

The Impact of Age on Black Median Income: A Critical Analysis

Bayowa Onabajo

2024-11-07

The Impact of Age on Black Median Income: A Critical Analysis.

Introduction.

Income inequality remains a persistent challenge in the United States, particularly impacting Black Americans due to systemic barriers that influence economic outcomes. It continues to be a critical issue within the Black American community, shaped by various systemic and historical factors. Even though some studies claim the income inequality is a correlation of poor intergenerational mobility (Raj, 2019) or difference in cognitive abilities (Rushton, 2005), the inequality exists in some spheres. Structural barriers—including racial discrimination, unequal access to career advancement opportunities, and health disparities—play significant roles in the economic disparities faced by Black Americans. As a factor, age may amplify these disparities, with older Black adults potentially facing additional challenges related to health, employment, and age-related discrimination. This paper explores the relationship between age and median income among Black adults across U.S. states, using 2022 data from the American Community Survey (ACS). This paper investigates the intersection between age and income for Black adults in the U.S. and hypothesizes that older Black populations in different states are more likely to have lower median incomes. Through a narrative exploration of this hypothesis, the study aims to uncover age-related economic disadvantages that may reflect broader, systemic inequalities.

Theory

The relationship between age and income is well-documented, with income generally expected to rise with experience and career advancement. However, Black Americans often encounter systemic barriers that limit access to high-paying jobs and career mobility. Historical and structural inequalities—such as racial discrimination, limited access to quality healthcare, and lower retirement benefits—may hinder the financial stability of Black Americans as they age (Wilson, 2012).

Cumulative disadvantage theory provides a framework for understanding these disparities, suggesting that structural barriers accumulate over a lifetime, disproportionately impacting older Black adults. Studies have shown that these compounded disadvantages may significantly affect income, as Black individuals are more likely to face systemic challenges over time (Ferraro & Shippee, 2009). Given these dynamics, exploring the relationship between age and median income across states may reveal whether age-related income trends in the Black population diverge from conventional patterns due to structural inequities.

Measurement

This study utilizes data from the American Community Survey (ACS) 2022, a nationally representative survey conducted by the U.S. Census Bureau. The ACS uses a multi-stage stratified sampling process to collect demographic and economic information from households across the United States. The survey

provides detailed data on income and age distributions for Black adults, making it a robust source for examining state-level income disparities.

The unit of analysis is the U.S. state. Specifically, the analysis examines the median age and median income of Black adults in each state, allowing us to investigate how age groups correlate with income within different age groups in state contexts. Aggregation of the data to the state level allowed capture of state-level variations in the relationship between age and income among Black adults, rather than individual income differences.

Two primary variables are examined in this study:

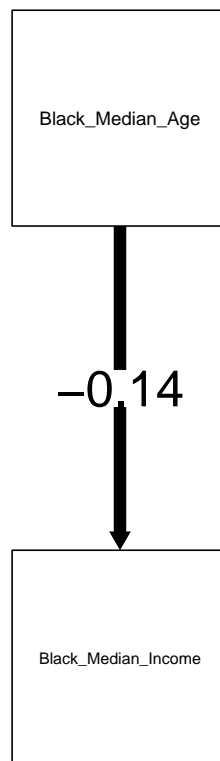
Independent Variable (Age): The median age of Black adults categorized into groups in each state, measured as a categorical variable. Dependent Variable (Income): The median income for Black adults in each state, also measured as a continuous variable.

```
## Loading required package: lavaan

## This is lavaan 0.6-19
## lavaan is FREE software! Please report any bugs.

## Loading required package: semPlot

## Warning: lavaan->lav_data_full():
##   some observed variances are larger than 1000000 use varTable(fit) to
##   investigate
```



The path diagram is presented in Figure 1 above, which illustrates the direct effect of age on income within

a bivariate model. This diagram focuses on the hypothesized relationship without incorporating additional variables.

Statistical Analysis.

The study hypothesizes that states with older Black populations tend to have lower median incomes compared to those with younger populations. This hypothesis reflects the expectation that aging, compounded by systemic disadvantages in the labor market amongst other factors, leads to reduced earning potential for Black Americans.

Data cleaning involved handling missing data which showed no missing variables and categorizing states based on the median age of Black adults in different stages for analysis. My first categorization stage was:

Younger adults: States where the median age of Black adults is below 40. Older adults: States where the median age of Black adults is 40 years or above.

My second categorization stage was: Younger adults: States where the median age of Black adults is below 30. Middle-aged adults: States where the median age of Black adults is between 30 to 50. Older adults: States where the median age of Black adults is 50 years or above.

