

RACE, RISK, AND THE EMERGENCE OF FEDERAL REDLINING

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Today's Talk

Goal:

- Place the initiation of government-sponsored “redlining” through the development of neighborhood-based risk maps into the context of a broader economic history.
- Provide a statistical analysis/description of the redlining process.

Motivation:

- Understand role of race in creation of HOLC security zone maps.

Outline:

- Introduction of risk maps and present-day relevance
- Historical narrative
- Empirical analysis

Origins of HOLC & FHA Redlining

- Homeowner's Loan Act of 1933
 - Passed at height of Great Depression.
 - Homeowners' Loan Corporation (HOLC) created to stabilize housing markets.
 - Refinanced troubled home loans with 15-year mortgages.
- The HOLC undertook the City Survey program to manage the risk of their mortgage portfolio 1936-1939.
 - Implemented after all loans had already been made.
- Residential security maps were produced for every major city, giving each neighborhood a letter grade (A-D) representing lending risk.
 - Genesis of redlining since D was in red.
 - Forerunner of Federal Housing Administration (FHA) redlining.

Description of HOLC zones

- Maps categorize neighborhoods for risk assessment purposes
 - Graphically reflect the *trend* of desirability in neighborhoods from a residential viewpoint.
 - “... embody all the salient neighborhood information required for the intelligent operation of mortgage lending activities.” Wilder 2000, p. 276, citing Gordon, p. 92.
- From HOLC Documents:
 - **Green (A)** - lenders are willing to make their maximum loans (75-80% of the appraisal) to be amortized over a 10-15 year period.
 - **Blue (B)** - lenders will have a tendency to hold loan commitments 10-15 % under the limit.
 - **Yellow (C)** - lenders are more conservative and hold loan commitments under the lending ratio for the A and B areas.
 - **Red (D)** - lenders may refuse to make loans in these neighborhoods and others will lend only on a conservative basis.

Factors Considered

- intensity of the sale and rental demand
- percentage of home ownership
- age and type of building
- economic stability of area
- social status of the population, “infiltration” of less desirable populations
- sufficiency of public utilities, accessibility of schools, churches, and business centers
- transportation methods
- topography of the area
- restrictions set up to ‘protect’ the neighborhood

Price level of the homes is not the guiding factor.

Modern Context - Redlining in the media and literature

- Broad narrative focuses on the relationship between race and redlining.
- Academia, Popular Press & Political Debate
 - Rothstein in *The Color of Law* (2017).
 - Ta-Nehisi Coates in *The Case for Reparations*
 - Elizabeth Warren's *American Housing and Economic Mobility Act*
- Work in economics focuses largely on long-term impacts of redlining via security zone grades
 - Aaronson, Hartley, & Mazumder (2019); Krimmel (2017); Appel & Nickerson (2016); Anders (2018).

Our paper

Place HOLC and redlining in the larger economic history context

- Focus on how lending practices and risk assessments were changing during the early twentieth century.
- Empirical analysis of security zone grades.

Four Main Empirical Question:

1. To what extent did grades reflect neighborhood demographics and prices?
2. How accurate were agents in their assessments of neighborhood characteristics?
3. Did agents discriminate on the basis of race?
4. Were agents able to accurately delineate neighborhoods and predict neighborhood trajectories?

A primer on the history of home loans in the U.S.

- Through the 1920s, home loans were often a 3-5 year straight or “balloon” loan through a bank, insurance company, or other institution.
 - Loan amount typically not more than 50 percent of home’s value.
- ~ 40% of home buyers borrowed through a Building & Loan for some part of their financing.
- Building and Loans were typically small, very local mutual funds focused entirely on home loans. Members met regularly and paid weekly or monthly dues.
 - Loans through B&Ls looked like ~ 10 year, amortized installment loans or mortgages.
- B&Ls held more debt on single-family homes at start of Depression than the other institutions combined (Snowden, 2010).

