$). These assumptions imply $a_1 = 0$, $G_1 = 0$, $a_2 = 1$, $R = 0$, and $G_B = 1 - p_2$.[6] Hence, the associated decomposition of the overall Gini coefficient G is given by

$$\begin{aligned} G &= G_B - G_B G_2 + G_2, \\ &= Z_{\mathrm{ZI}} + G_2. \end{aligned} \tag{2}$$

This equation shows that the Gini coefficient G depends on the between-groups Gini coefficient G_B, the within-subgroup Gini coefficient G_2 among individuals with positive total income, and a (negative) composition effect due to interactions between G_B and G_2. Moreover, compared with studies restricted to individuals with positive total income, the term $Z_{\mathrm{ZI}} = G_B - G_B G_2$ can be interpreted as the contribution of individuals with zero income (ZI) to overall inequality if this subgroup was additionally taken into account.

Furthermore, because total income is the sum of different income types, I follow Hungerford (2020) and decompose G_2 by different income sources using the method developed by Lerman and Yitzhaki (1985):

$$G_2 = \sum_{i \in L} Z_i = \sum_{i \in L} S_i G_i R_i, \tag{3}$$

in which the term $Z_i = S_i G_i R_i$ represents the contribution of income source i to the overall Gini coefficient G_2. This approach is particularly interesting as it provides a more detailed picture of inequality between the respective age groups. The variables S_i and G_i denote the share in total income and the Gini coefficient of income component i,

[6] The mathematical derivations and proofs are provided in Yitzhaki (2002). Moreover, because I use sample weights with respect to the aggregation from sample to population values, I use the formulas of Lerman and Yitzhaki (1989) for the calculation of the Gini coefficient.

respectively. The term R_i measures the ”Gini correlation” between income component i and total income. To keep the analysis tractable, I divide total income into the aforementioned six categories from Sect. 2 such that $L = \{\text{WI, BI, SSBI, RI, AI, OI}\}$. Hence, the final total decomposition of the Gini coefficient G is given by

$$G = Z_{\text{ZI}} + Z_{\text{WI}} + Z_{\text{BI}} + Z_{\text{SSBI}} + Z_{\text{RI}} + Z_{\text{AI}} + Z_{\text{OI}}. \quad (4)$$

Gini Coefficients of Females

For the 2005 ACS sample, the two panels in the first row of Fig. 1 present the age-group-specific Gini coefficients of total income of less (LE) and highly (HE) educated females (F), as well as the decompositions with respect to the income components ZI, WI, BI, SSBI, RI, AI, and OI. The x-axes denote the age groups. In these panels, the absolute contributions of each income component to inequality are displayed as stacked bar plots such that the age-group-specific vertical sums are equal to the respective Gini coefficients of total income, denoted by black dots at the midpoint of each age interval.

The left panel of the first row shows that the inequality of total income of highly educated females aged 26–35 was relatively low with a Gini coefficient of 0.44 and increased to 0.50 in the age group 36–45, mainly due to higher contributions of the wage income component WI to overall inequality, as displayed by the blue areas. Inequality then fell again and followed a weakly pronounced U-shaped pattern, with the Gini declining to 0.46 in the age group 46–55 and then rising again to 0.50 for females in the age groups 66–75. Thereafter, the Gini coefficient remained relatively constant among females aged 76–85. This pattern mainly resulted from a steady decline in WI, which was increasingly outpaced by larger contributions of the asset and retirement income components AI and RI with increasing age, according to the gray and dark green areas, respectively. Moreover, Social Security benefit incomes SSBI, which are displayed in orange, marginally decreased the overall inequality in the age group 56–65 due to a negative correlation with total income and contributed to a higher level of inequality among the older age groups. Furthermore, the contributions of business incomes BI and other incomes OI to overall inequality, see the yellow and light green areas, respectively, were relatively small across all age groups. In contrast, as the beige areas show, the zero income component ZI made more pronounced contributions to inequality in the first four age groups with females aged 26–65 because it accounted for a greater share of total inequality. On average, this share was equal to 11.77% in these age groups. Compared with highly educated females, the corresponding right panel shows that females with a low educational level faced higher levels of inequality in the first four age groups, whereas inequality was considerably lower in the last two age groups. Specifically, the Gini coefficient of less educated females at ages 26–35 was much higher, by as much as 18.28%, and amounted to 0.53, which only slightly decreased to 0.51 among females aged 46–55. Then, inequality increased to its maximum of 0.54 in the age group 56–65, before it steadily declined to 0.43 in the oldest age group 76–85. As the decompositions show, the contributions of ZI were much more pronounced in the first four age groups with less educated females at ages 26–65. On average, its relative contributions amounted to 16.90% and, therefore,