My third categorization stage was: Very young adults: States where the median age of Black adults is below 30. Young adults: States where the median age of Black adults is between 30 to 40. Old adults: States where the median age of Black adults is between 40 to 50 years or above. Older adults: States where the median age of Black adults is 50 years or above. Several statistical techniques were applied to explore the relationship between age and income:

Descriptive Analysis: Summary statistics, including mean, median, and standard deviation, were calculated for median income in the initial age grouping. Visual tools, such as histograms and box plots, were used to illustrate the distribution of income across age categories. Inferential Analysis: T-test: A T-test was conducted to compare mean income between the younger and older age groups. ANOVA: An ANOVA was used to test income differences across multiple age group categories. Correlation Analysis: Correlation analysis measured the strength and direction of the relationship between median age and income, quantifying how age influences income. R commands were used to execute these tests in the R programming environment, ensuring a reproducible analysis.

Visuals for Analysis

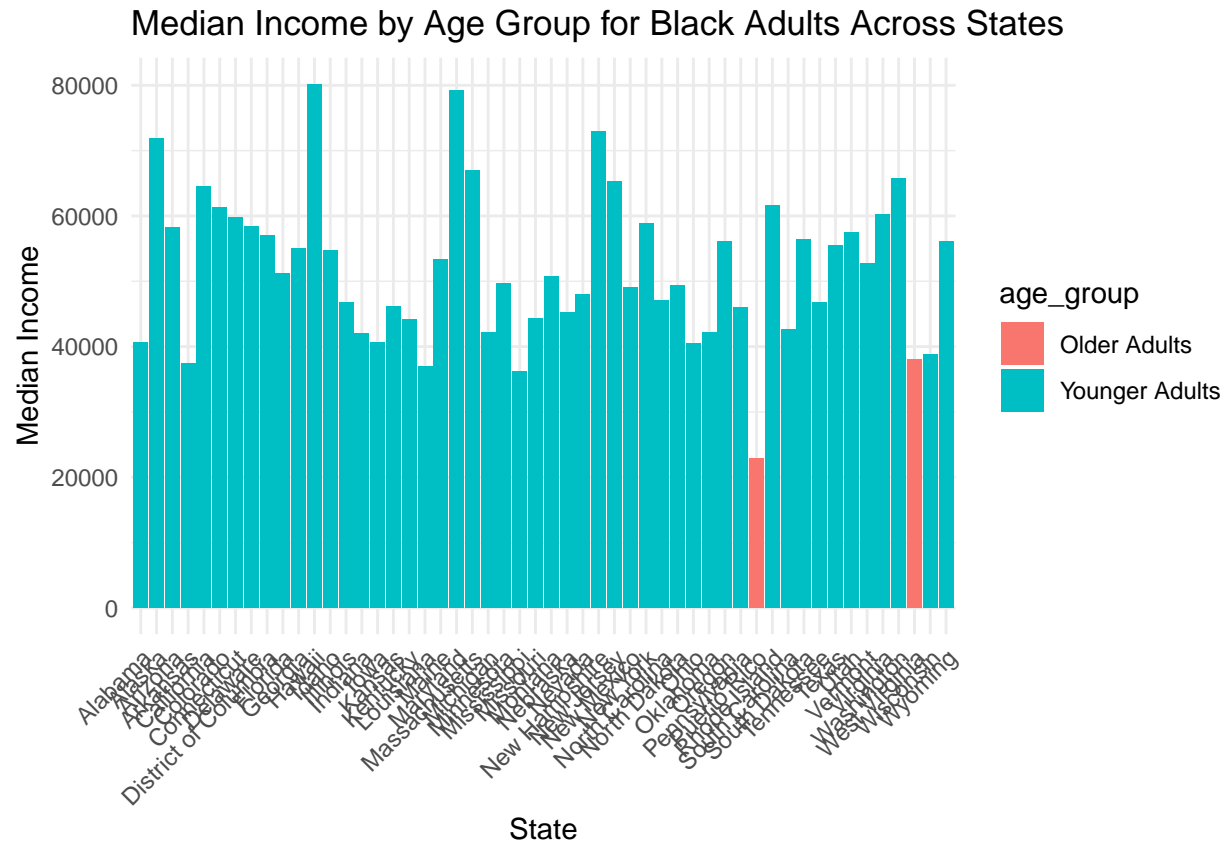
A box plot (Figure 2) illustrates the relationship between median age and income, with a right or positive skew for young adults especially young adults aged between 30 to 39. There was no box plot skew for all other age groups even though the older age group consistently had a lower income compared with the younger age group. This visual aid helps demonstrate the slight downward income trend as age increases, though the correlation remains weak.