Shares of Single Family Residential Debt

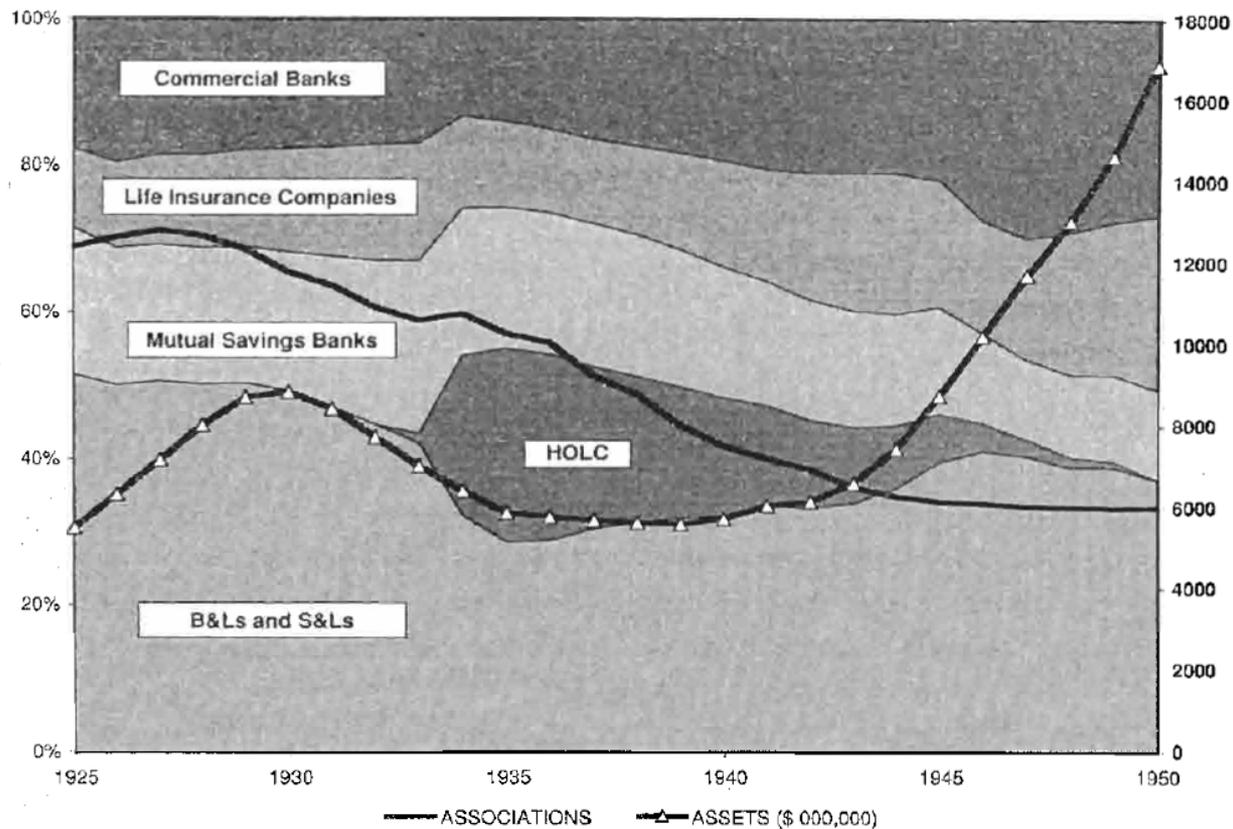


FIGURE 6.5. B&L and S&L Growth: 1925–1950. (Number of Associations and Total Assets) With Shares of Mortgage Holdings on 1-4 Family Nonfarm Homes by Institutional Lenders

Source: *Savings and Home Financing Source Book*, 1953, Table II; 1960, Table 3.

Source: Snowden, 2003.

Great Depression hits!

- At depression's height, ~40 percent of total mortgages in default
 - Families struggled to roll over their loans.
 - Many B&Ls “frozen.”
- Small B&Ls disappear
 - Give way to S&L's which required reserve holdings and savings accounts.

Arrival of HOLC

- HOLC intended to stabilize housing markets
 - Not to promote new housing construction.
- Little evidence of racial discrimination (Hillier, 2003)
 - HOLC bought mortgages in all types of neighborhoods, “safe” or not.
- HOLC loans represented a shift to longer-term loans issued in bulk at a greater distance from borrowers .
 - Fully amortized 15-year loans with a comparatively low interest rate of 5 percent.
 - Just over 1 million loans issued between 1933 and 1935.
 - This is about 10 percent of non-farm mortgages in the U.S.

Great Depression and Private Lenders

- Private lenders are also moving towards longer-term loans and larger portfolios (shift to larger institutions) at this time.
- “A New Plan for Home Purchase” by W.S. Van Dyke (June 1929)
 - Van Dyke was the vice-president of the Peoples Savings and Trust Company in Pittsburgh, PA.
 - Discusses new fifteen-year monthly payment mortgage plan.
 - Mortgages only applicable for new homes only; “**For reasons which are obvious to the banking mind**, the plan is confined to new homes only.” (emphasis ours)
- “New Mortgages for Old” by Arthur C. Comey (December 1920)
 - “The individual, short term mortgage is antiquated.”
 - “Mortgages should be written for the full duration of the loan and should be steadily reduced by periodic payments.”