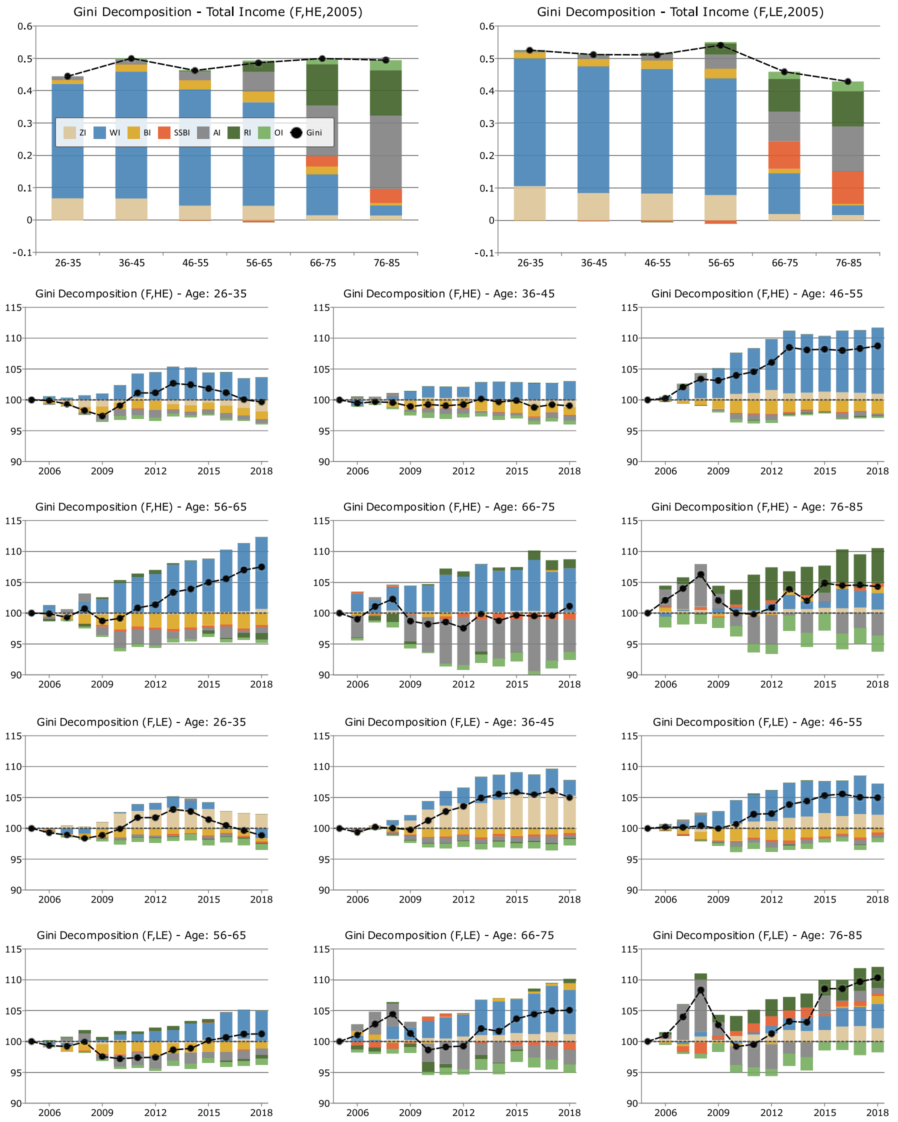

Fig. 1 Decomposition of Gini coefficients of total income - Females (F) with high (HE) and low (LE) education

explained a higher share of total income inequality in these age groups. Moreover, compared with highly educated females, the contributions of SSBI to overall inequality were much more pronounced in the two oldest age groups comprising females between ages 66–85. However, the income sources AI and RI particularly contributed much less to inequality in these age groups, which is why the Gini coefficients of total income declined.

The bottom four rows of Fig. 1 show how total income inequality evolved in each age group from 2005 to 2018. In these panels, the black dashed lines with dots represent the evolution of the normalized Gini coefficient (NGC) with 2005=100 as the base year. Moreover, the stacked bar plots display the associated absolute changes of each income component with respect to 2005, which were divided by the corresponding Gini coefficients of 2005 and multiplied by 100. Thus, these bar plots show the contributions of all income components to inequality growth in that the vertical sums are equal to the relative changes in the 2005 Gini coefficients. For the readers' convenience, I centered these changes at the 100 line in each panel, so the sums coincide visually with the NGCs. Stacked bar plots above (below) this line, therefore, represent positive (negative) changes. The x-axes denote the time in years.