Black Median income by Age groups across U.S states and T-test to ascertain significance.

```
## Getting data from the 2018-2022 5-year ACS
## Getting data from the 2018-2022 5-year ACS

## [1] "GEOID"      "NAME.x"      "variable.x"  "estimate.x"  "moe.x"
## [6] "NAME.y"      "variable.y"  "estimate.y"  "moe.y"

## 'summarise()' has grouped output by 'state'. You can override using the
## '.groups' argument.
```



```
## 'summarise()' has grouped output by 'state'. You can override using the
## '.groups' argument.
```

```
##
## Welch Two Sample t-test
##
## data: mean_income by age_group
## t = -2.9151, df = 1.0826, p-value = 0.1948
## alternative hypothesis: true difference in means between group Older Adults and group Younger Adults
## 95 percent confidence interval:
## -104178.91 59338.75
## sample estimates:
## mean in group Older Adults mean in group Younger Adults
## 30464.00 52884.08
```

Correlation test

```
## [1] -0.1993922
```

Median income by age group(<40years and >40years) and T-testing.



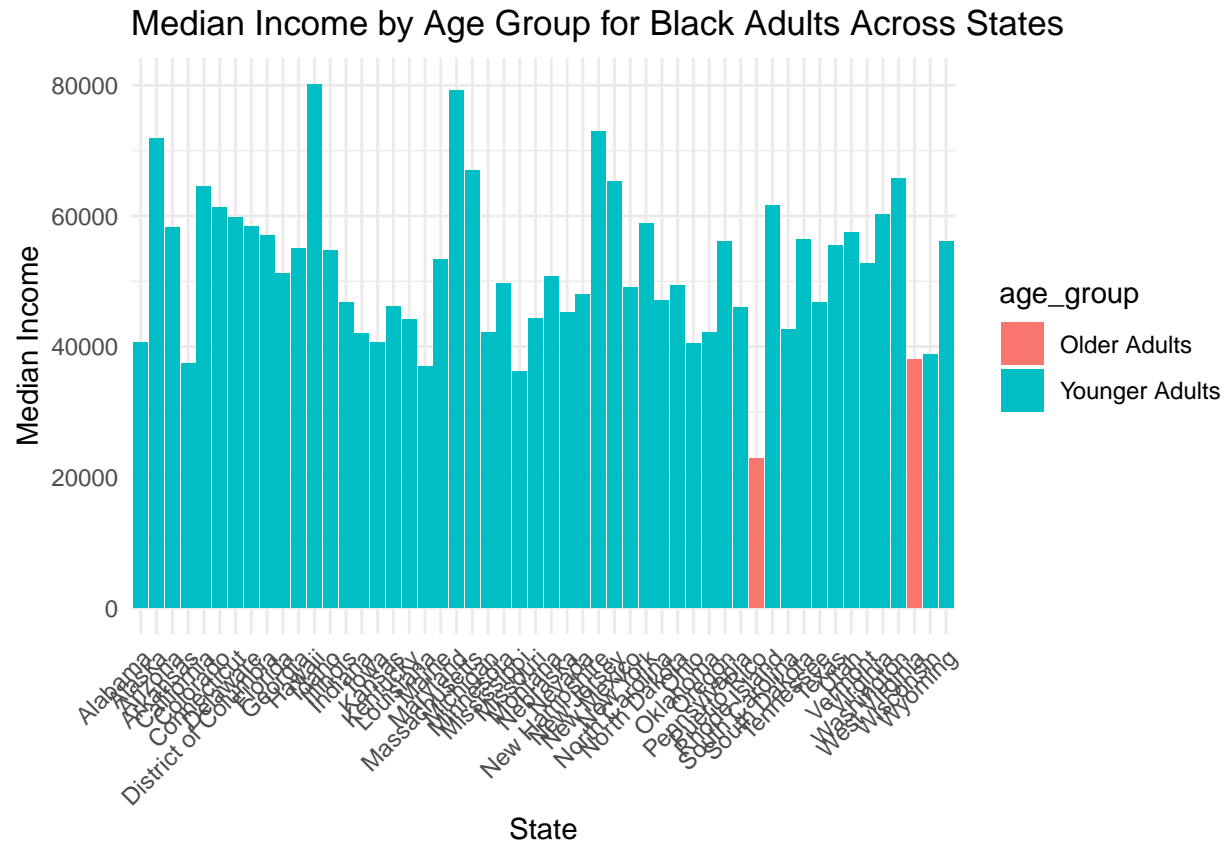
```
##
## Welch Two Sample t-test
##
## data: mean_income by age_group
## t = -2.9151, df = 1.0826, p-value = 0.1948
## alternative hypothesis: true difference in means between group Older Adults and group Younger Adults
## 95 percent confidence interval:
## -104178.91 59338.75
## sample estimates:
## mean in group Older Adults mean in group Younger Adults
## 30464.00 52884.08
```

