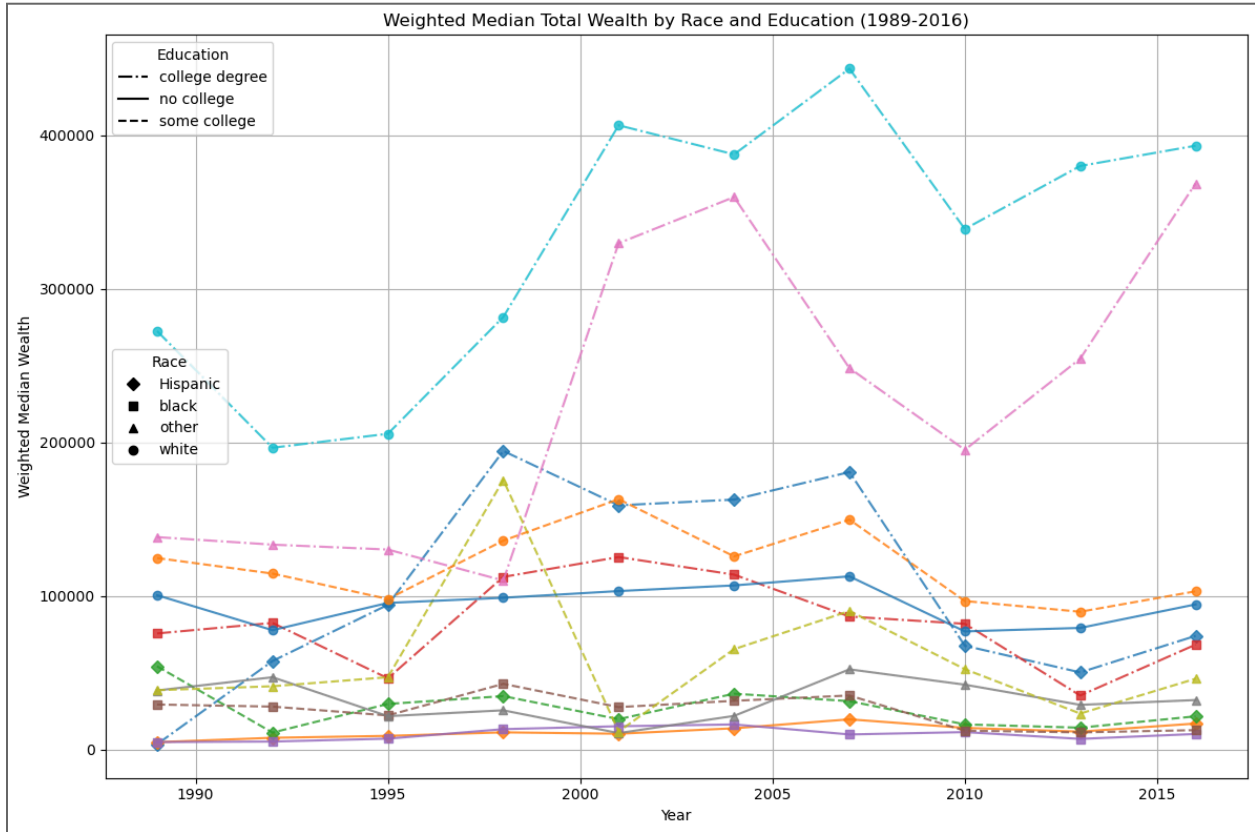


Data Task

Question 1:



The graph shows the weight-adjusted trend for the median individual's total wealth (*total assets* – *total debt*) for each race-education combination subset from 1989 to 2016.