HOLC is a Sea Change in Lending Risk

- HOLC's standardized terms eliminated the discretion exercised by local financial institutions to mitigate risk, such as increasing collateral or interest rates.
- Repayment of mortgages rested on homes maintaining or increasing their value over the 15-year life of the loan.
 - Long-run value of asset is important!
 - HOLC is dealing with value of old homes, not new homes.
- The HOLC undertook the City Survey program (Risk Maps) to manage the risk of their mortgage portfolio 1936-1939.
- This program went back to the local experts – real estate professionals, local bank loan officers, and city officials – to assess lending risk on a neighborhood basis.

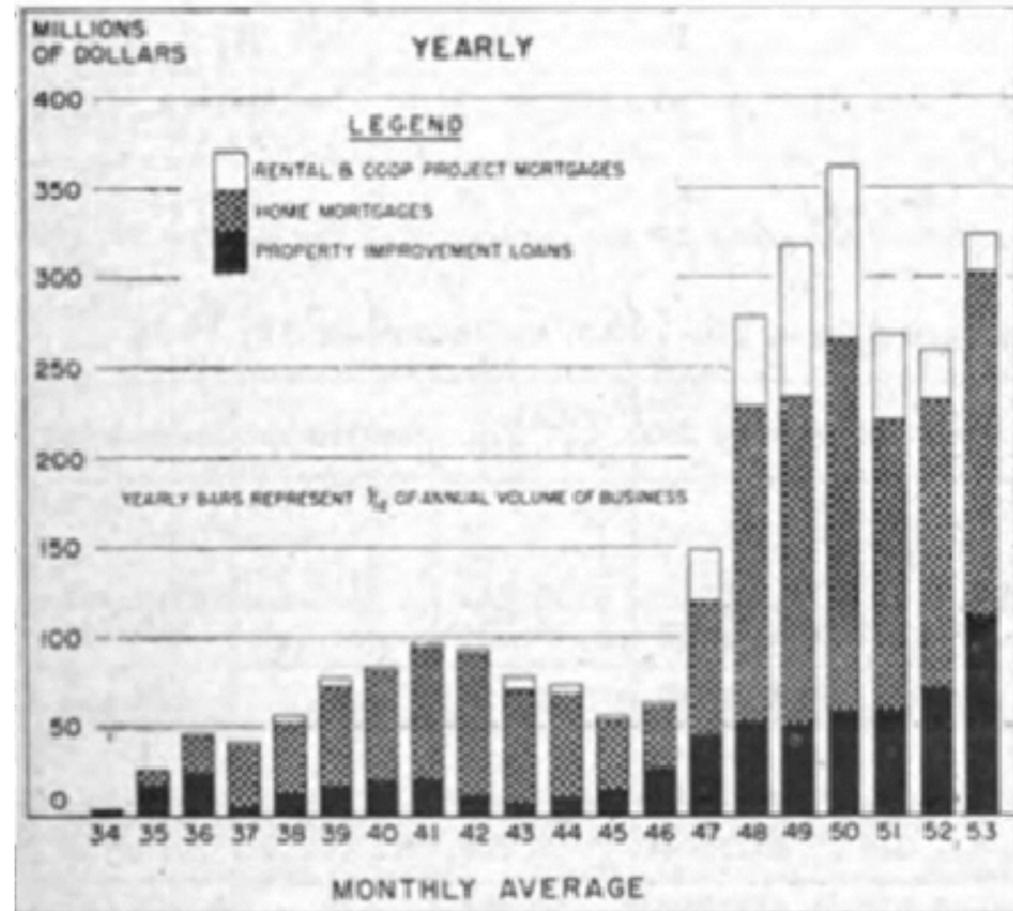
National Housing Act of 1934

- Establishes Federal Housing Administration (FHA)
 - Intended to boost housing construction.
 - Stabilize mortgage market.
 - Majority of underwriting is for new construction.
- Provides insurance for privately issued mortgages.
- Evolves into major player in housing markets through the 1940s and 1950s.