Black Median income by Age groups across U.S states and T-test to ascertain significance.

```
## Getting data from the 2018-2022 5-year ACS
## Getting data from the 2018-2022 5-year ACS

## [1] "GEOID"      "NAME.x"     "variable.x" "estimate.x" "moe.x"
## [6] "NAME.y"     "variable.y" "estimate.y" "moe.y"

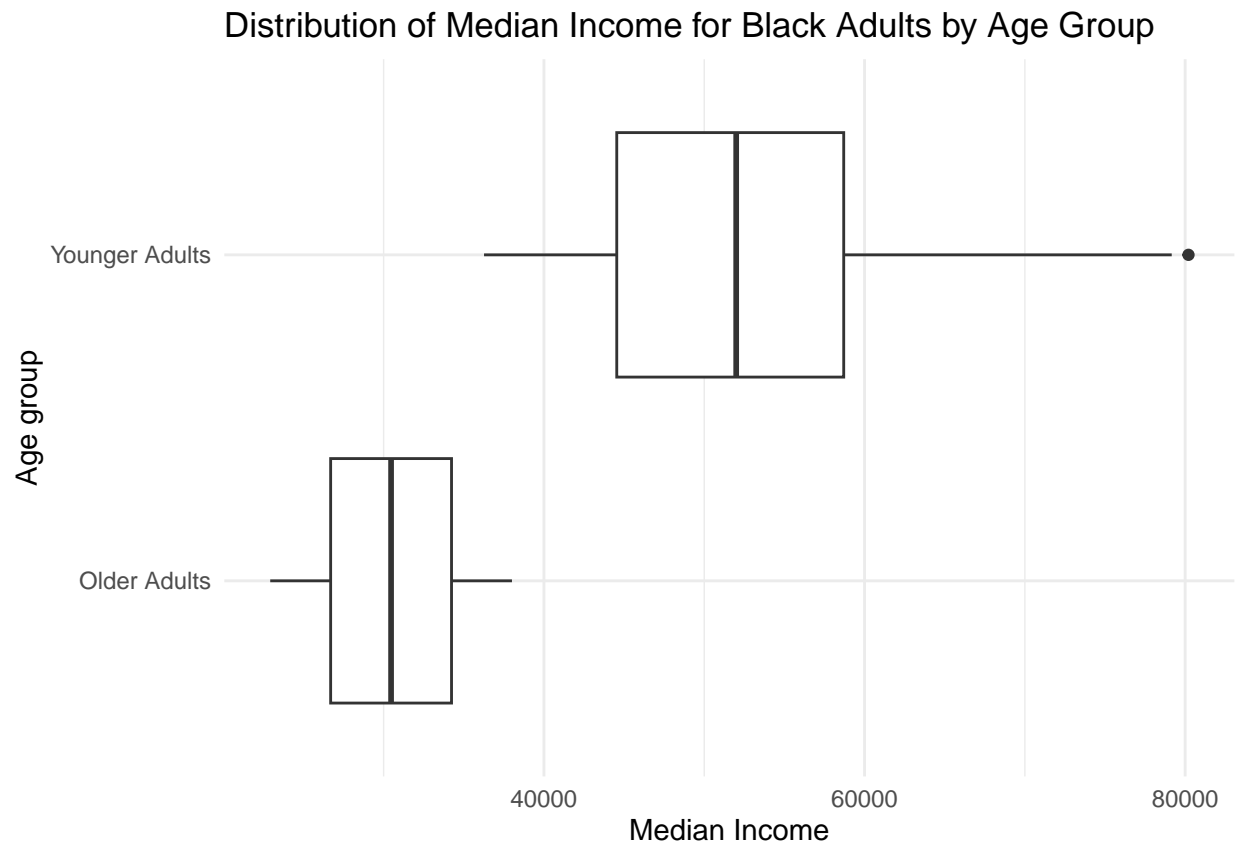
## 'summarise()' has grouped output by 'state'. You can override using the
## '.groups' argument.
```