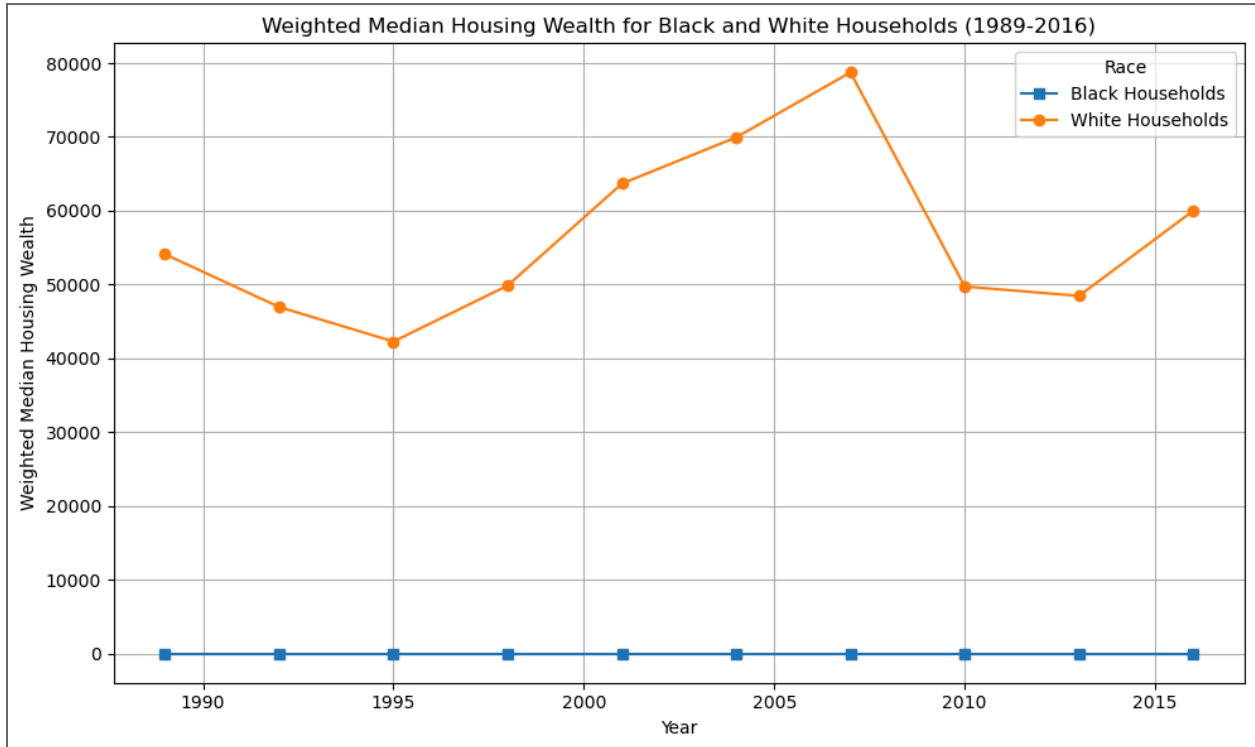
Through the timeline, the highest wealth median belongs to the white-college degree category, with a significant peak in 2007. At each education level, the white racial category's median wealth, shown with circle markers, sits higher than the other three racial categories' median wealth.

For the median individual of each racial category every year, having a college degree or some college education correlates with a higher wealth level than having no college education.

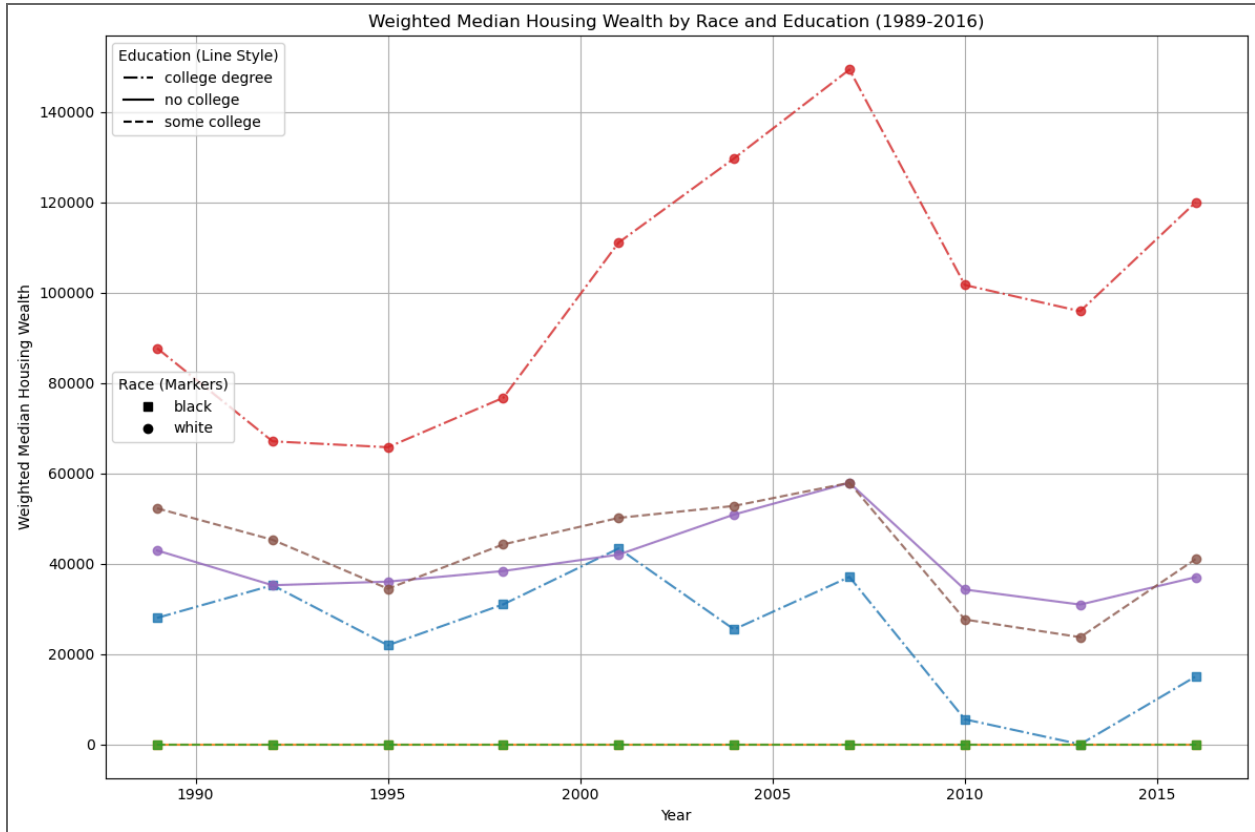
The median wealth trends for the two categories at the bottom of the chart, blacks without college education and Hispanics without college education, show negligible fluctuations and almost zero overall change in the given period.

