# Understanding the Legacy of Redlining

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# What is Redlining?

Historical Context of Redlining:

Redlining refers to the discriminatory practice of denying or limiting financial services, such as loans and insurance, to specific neighborhoods based on their racial or ethnic population. The term originated in the 20th century, particularly during the 1930s, following the abolishment of slavery and the Great Migration, when African Americans moved from the rural South to urban areas in the North and West such as Los Angeles and Chicago.

Agencies such as the Home Owners Loan Corporation (HOLC) and the Federal Housing Administration (FHA) played a role in these policies. These agencies created maps to assess the creditworthiness of neighborhoods, assigning grades (A-D) based on factors such as racial composition, property condition, and economic status. Areas with higher minority populations, particularly African American and immigrant communities, were often deemed "hazardous" or "high-risk," leading to disinvestment and segregation.

# Objectives of this analysis

"Understanding the Legacy of Redlining" aims to analyze the impact of redlining on racial disparities using data from the Mapping Inequality project. The project seeks to understand how historical housing policies continue to influence current demographic and socioeconomic conditions, with a focus on housing, wealth inequality, and access to resources.

Understanding how redlining influences current demographic and socioeconomic conditions, particularly focusing on housing, wealth inequality, and access to resources. This project aims to shed light on the factors contributing to systemic inequality and its persistence in modern society.

We will use data analysis to provide insights into historical trends, patterns, and disparities in factors such as wealth

***Motivation:*** Watching the documentary the “Bronx is Burning” sparked my interest into the dynamics of the inner cities of America and how they came to be

***Challenges***: It was difficult to obtain  real estate sales data for specific zip codes or regions

# Statistical Analysis

***My hypothesis***:

**Null hypothesis H0:** In this case redlining has not had any effect on wealth and other factors such as real estate appreciation throughout generations in the different regions of the United States

**Alternative hypothesis H1:** In this case the effect of Redlining policies such as the grading of neighborhoods by the HOLC has caused a negative impact on these communities through generations in matters such as real estate appreciation which impacts building wealth

Dependent Variable: These dependent variables are factors such as the rate of change of the property values per region.

Independent Variable: These independent variables include the region of the United states said neighborhood is located in. As well as the grades assigned to a neighborhood by the HOLC

# Findings from my analysis

- Number of places with majority white and black populations, distribution of HOLC grades, and top 20 cities with highest white and black populations. The findings highlight spatial disparities, racial segregation, and economic inequalities resulting from historical redlining practices.

  Number of places with majority white populations: 332

  A B C D

  125 103 65 39

  Number of places with majority black populations: 46

  A B C D

  2 6 12 26

  ***Areas with majority black populations are disproportionately graded lower on the HOLC scale***

# Findings from my analysis

The top 20 majority white neighborhoods:

A B C D

1 7 7 5

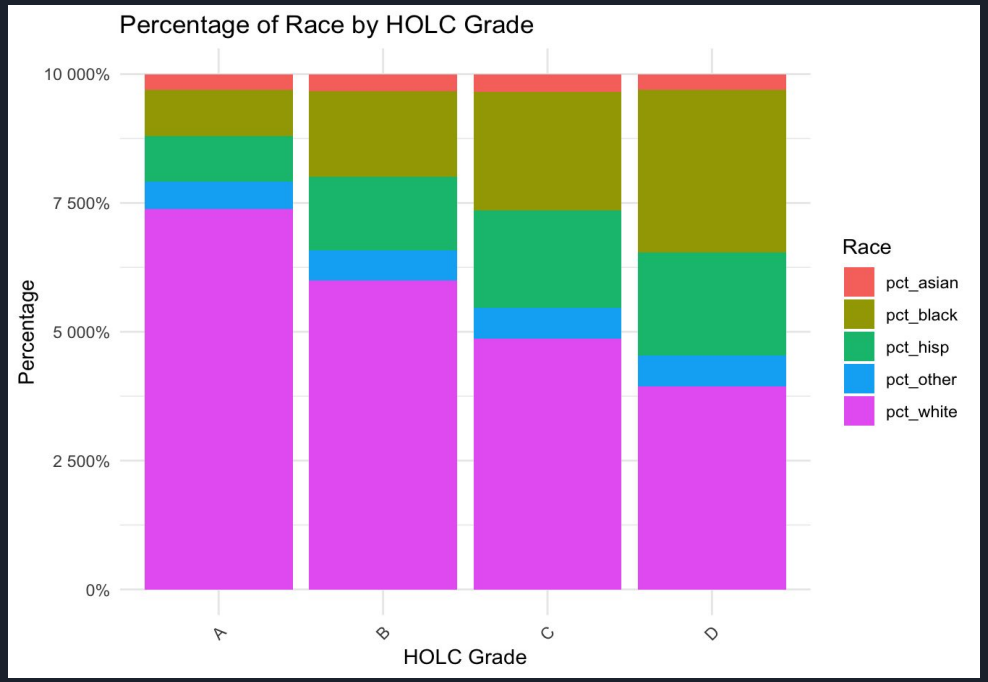
The top 20 majority black neighborhoods:

B C D

5 10 5

- This displayed the concentration of minority populations in lower-grade neighborhoods, impact on housing values and wealth accumulation. These disparities perpetuate systemic racism and socioeconomic disadvantages, affecting access to quality housing, education, and employment opportunities.

# Findings from my analysis




This bar graph displays the composition of races among the different level grade neighborhoods. This supports our theory that neighborhoods that were predominantly minority or black were usually graded lower on the HOLC scale. This supports our alternative hypothesis. We will analyze our next dataset to determine its effect on wealth appreciation in the other cities.

