



# Mapping the Legacy of Redlining

Ian, Maria, and Moulik

*Mentor:* Sal

# Content



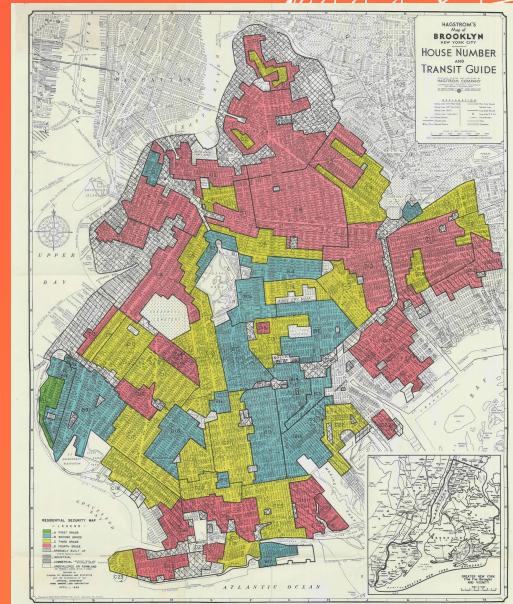
- **What is Redlining?**
- **HOLC**
- **Our Investigation**

# What is Redlining?

- Redlining was the practice of denying borrowers access to credit based on the ethnic makeup of neighborhoods. Red-coded “Declining” or “Hazardous” areas were predominantly minority or economically disadvantaged neighborhoods. Redlining was prohibited under the Fair Housing Act of 1968, however its legacy continues to appear in the makeup of cities.

# Redlining Data

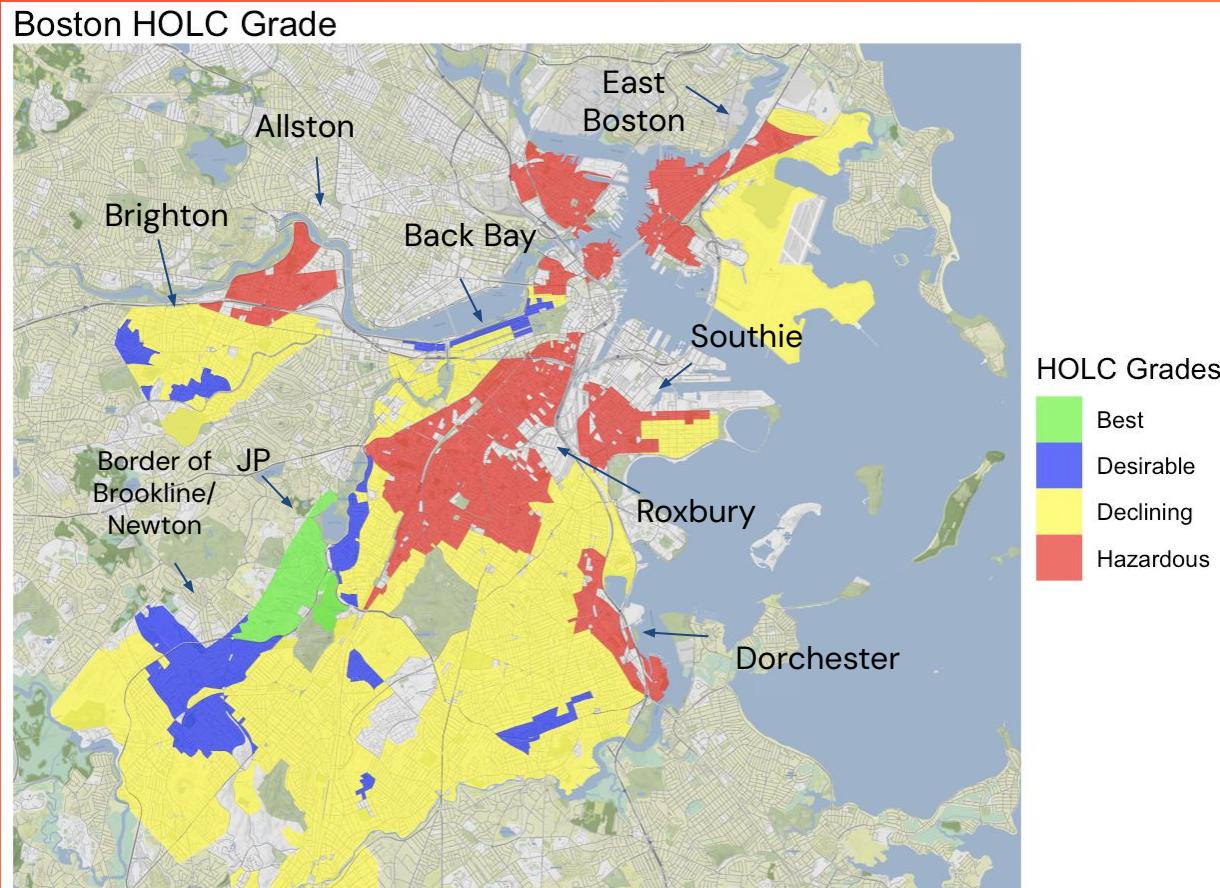
- The Home Owners Loan Corporation (HOLC) assigned grades to assess the risk of mortgage lending in different neighborhoods in the 1930s.
- We took HOLC's 1930s data from the article “[The Lasting Legacy of Redlining](#)” *FiveThirtyEight*, 2022 and loaded into R



# HOLC Grades for Boston

- Grades :

- A = “Best”
- B = “Desirable”
- C = “Declining”
- D = “Hazardous”