Almost all the twelve median wealth trends show two dips, the major one occurring in 2010. Only the two top categories, white with college degree education and others with college degree education, showed signs of considerable recovery by 2016.

Question 2:



The above graph shows the housing wealth (*housing assets – housing debts*) of the two racial groups, white and black. The median for black households remained equal to zero through the period, yet for the white racial group, it stayed above the \$40k line, peaking at almost \$80k in 2007. To further investigate the gap between the two racial groups, the following graph illustrates the median housing wealth based on the education level of the two racial groups.



This graph explains the gap between these two racial groups in a more transparent way. The only subset of the black racial group with a median for housing assets not equal to zero is the college degree education group, whose value fluctuates between \$20k and \$40k for most of the period and only gets below the \$20k post-2007. Comparing the two graphs also indicates that for the black racial group, the majority of the subset has no college education or some college education; that is why in the combined data (first graph), the 50th percentile of the racial groups housing wealth is equal to zero, ergo the flat line at the bottom of the graph.

Another interesting point, which has potential for further investigation, is the pattern similarity between two different indicators. A comparison shows that the changes in median housing wealth for the white racial group from the first graph are very similar in behavior to the college degree education median wealth for the white racial group from the second graph. Both lines have the same peaks, deeps, and similar behavior throughout the timeline but at different wealth levels. Since the median wealth values are different between the two lines, we can not infer that the median of the subset is equal to the median of the general group. Still, we can say that the two medians have a correlative behavior.