The panels in the second and the third row of Fig. 1 display the evolution of inequality among highly educated females. They show that, up to 2018, the NGCs of age groups 26–35 and 36–45 weakly declinded by 0.35 and 0.96%, respectively. In particular, the inequality among females at ages 26–35 first decreased during the Great Recession and then increased only temporarily in the subsequent periods, while it remained fairly stable over time with respect to females aged 36–45. By contrast, females at ages 46–55 and 56–65 faced the most pronounced increases in inequality until 2018. Their NGCs rose by 8.75 and 7.49%, respectively. Especially the wage component WI and, to a much lesser extent, the zero income component ZI contributed to these large increases of inequality, which were only slightly dampened by lower contributions of the remaining income components (in particular BI and AI). However, the NGC of females aged 66–75 increased by only 1.12% until 2018 due to much more pronounced declines of the asset income component AI that partly offset the similarly strong increases in WI between 2009 and 2018. Moreover, the NGC of females aged 76–85 temporarily rose by 6.24% until 2008, whereas the younger age group 66–75 faced a weak increase of only 2.29%. This was primarily attributable to higher contributions of AI, which decreased and even turned negative in the following years, so the NGC declined until 2011. Thereafter, inequality increased again due to the higher contributions of RI and WI, which outweighed the declines in AI and OI. The last two rows of Fig. 1 present the corresponding results for females with low levels of education. In contrast to highly educated females at ages 36–45, the NGC strongly increased by 4.98% among less educated females in the same age group until 2018. The decompositions show that this difference mainly resulted from very high contributions of the zero income component ZI to inequality since the effects of the remaining income components on inequality almost cancelled each other out. Furthermore, the NGCs of the other age groups followed qualitatively similar trends. Note, however, that the contributions of the zero income component ZI were also more pronounced in most of these age groups, in particular in the youngest age group comprising less educated females at ages 26–35.

Gini Coefficients of Males

Fig. 2 is analogous to Fig. 1 except that it displays the age-group-specific decompositions of inequality for males (M). Comparing highly (HE) and less (LE) educated males in the first row, the Gini coefficient of highly educated males at ages 26–35 was slightly lower and amounted to 0.39 in 2005, whereas the corresponding value was