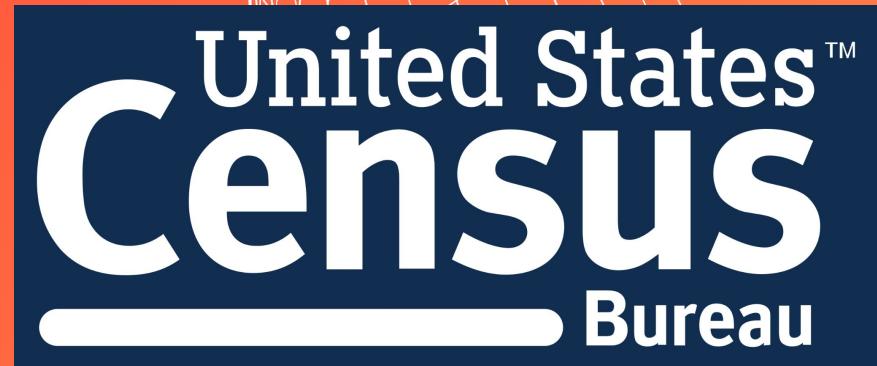
# Project Objectives

Questions we want to answer:

- How did HOLC grades impact the segregation of Boston by race?
- Is it still harder for minorities to *own or rent* homes in areas with higher HOLC grades today?

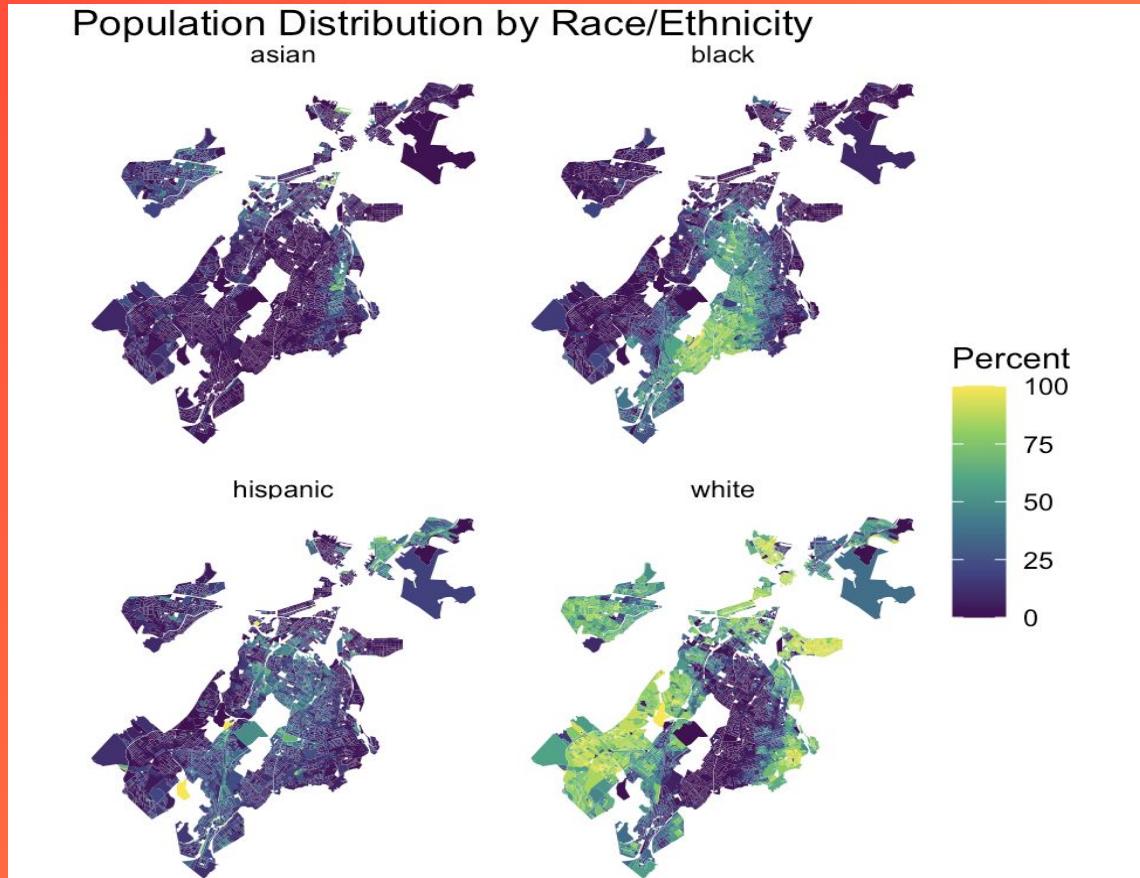
# What does Boston look like today?

- We used `tidycensus` package in R to extract 2020 Decennial Census sociodemographic data
- Merged modern-day census data to 1930s HOLC grade data
- Filtered to Boston area