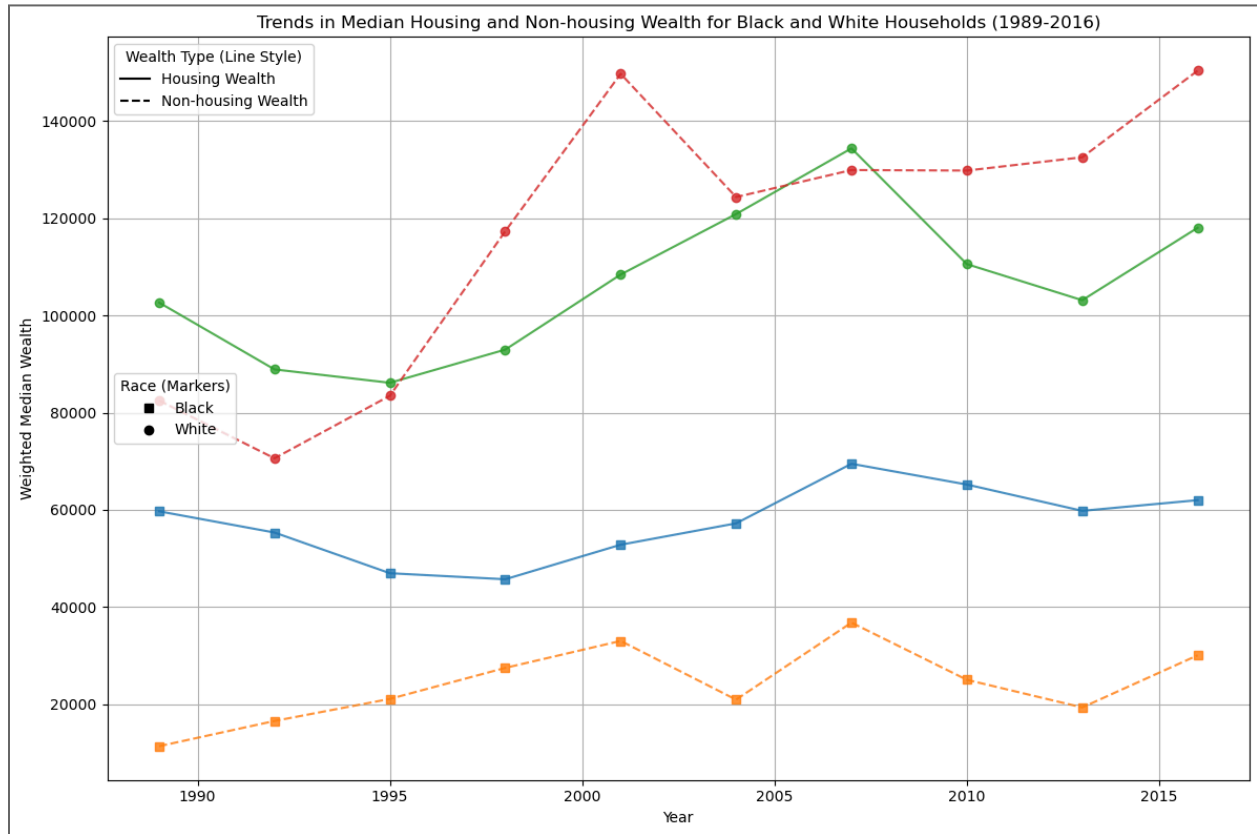
Question 3:

Here, non-housing wealth is defined as

$$\text{non housing wealth} = \text{total wealth} - \text{housing wealth}$$

and the individual with the following condition is assumed to be a homeowner.

$$\text{housing asset} \neq 0$$



The graph shows the median value trend for housing wealth and non-housing wealth of house owners aged 25 or more in the two racial categories of white and black. There is a racial gap between the two groups. For the given period, the housing and non-housing wealth trend lines for the white subset of society are higher than their black racial group counterparts.

Considering 2007 as the base period, the white housing wealth subset of the dataset experienced the biggest fall in wealth compared to the other three subcategories. Notably, despite the decline in the other three, the white non-housing median wealth experienced a steady increase until the end of the period.

Question 4:

Hypothesis 1: Parents' education level positively correlates with the individual's wealth as an adult.

Parents' Education Agregate Level ~ Individual's Wealth

Causal path explanation:

Parents with higher education levels will positively affect an individual's wealth in different ways, including providing better education for children, having higher incomes, and having better networks for their children's employment.

The parent's education level must be included in the survey to examine the existence of the correlation and its direction. This can be added by asking the respondents about their parents' education level and then creating an aggregate level variable in the data set that can be regressed with the individual's wealth.

To further investigate this effect, we can check for the causality effect:

Parent's Education Agregate Level → Individual's Wealth as Adult

Since this survey is nationwide and the individuals answering the questions are scattered, finding or creating experimental conditions with two precise treatment and placebo groups is a very complex challenge. Let's narrow the scope of the experiment from the state level to the county level. In that case, we can eliminate other potential contributing factors and create an experimental condition to look for the causal effect of the treatment.

Hypothesis 2: Individuals who live in more populated locations have higher wealth.

Community Population ~ Individual's Wealth

Causal path explanation:

Communities with a higher population are more prosperous, and living in such a location will positively affect the residents' wealth through better economic conditions, like higher salaries.

In this survey, by asking about respondents' locations, we can constitute a community based on the location information, and by aggregating the population in each area, we can generate the community population data. We can use a matching/propensity matching technique to find counterfactuals for the treatment group members and, by comparing the wealth between the two groups, evaluate the causal effect of the community's population in each location.