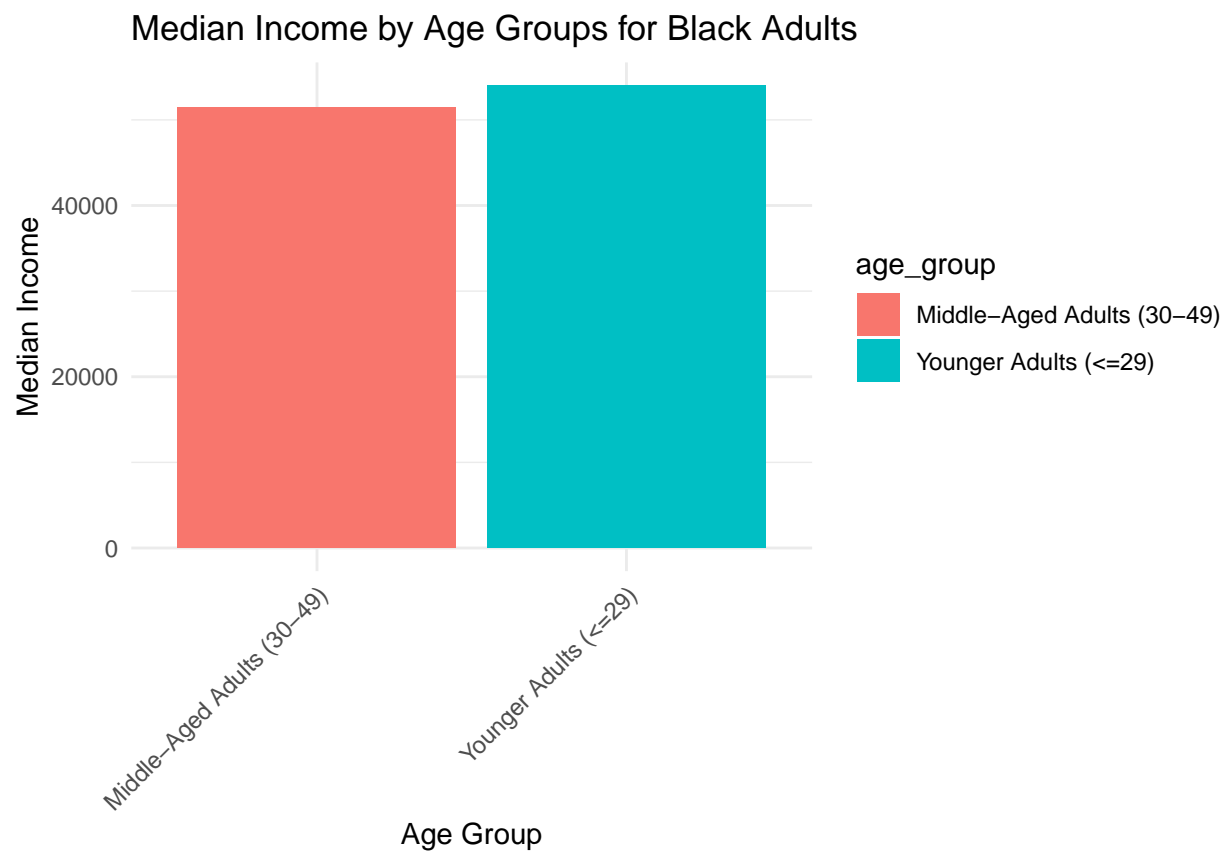
```
## 'summarise()' has grouped output by 'state'. You can override using the
## '.groups' argument.
```

```
##
## Welch Two Sample t-test
##
## data: mean_income by age_group
## t = -2.9151, df = 1.0826, p-value = 0.1948
## alternative hypothesis: true difference in means between group Older Adults and group Younger Adults
## 95 percent confidence interval:
## -104178.91 59338.75
## sample estimates:
## mean in group Older Adults mean in group Younger Adults
## 30464.00 52884.08
```

Boxplot for binary grouping younger and older adults.