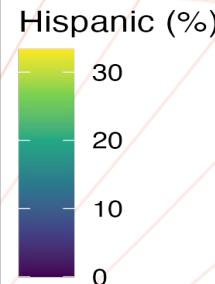
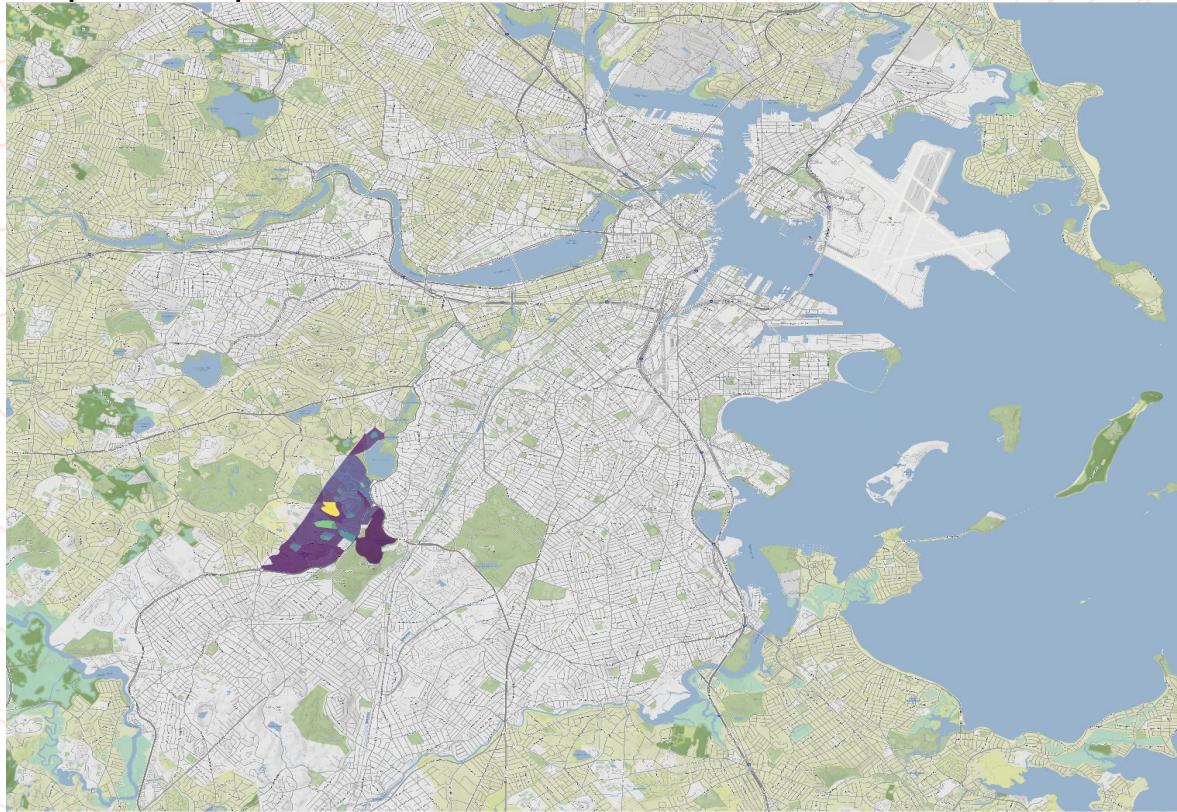
# Census Blocks Today

- A Census block is the smallest geographic unit used by U.S. Census Bureau for collecting and tabulating data.



# Example: Distribution of Hispanic Population by HOLC grade

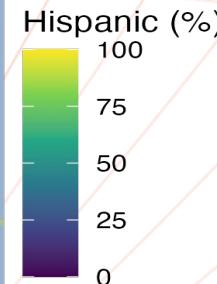
Hispanic Population in HOLC Grade A Areas



- These maps represent the distribution of hispanic people in boston side by side to HOLC grades, giving a proper visual example for which HOLC grades they are mostly situated in.

# Example: Distribution of Hispanic Population by HOLC grade

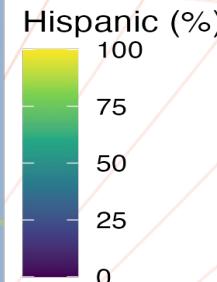
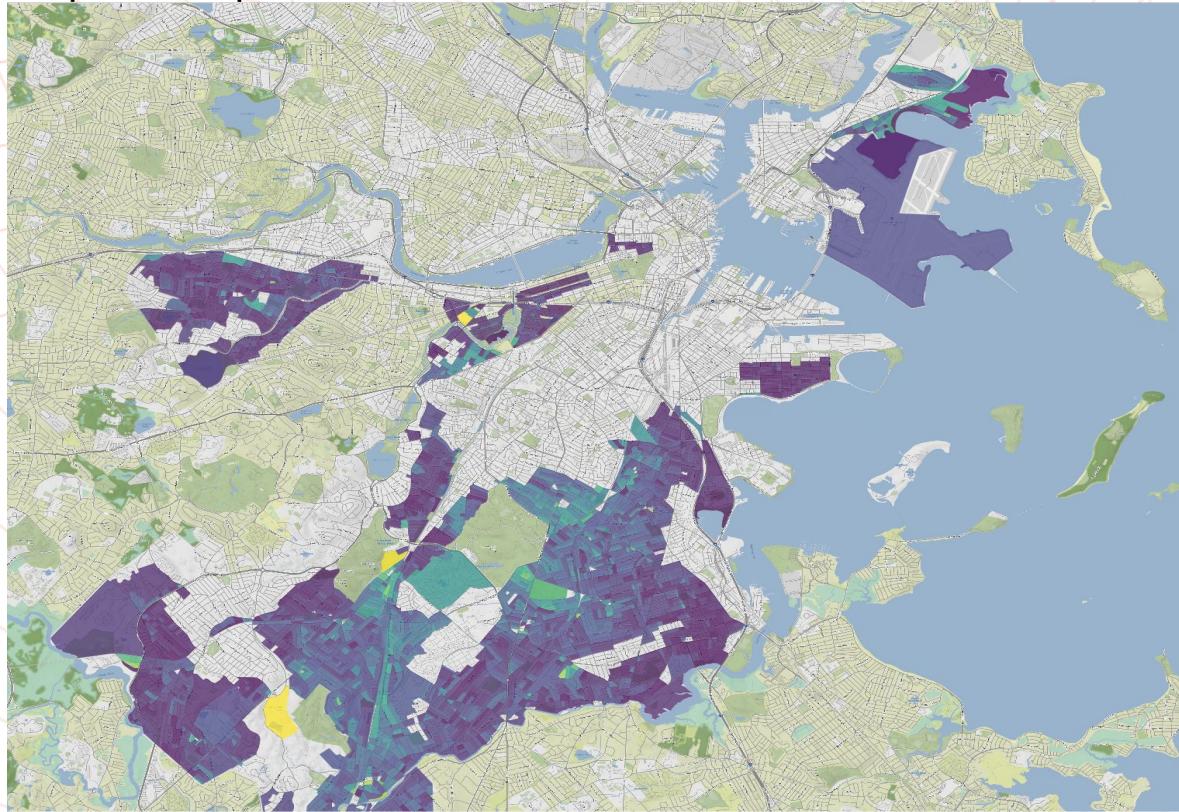
Hispanic Population in HOLC Grade B Areas



- These maps represent the distribution of hispanic people in boston side by side to HOLC grades, giving a proper visual example for which HOLC grades they are mostly situated in.