# Further analysis

- Utilizing R programming to analyze demographic data from the Mapping Inequality project. The data includes information on HOLC grades, racial composition, and population estimates by race and ethnicity within different metropolitan areas.
- Used code to  demonstrate how to count places with majority white and black populations, examine HOLC grade distribution, and visualize top 20 cities with highest white and black populations. These analyses help identify spatial patterns, demographic trends, and disparities related to redlining.
- Using statistical analysis to  analyze historical sales prices by region from FRED economic data
- Data analysis allows researchers to quantify the impact of redlining on housing, wealth, and access to resources, providing empirical evidence to inform policy discussions and advocacy efforts.

# Statistical Analysis

These are the total appreciation that people who lived in different regions of the U.S. experienced through 1963-2024. We can see that the first region which is the Northeast had the greatest appreciation, followed by the midwest, south and West. We can see that the midwest and south had the lowest amounts of appreciation

```
[1] 3675.481 2047.429 2141.071 2946.667
```

```
# Calculate appreciation rates
# Define a function to calculate percentage change
percentage_change <- function(x) {
  return((x[length(x)] - x[1]) / x[1] * 100) }
# Apply the function to each row (region) of the dataset
appreciation_rates <- apply(homes_sales_data[, -c(1:3)],
1, percentage_change)
[1] 3675.481 2047.429 2141.071 2946.667
```

```
summary(anova_result)

            Df    Sum Sq Mean Sq F value
Pr(>F)

Region       3    7145    2382   0.005
0.999

Residuals   976 428897070  439444
```

# Statistical Analysis (ANOVA, Tukey)

```
Tukey multiple comparisons of means
    95% family-wise confidence level

Fit: aov(formula = Appreciation_Rate ~ Region, data =
appreciation_data)

$Region
```

| | diff | lwr | upr | p adj |
|---|---|---|---|---|
| Northeast-Midwest | 6.6451110 | -147.4900 | 160.7802 | 0.9995114 |
| South-Midwest | 0.3822157 | -153.7529 | 154.5173 | 0.9999999 |
| West-Midwest | 3.6703596 | -150.4647 | 157.8054 | 0.9999174 |
| South-Northeast | -6.2628953 | -160.3980 | 147.8722 | 0.9995907 |
| West-Northeast | -2.9747514 | -157.1098 | 151.1603 | 0.9999560 |
| West-South | 3.2881438 | -150.8469 | 157.4232 | 0.9999406 |

These results are from Tukey's multiple comparisons of means, which is a post-hoc test conducted after performing the ANOVA. Since ANOVA indicates significant differences, we can conduct post-hoc tests, such as Tukey's Honestly Significant Difference (HSD) test, to identify which specific regions differ significantly from each other in terms of appreciation rates.The diff column indicates the appreciation rates in the Northeast are, on average, 6.65 units higher than in the Midwest. There is no significant difference in appreciation rates between the South and Midwest regions. The appreciation rates in the South are, on average, 6.26 units lower than in the Northeast. There is also no significant difference in appreciation rates between the West and Northeast regions. These results confirmed my alternative hypothesis for me. The LWR and UPR columns provide the lower and upper bound of the 95% confidence interval for the difference in means. The P adj column provides the adjusted p-value for each pairwise comparison.

# Example Code From my analysis:

```
# Sort by total black population from largest to smallest
metro_grades_sorted <- metro_grades[order(-metro_grades$black_pop), ]
# List the top 20 cities with the highest black population
top_20_black_population <- head(metro_grades_sorted, 20)
print(top_20_black_population[, c("metro_area", "black_pop")])
# Get the count of HOLC grades for the top 20 highest populated black neighborhoods
top_20_holc_grade_counts <- table(top_20_black_population$holc_grade)
print("HOLC Grade Counts for Top 20 Highest Populated Black Neighborhoods:")
print(top_20_holc_grade_counts)
```

# Impact of Redlining

- Contributing to racial segregation, wealth disparities, and economic inequality. Redlining has entrenched structural barriers that limit opportunities for marginalized communities, perpetuating cycles of poverty and exclusion.
- One of the **challenges** faced was getting data from multiple different zones specifically zip codes in the United States
- Disinvestment, gentrification, and displacement exacerbate housing instability and social fragmentation, undermining community integrity and resilience.
- Redlining is a manifestation of institutionalized discrimination that reinforces racial hierarchies and inequitable distribution of resources, perpetuating intergenerational cycles of disadvantage.

# Policy

- Efforts to address its legacy through fair housing laws, community reinvestment programs, and equitable development initiatives. Policies such as the Community Reinvestment Act (CRA) and the Affirmatively Furthering Fair Housing (AFFH) rule aim to promote inclusive and sustainable communities, addressing systemic barriers to housing and economic opportunity.
- Despite legislative efforts, challenges persist in achieving meaningful progress in dismantling systemic racism and advancing equitable outcomes
- Policy interventions must address root causes of inequality and prioritize community-driven solutions to create inclusive and resilient neighborhoods.

# Conclusion

- Redlining has had a profound and lasting impact on communities, contributing to systemic inequalities in housing and wealth. Understanding the legacy of redlining is essential for addressing systemic racism and promoting social justice in our society.
- We rejected the **Null Hypothesis** because our analysis did show differences in asset appreciation in these different regions of the U.S.
- The analysis of the housing sales data showed just the averages by region so this was a challenges  in our analysis but we did conclude that practices such as Jim crow had a greater effect in preventing economic growth in the southern region of the U.S. as well as the population that left the south due to these policies
- Collaboration across sectors, community engagement, and advocacy are essential for creating inclusive and sustainable communities where everyone can thrive.
- Together, we can work towards a future where every individual has access to safe, affordable, and dignified housing, regardless of race or socioeconomic status.

# Questions?