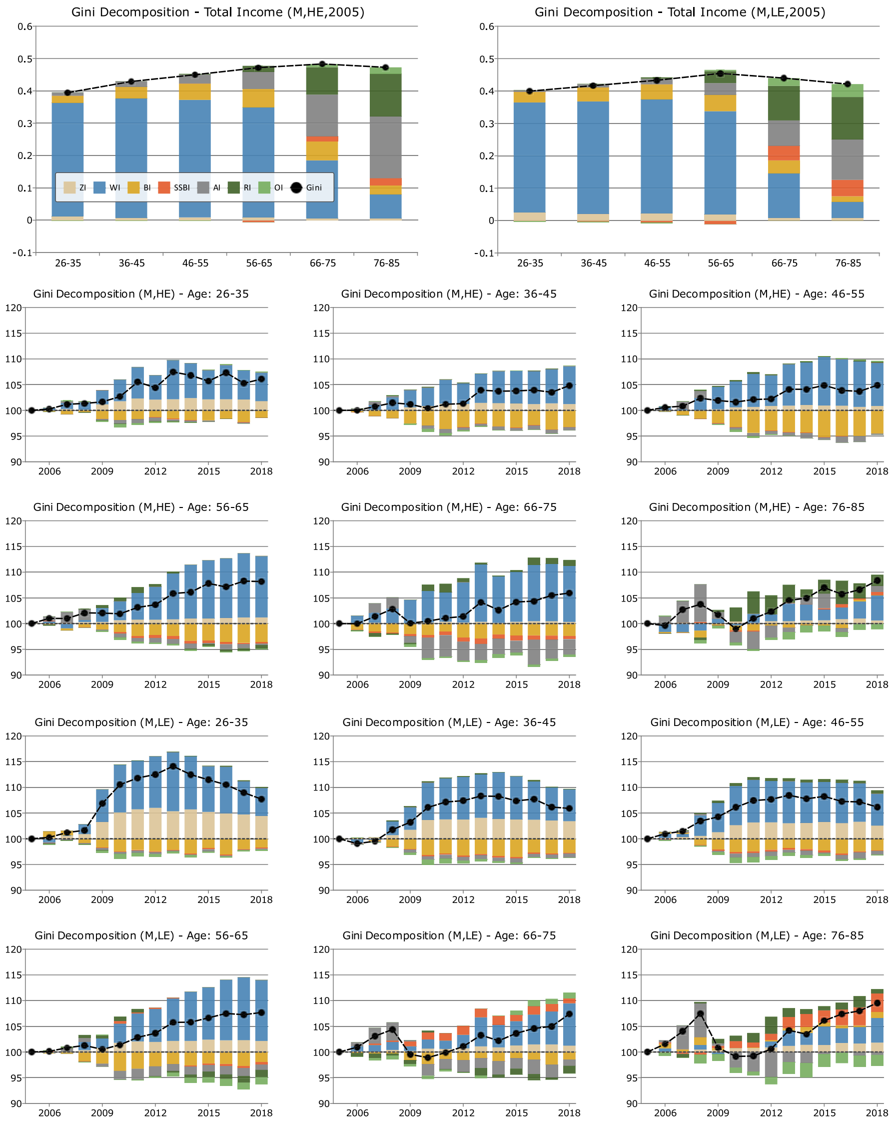

Fig. 2 Decomposition of Gini coefficients of total income - Males (M) with high (HE) and low (LE) education

equal to 0.40 among less educated males. Then, the inequality among highly educated males increased to 0.48 up to age group 66–75, before it decreased to 0.47 in the oldest age group. In contrast, the Gini coefficient of males with low levels of education only increased to 0.45 up to age group 56–65 and then decreased to 0.42 in the oldest age group 76–85. Thus, the decline of inequality among less educated males in the oldest age groups was somewhat more pronounced. Compared with males holding a college degree, the associated decompositions show that especially the income components RI and AI contributed less to overall inequality among males with low educational levels in the two oldest age groups 66–75 and 76–85, so they dampened the higher contributions of SSBI to inequality. Moreover, the influence of the wage income component WI on overall income inequality became less important with increasing age for both education types across all age groups and was primarily replaced by the income components AI, RI, OI, and SSBI. Furthermore, the zero income component ZI explained, on average, only 2.17% of total income inequality in the youngest four age groups comprising highly educated males between ages 26–65. However, it accounted for a much higher share of total income inequality among males with low levels of education in these age groups, which was on average equal to 5.27%. Additionally, note that the business income component BI generally contributed more to overall inequality than ZI. On average across all age groups, BI explained 9.21 and 8.88% of total inequality among highly and less educated males, respectively.

The bottom four rows of Fig. 1 display the corresponding evolutions until 2018. Overall, inequality increased relatively uniformly among both highly and less educated males across all age groups. On average, across all age groups, the normlalized Gini coefficients of males with and without a college degree increased by 6.38% and 7.41% from 2005 to 2018, respectively. The associated growth decompositions show that the observed increases in inequality among both highly and less educated males were primarily attributable to increases in the wage income component WI up to age group 66–75, whereby the zero income component ZI, in particular, reinforced the increases of inequality among less educated males in the youngest three age groups 26–35, 36–45, and 46–55. Moreover, males at ages 66–75 and 76–85 with a low educational level also faced relatively large increases in SSBI, while retirement incomes RI mainly contributed to a higher level of inequality among highly educated males in the oldest age group 76–85. Moreover, irrespective of educational status and similar to the analysis with respect to females in Fig. 1, the contributions of the business income component BI were rather negligible in the oldest age groups, whereas they dampened the observed increases in inequality in younger age groups; in particular among highly educated males in the age groups 36–45, 46–55, and 56–65. Furthermore, asset incomes AI primarily contributed to the observed rises of inequality among both highly and less educated males in the oldest age groups 66–75 and 76–85 until 2008. Thereafter, this income component, however, rather dampened the increasing levels of inequality in most of these age groups up to 2018.