# Example: Distribution of Hispanic Population by HOLC grade

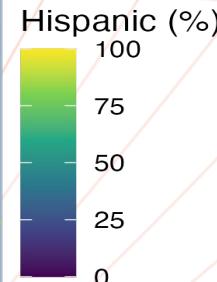
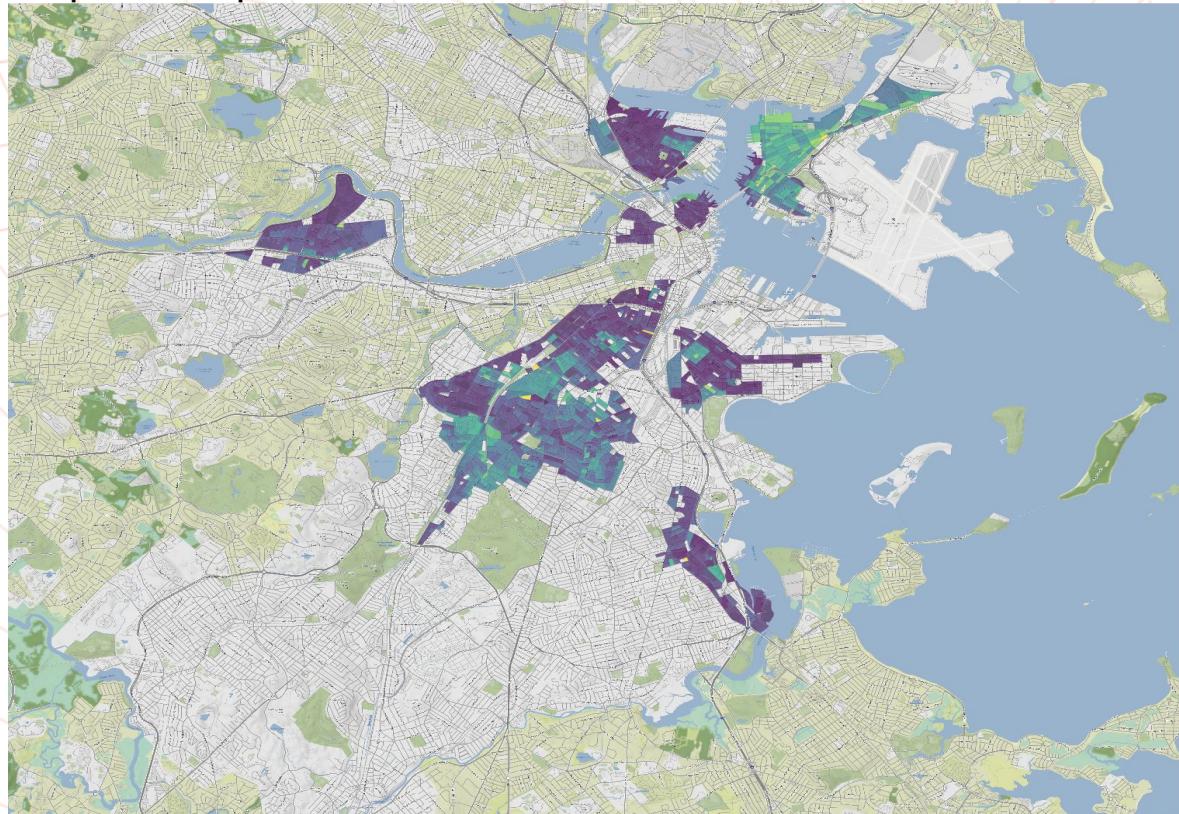
Hispanic Population in HOLC Grade C Areas



- These maps represent the distribution of hispanic people in boston side by side to HOLC grades, giving a proper visual example for which HOLC grades they are mostly situated in.

# Example: Distribution of Hispanic Population by HOLC grade

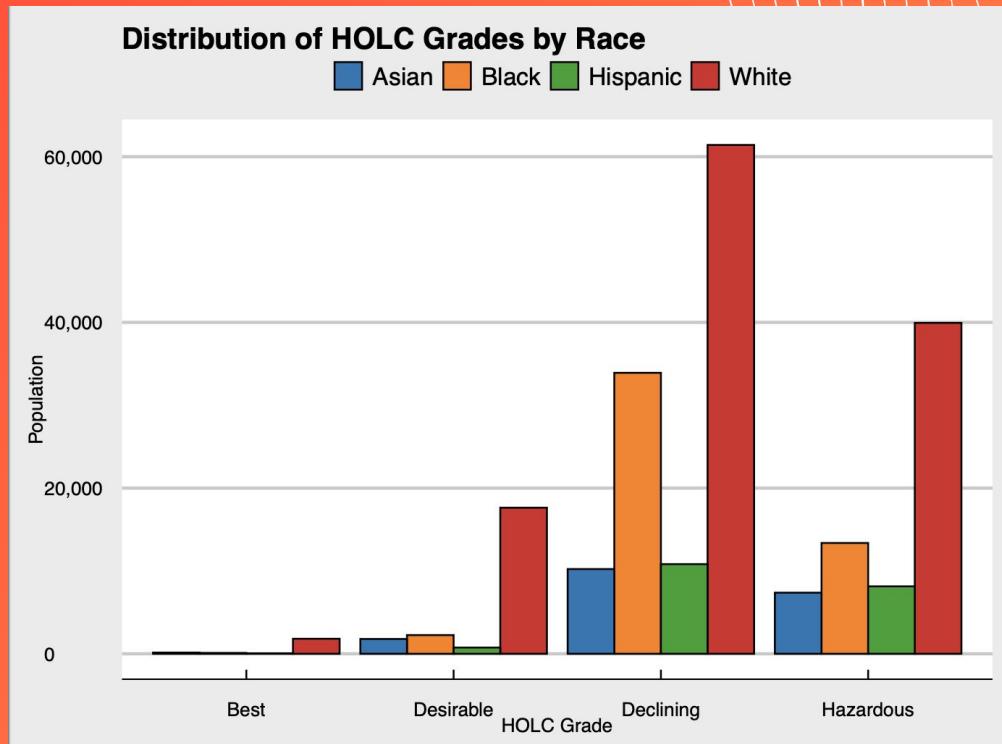
Hispanic Population in HOLC Grade D Areas