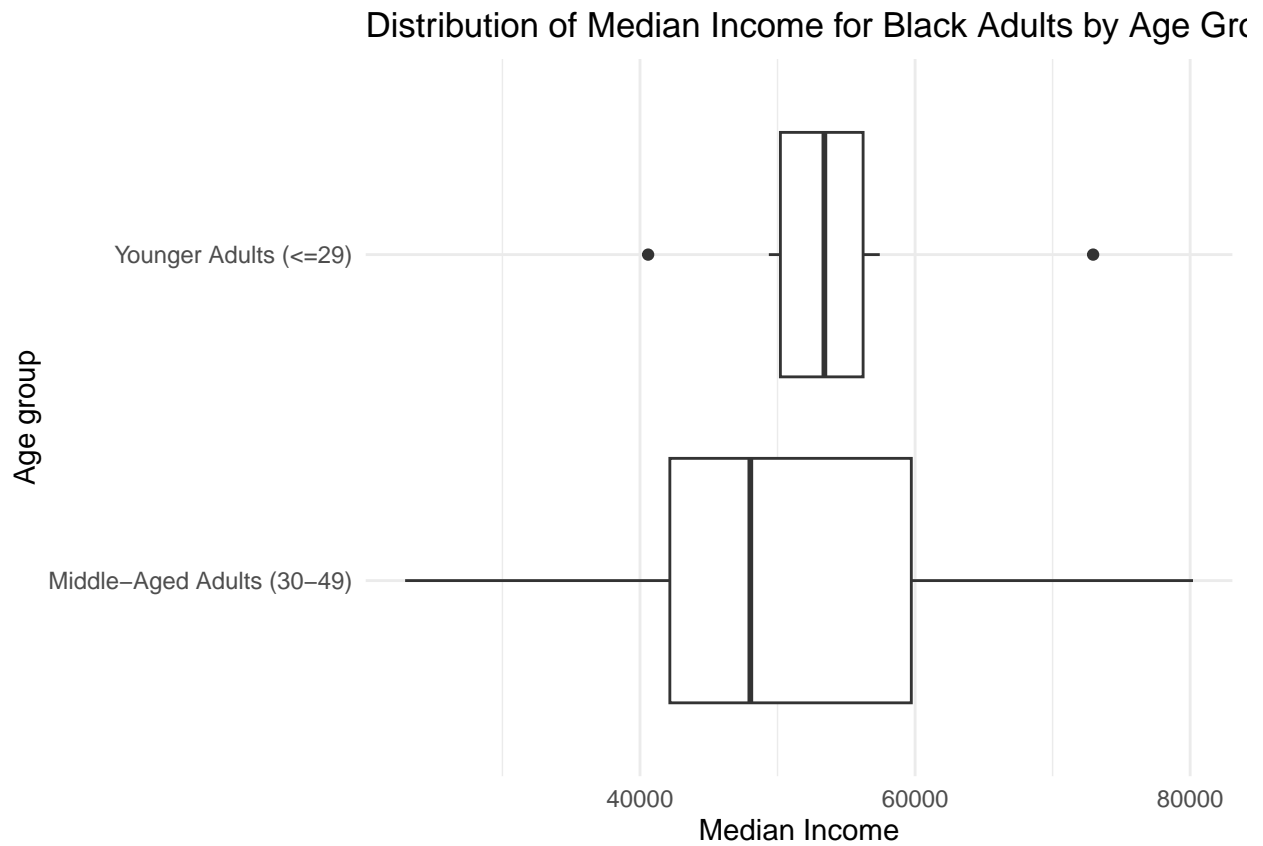


Median income across age groups(<30years,30-49 and >50years) and anova testing.