Conclusion

In this paper, I have presented a very detailed analysis of the age-group-specific evolutions of total income inequality among highly and less educated females and males at ages 26–85 between 2005 and 2018. This analysis examined the age-group-specific trends of the Gini coefficients of total income, which I decomposed by six normal income components, such as wage or asset incomes, and an additional zero income component for individuals with a total income of zero, similar to Lerman and Yitzhaki (1985). Overall, the inequality of total income evolved very differently by age among highly and less educated females. In particular, from 2005 to 2018, the Gini coefficients of females with a college degree at ages 46–55 and 56–65 strongly rose by 8.75 and 7.49%, respectively, while the inequality even slightly decreased by 0.35 and 0.96% in the age groups 26–35 and 36–45, respectively. In contrast, the two largest increases of 5.08 and 10.33% occurred among less educated females at ages 66–75 and 76–85, respectively, whereas the Gini coefficients only declined by 1.16% in the youngest age group 26–35. The inequality of both highly and less educated males, however, increased relatively uniformly across all age groups. On average, the Gini coefficients of highly and less educated males rose by 6.38 and 7.41%, respectively.

The associated decompositions of the Gini coefficients show that the economic shocks during the Great Recession had a very persistent effect on the zero income component. Until approximately 2010, it strongly increased in age groups with less educated females and males aged 26–45 and 26–55, respectively, and then remained relatively constant in most of these age groups until 2018. As a consequence, this income component additionally amplified the very pronounced increases of inequality that were caused by wage incomes in these age groups between 2009 and 2018. The higher contributions of the zero income component to overall inequality, therefore, suggest that, in particular, young less educated individuals were left behind economically during the recovery phase after the Great Recession. Furthermore, asset incomes primarily contributed to the rises in inequality among both females and males in the two oldest age groups 66–75 and 76–85 until 2008, which were somewhat more pronounced among less educated individuals. Thereafter, the contributions of this income component to inequality declined, so the Gini coefficients also decreased. However, the declines of inequality were only temporary because the contributions of other income components, such as Social Security benefits, retirement, or wage incomes, strongly increased over time. For this reason, the corresponding Gini coefficients increased again in these age groups until 2018.

In sum, the distributions of total income differed in many ways across age groups and over time. Thus, political decision-makers, sociologists, and economists should pay much more attention to age-specific trends of inequality with a particular focus on the lower tail of the income distribution. Nevertheless, the results of this study should also be interpreted with caution for the following three reasons. First, in contrast to, for example, the Survey of Consumer Finances, the ACS does not oversample the wealthiest households, so the Gini coefficients were likely somewhat downward biased between 2005 and 2018. This shortcoming occurs in many other studies as well. Second, this study covered only a relatively short history of inequality in the US. Third, I intentionally refrained from a cohort-based inequality analysis to compare more precisely trends across age groups, but such an analysis with ACS data might prove valuable for future research.

Author Contributions The author confirms the sole responsibility for the entire content of this manuscript.

Funding Open Access funding enabled and organized by Projekt DEAL. No funding was received for conducting this study.

Data Availability The data that support the findings of this study are openly available at IPUMS USA, see https://doi.org/10.18128/D010.V11.0.

Declarations

Conflict of interest The author has no competing financial or non-financial interests to disclose.

Ethical Approval Not applicable.

References

Alvaredo, F., Atkinson, A. B., Piketty, T., & Saez, E. (2013). The Top 1 Percent in International and Historical Perspective. *Journal of Economic Perspectives, 27*(3), 3–20.

Atkinson, A. B. (1971). The Distribution of Wealth and the Individual Life-Cycle. *Oxford Economic Papers, 23*(2), 239–254.

Atkinson, A. B., & Harrison, A. J. (1978). *Personal Wealth in Britan*. Cambridge University Press.

Attanasio, O. P., Banks, J., Meghir, C., & Weber, G. (1999). Humps and Bumps in Lifetime Consumption. *Journal of Business & Economic Statistics, 17*(1), 22–35.

Berrebi, Z. M., & Silber, J. (1985). The Gini Coefficient and Negative Income: A Comment. *Oxford Economic Papers, 37*(3), 525–526.

Bhattacharya, N., & Mahalanobis, B. (1967). Regional Disparities in Household Consumption in India. *Journal of the American Statistical Association, 62*(317), 143–161.

Bosworth, B., Burtless, G., & Steuerle, E. (2000). Lifetime Earnings Patterns, the Distribution of Future Social Security Benefits, and the Impact of Pension Reform. *Social Security Bulletin, 63*(4), 74–98.

Burkhauser, R., Feng, S., Jenkins, S., & Larrimore, J. (2011). Estimating Trends in US Income Inequality Using the Current Population Survey: the Importance of Controlling for Censoring. *The Journal of Economic Inequality, 9*(3), 393–415.