- These maps represent the distribution of hispanic people in boston side by side to HOLC grades, giving a proper visual example for which HOLC grades they are mostly situated in.

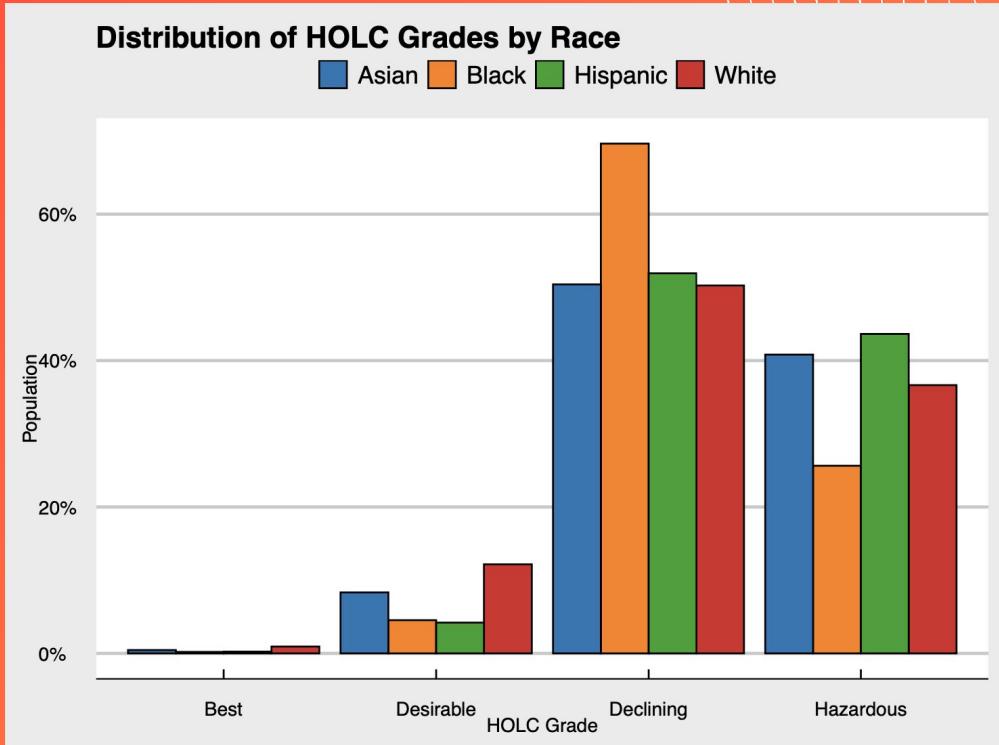
# Impact of HOLC grades on the socioeconomic makeup of Boston

- This bar plots illustrate the number of households by race across the HOLC grades.
- As we can see, all households are mostly concentrated in D and C graded areas, with little to none in A and B graded neighborhoods.
- On the other hand, White households are more prevalent across all grades, they appear in higher numbers in A and B zones compared to other groups. But they are also inflated due to the difference in population



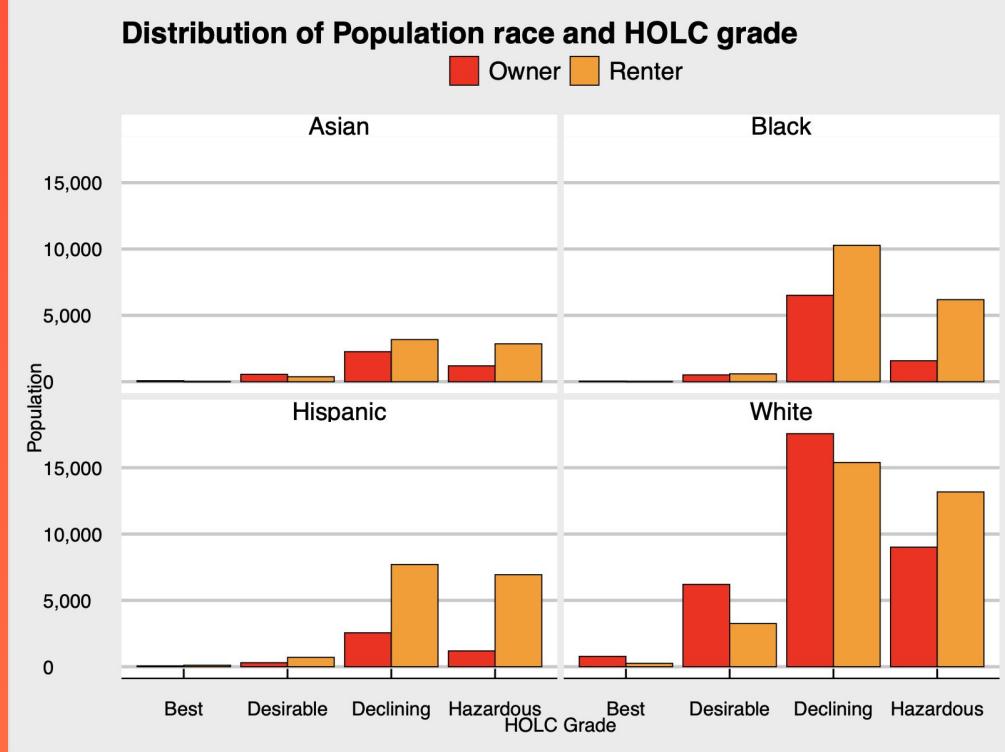
# Taking into consideration the difference in population