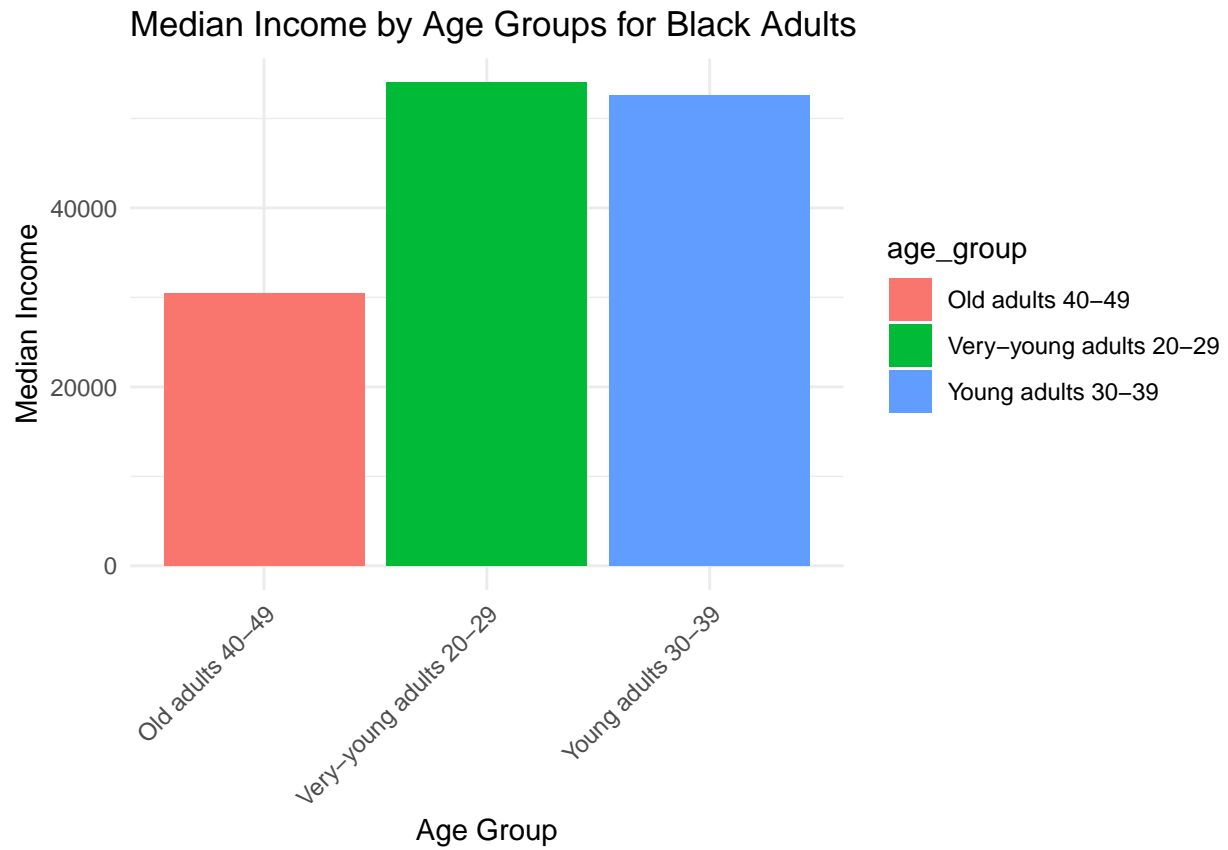


##	Df	Sum Sq	Mean Sq	F value	Pr(>F)
## age_group	1	5.494e+07	54943448	0.412	0.524
## Residuals	50	6.663e+09	133267154		

Box plot across age groups(<30years,30-49 and >50years)