Burkhauser, R. V., Feng, S., Jenkins, S. P., & Larrimore, J. (2012). Recent Trends in Top Income Shares in the United States: Reconciling Estimates from March CPS and IRS Tax Return Data. *The Review of Economics and Statistics, 94*(2), 371–388.

Chen, C.-N., Tsaur, T.-W., & Rhai, T.-S. (1982). The Gini Coefficient and Negative Income. *Oxford Economic Papers, 34*(3), 473–478.

Crystal, S., Shea, D., & Reyes, A. (2016). Cumulative Advantage, Cumulative Disadvantage, and Evolving Patterns of Late-Life Inequality. *The Gerontologist, 57*, 910–920.

Crystal, S., & Waehrer, K. (1996). Later-Life Economic Inequality in Longitudinal Perspective. *Journal of Gerontology: Social Sciences, 51B*(6), 307–318.

Deaton, A., & Paxson, C. (1994). Intertemporal Choice and Inequality. *Journal of Political Economy, 102*(3), 437–467.

Gourinchas, P.-O., & Parker, J. A. (2002). Consumption Over the Life Cycle. *Econometrica, 70*(1), 47–89.

Heathcote, J., Storesletten, K., & Violante, G. L. (2005). Two Views of Inequality over the Life Cycle. *Journal of the European Economic Association, 3*(2/3), 765–775.

Hoffmann, F., Lee, D. S., & Lemieux, T. (2020). Growing Income Inequality in the United States and Other Advanced Economies. *Journal of Economic Perspectives, 34*(4), 52–78.

Hungerford, T. L. (2020). The Course of Income Inequality as a Cohort Ages into Old-Age. *The Journal of Economic Inequality, 18*(1), 71–90.

Kuhn, M., Schularick, M., & Steins, U. I. (2020). Income and Wealth Inequality in America, 1949–2016. *Journal of Political Economy, 128*(9), 3469–3519.

Kuznets, S., & Jenks, E. (1953). *Shares of Upper Income Groups in Income and Savings (1953)*. National Bureau of Economic Research, Inc.

Lambert, P. J., & Aronson, J. R. (1993). Inequality Decomposition Analysis and the Gini Coefficient Revisited. *The Economic Journal, 103*(420), 1221–1227.

Larrimore, J., Burkhauser, R., Feng, S., & Zayatz, L. (2008). Consistent Cell Means for Topcoded Incomes in the Public Use March CPS (1976–2007). *Journal of Economic and Social Measurement, 33*, 89–128.

Lerman, R. I., & Yitzhaki, S. (1985). Income Inequality Effects by Income Source: A New Approach and Applications to the United States. *The Review of Economics and Statistics, 67*(1), 151–156.

Lerman, R. I., & Yitzhaki, S. (1989). Improving the accuracy of estimates of Gini coefficients. *Journal of Econometrics, 42*(1), 43–47.

Manero, A. (2017). The Limitations of Negative Incomes in the Gini Coefficient Decomposition by Source. *Applied Economics Letters, 24*(14), 977–981.

Mookherjee, D., & Shorrocks, A. (1982). A Decomposition Analysis of the Trend in UK Income Inequality. *The Economic Journal, 92*(368), 886–902.

Mussini, M. (2013). A Matrix Approach to the Gini Index Decomposition by Subgroup and by Income Source. *Applied Economics, 45*(17), 2457–2468.

Piketty, T. (2014). *Capital in the Twenty-First Century*. Harvard University Press.

Piketty, T., & Saez, E. (2003). Income Inequality in the United States 1913–1998*. *The Quarterly Journal of Economics, 118*(1), 1–41.

Ruggles, S., Fitch, C. A., Goeken, R., Hacker, J. D., Nelson, M. A., Roberts, E., Schouweiler, M., & Sobek, M. (2021). IPUMS USA: Version 11.0 [dataset]. *Minneapolis, MN: IPUMS*. https://doi.org/10.18128/D010.V11.0. Accessed 15 Sept 2023

Saez, E., & Zucman, G. (2020). The Rise of Income and Wealth Inequality in America: Evidence from Distributional Macroeconomic Accounts. *Journal of Economic Perspectives, 34*(4), 3–26.

Yitzhaki, S. (2002). Do We Need a Separate Poverty Measurement? *European Journal of Political Economy, 18*(1), 61–85.

Zewde, N., & Crystal, S. (2021). Impact of the 2008 Recession on Wealth-Adjusted Income and Inequality for U.S. Cohorts. *The Journals of Gerontology: Series B 77*(4), 780–789.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.