- Now this is the same data but now we are taking into consideration the difference in population by race.
- This allows us to see clearer the amount of population within each race and where they are situated in the HOLC grades



# Renter vs Owner Distribution by Race in HOLC grades

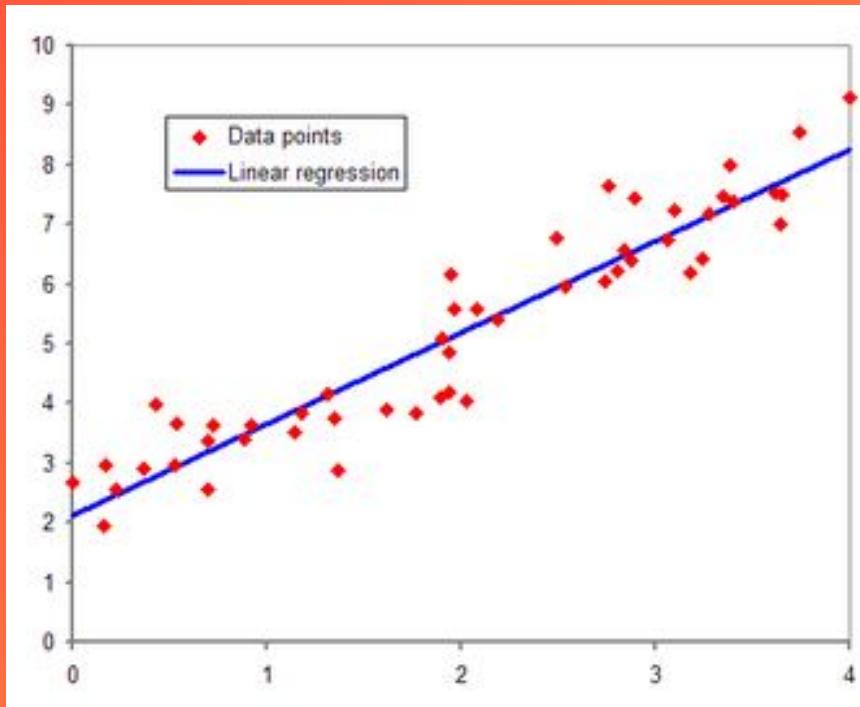
- This bar plot shows the distribution of households in Boston by race and HOLC grade, broken down by owner and renter status across all the races.
- We can see that between all the race's and the HOLC grades there a significantly higher number of renters.



# Regression Analysis

# What is regression?

- A regression measures the effect of one variable on another.
- We used regression to quantify the effect of HOLC grades by race.



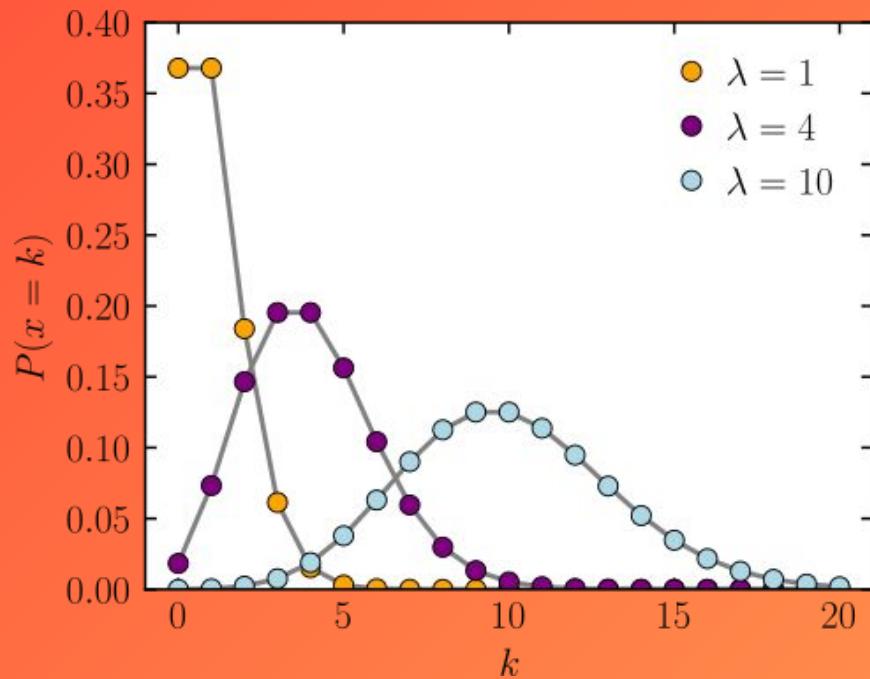
# Poisson Regression

- The Poisson regression models counts, which is well suited for analyzing the census data.
  - Can include total population of each census block as offset

$$E(Y | X) = \exp(a + X \cdot b) \cdot \text{offset}$$

“exp” function →  
effect sizes represent  
“proportion increase”