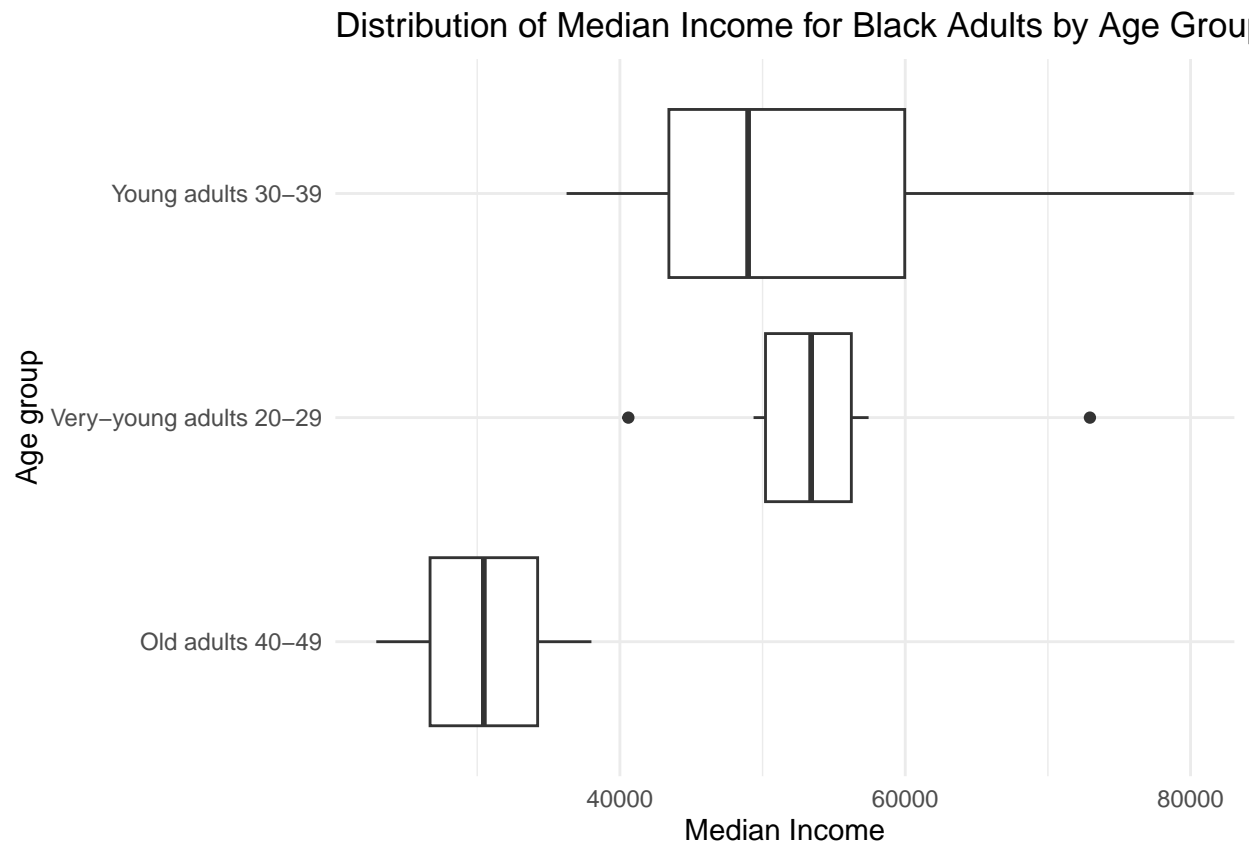


Median income across age groups(<30years,30-39,40-49 and >50years) and anova testing



```
##          Df    Sum Sq   Mean Sq F value Pr(>F)
## age_group  2 9.844e+08 492206707   4.206 0.0206 *
## Residuals 49 5.734e+09 117018117
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Box plot for age groups(<30years,30-39,40-49 and >50years)



Results.

The statistical tests produced mixed results. The T-test did not indicate a statistically significant difference in mean income between the two age groups (younger vs. older). However, the ANOVA analysis did reveal significant differences in income across different age groups, suggesting that age may influence income disparities in complex ways. Additionally, the correlation analysis indicated a weak negative correlation between age and income, suggesting a slight trend where income decreases as the median age of Black adults increases.

The spread of median income, which was more for younger adults between thirty to thirty-nine was viewed using a histogram spread out by U.S states. A box plot illustrated the relationship between median age and income, with a right or positive skew for young adults especially young adults aged between thirty to thirty-nine. There was no box plot skew for all other age groups even though the older age group consistently had a lower income compared with the younger age group. This visual aid helped demonstrate the slight downward income trend as age increases, though the correlation remains weak. With a binary grouping of my age data variables the t-test shows the relationship between median income and age groups is not statistically significant (p-value: 0.1948). This also shows that there is a weak negative relationship (correlation coefficient: -0.1993922) between black median income and black median age which means as the median age of Black adults in a state increase, there is a slight tendency for the median income to decrease, but this relationship is not strong.

This contrasts with the Anova test with further grouping of my age variable which shows the relationship between black median income and age is statistically significant (p-value of 0.02060) with a spread of four age groups. This could mean that age has an impact on income or there is a significant relationship with age

for black adults across the U.S. This is in line with my hypothesis and theory that older Black population have lower income than younger black population and informs the possibility that age is related to income disparities. This does not discard those other accumulative factors like systemic discrimination, education and age-related health issues may also contribute, of which none are tested in this paper.

The limitations in this study are primarily due to its bivariate approach, which excludes other significant mediating variables such as education, health issues and occupation. There is also less statistical power when using the median data values which is less compared to using the mean data values. The spread of black median age did not have values greater than 50 years therefore reducing the power of the study. Additionally, the cross-sectional nature of ACS data limits the ability to observe income trends over time.

Conclusion

The findings reveal a nuanced relationship between age and income among Black adults in the U.S., with older Black populations showing a slight decrease in income. While this relationship is not strong, it suggests that age groups may have a compounding relationship with income disparity due to accumulated disadvantages. This trend aligns with cumulative disadvantage theory, which posits that systemic barrier—such as limited career mobility, historical or systemic discrimination, health disparities amongst other factors —worsen over time, impacting older Black adults disproportionately.

There are indicators that age, while not a definitive factor, may contribute to income disparities in the Black population. These results highlight the importance of considering age in policies addressing income inequality and support the need for further research to investigate additional factors, such as education and industry representation, that may interact with black income.

This paper shows the importance of age-sensitive policies to address income disparities in the Black populace. Targeted initiatives that focus on supporting older Black adults in accessing career opportunities, healthcare, and retirement resources could mitigate the compounded disadvantages they face.

This analysis provides valuable insights into the relationship between age and income within the Black American populace, revealing a slight tendency for income to decrease as the median age increases. Although this correlation is weak, the findings suggest a need for further exploration into how systemic factors exacerbate economic disadvantages for older Black adults. By expanding research to include additional socioeconomic variables, future studies can deepen our understanding of income inequality and guide policy interventions aimed at reducing disparities across age groups.

References

- Bound, J., & Freeman, R. B. (1992). What went wrong? The erosion of relative earnings and employment among young Black men in the 1980s. *The Quarterly Journal of Economics*, 107(1), 201–232. <https://doi.org/10.2307/2118327>
- Ferraro, K. F., & Shippee, T. P. (2009). Aging and cumulative inequality: How does inequality get under the skin? *The Gerontologist*, 49(3), 333–343. <https://doi.org/10.1093/geront/gnp034>
- Chetty, R., Hendren, N., Jones, M. R., & Porter, S. R. (2020). Race and economic opportunity in the United States: An intergenerational perspective. *The Quarterly Journal of Economics*, 135(2), 711–783. <https://doi.org/10.1093/qje/qjz042>
- Rushton, J. P., & Jensen, A. R. (2005). Thirty years of research on race differences in cognitive ability. *Psychology, Public Policy, and Law*, 11(2), 235–294. <https://doi.org/10.1037/1076-8971.11.2.235>
- Wilson, W. J. (2012). *The truly disadvantaged: The inner city, the underclass, and public policy* (2nd ed.). University of Chicago Press. <https://doi.org/10.7208/chicago/9780226924656.001.0001>