Effect Size



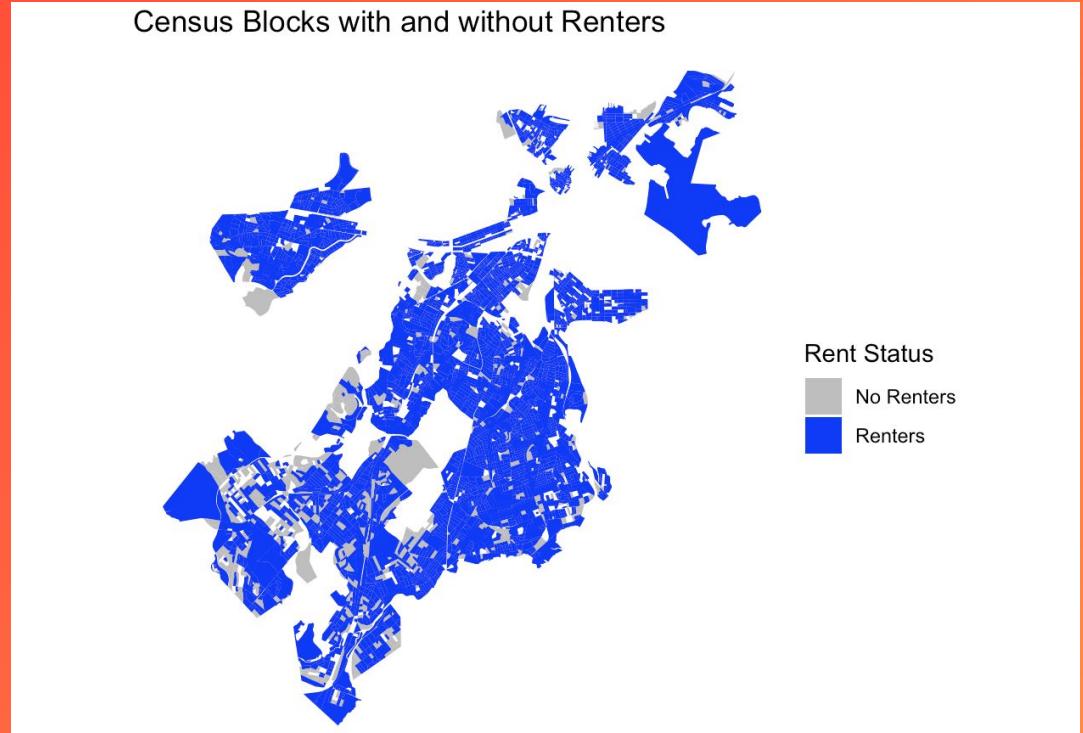
# HOLC data regressions

- Model for each census block (“Best” is reference category)

Race ~  $\exp(b_0 + b_1 \cdot \text{Desirable} + b_2 \cdot \text{Declining} + b_3 \cdot \text{Hazardous}) \cdot \text{population}$

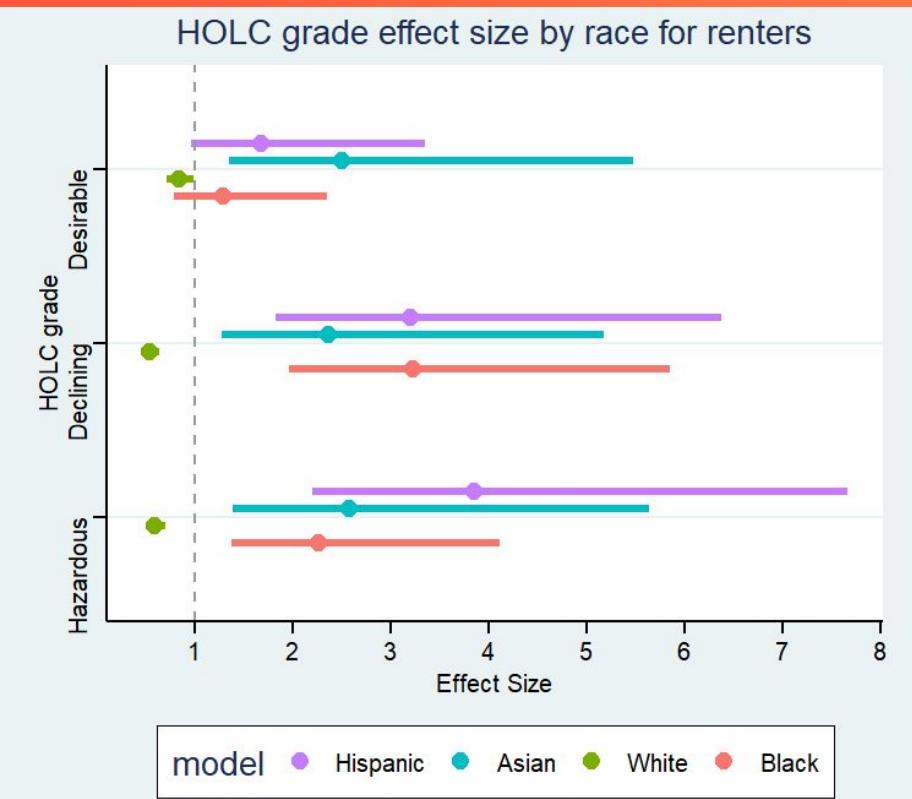


# How segregated are HOLC grades by renter?

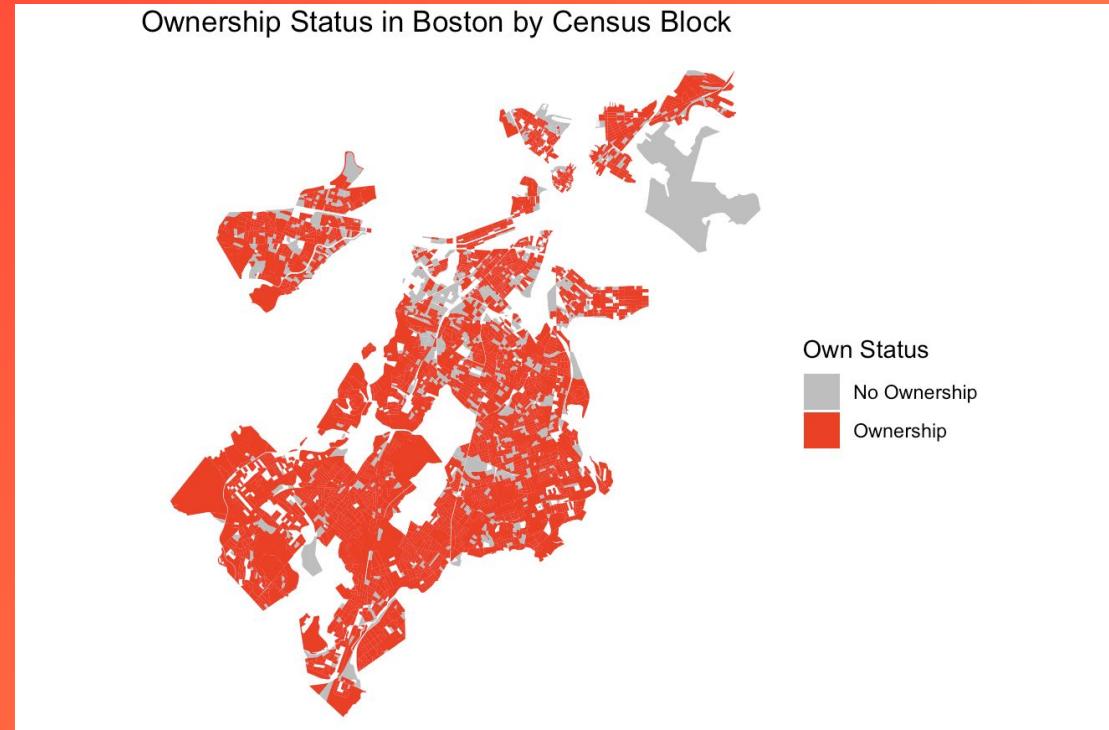


# Poisson Regression on Renters

- White renters are less likely to be living in lower HOLC grade census blocks.
- Minority renters are more likely to be living in lower HOLC grade census blocks, with the effect size relatively even across the board.

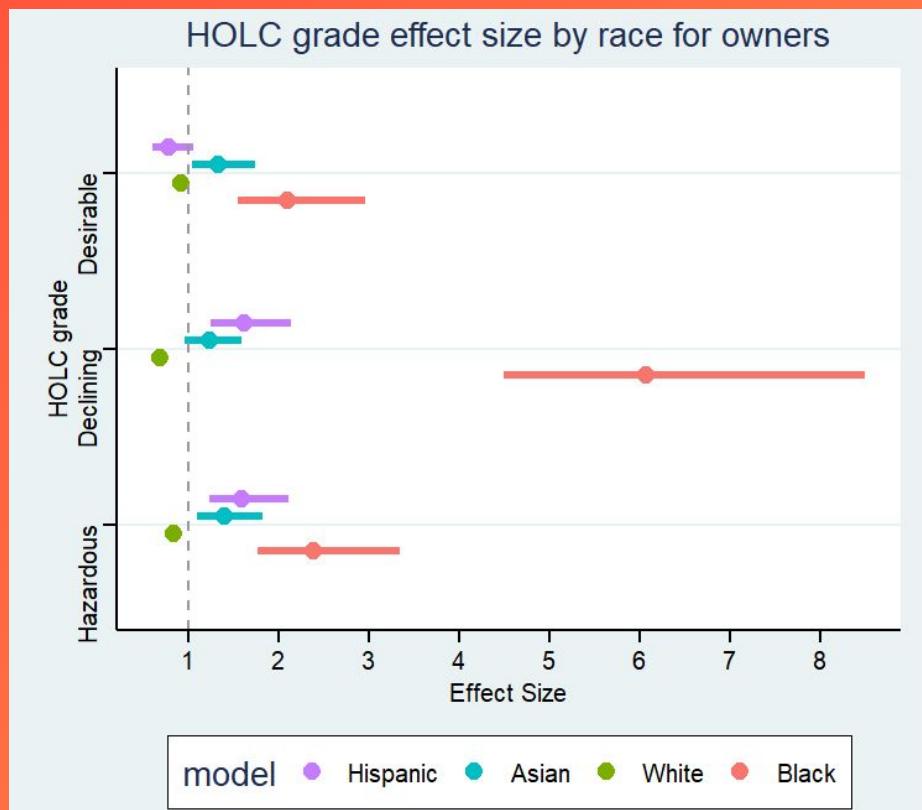


# How segregated are HOLC grades by homeowner ship?



# Poisson Regression on Homeowners

- White homeowners are less likely to be living in lower HOLC grade census blocks.
- The effect size for minority owners across the HOLC grade census blocks is lower than for renters, hovering around 1.4.
- However, “Declining” census blocks have 6.1x the number of Black homeowners compared to the “Best” census blocks.



# Summary

**How did HOLC grades impact the segregation of Boston by race?**

- “Inner-city” portions of Boston deemed the most hazardous by HOLC
- Boston is still (somewhat) segregated by former HOLC grade with Hispanic/Latino most segregated among renters

**Is it still harder for minorities to own or rent homes in areas with higher HOLC grades today?**

- Areas assigned the highest HOLC grades in the 1930s still have more white homeowners and renters



# Thank you!

Questions?