Expansion of FHA Underwriting

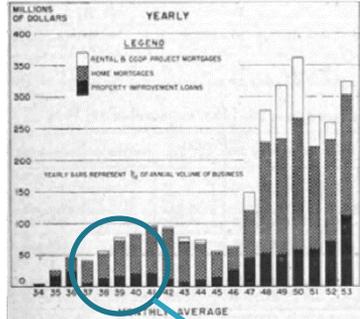
- Big jump in home lending occurs in 1947.
- Home Lending activity in late 1940s is more than 5x that of late 1930s.

TOTAL DOLLAR VOLUME OF FHA INSURANCE WRITTEN
1934 - 1953



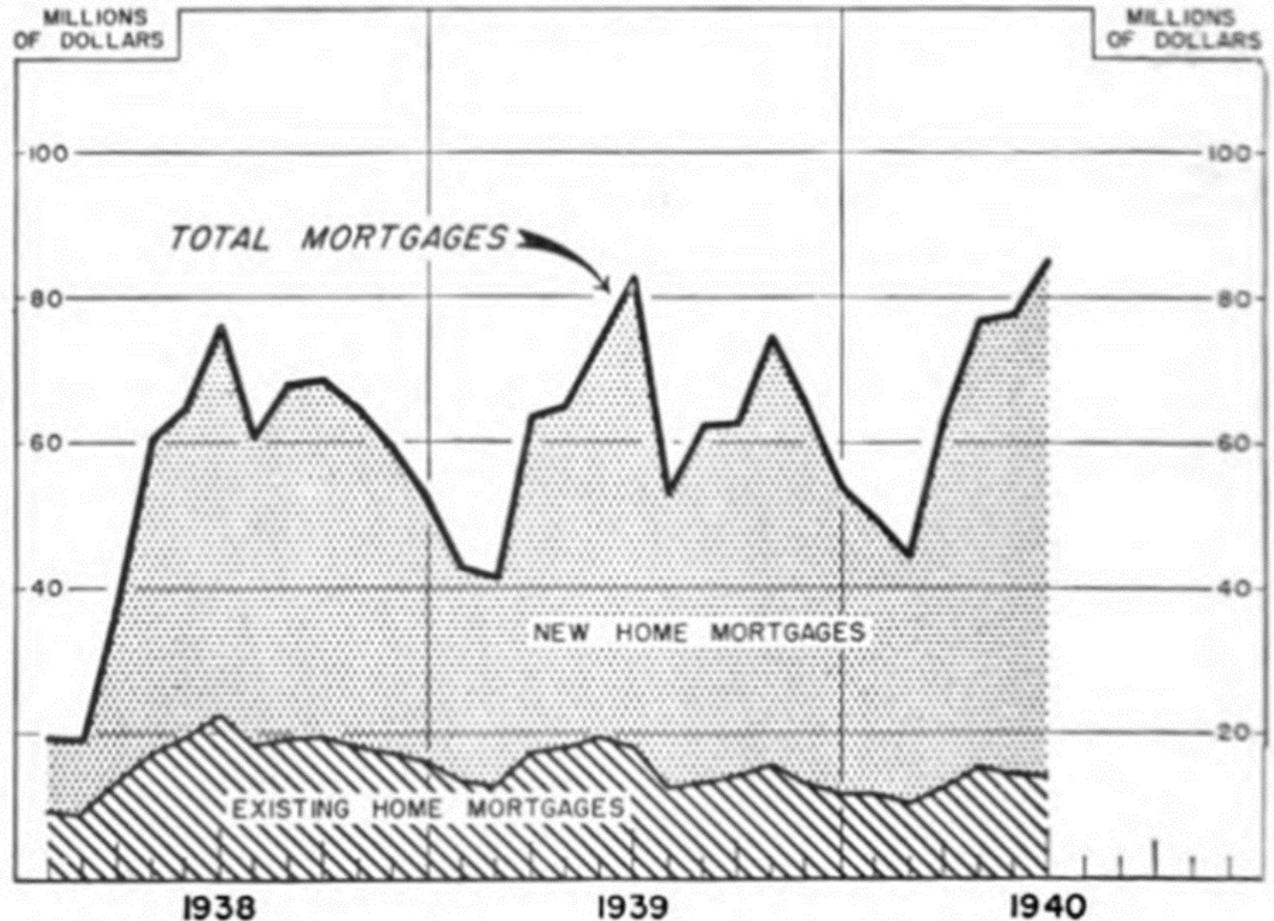
Expansion of FHA Underwriting

TOTAL DOLLAR VOLUME OF FHA INSURANCE WRITTEN
1934 - 1953



New home lending roughly 4x that of existing home lending.

MORTGAGES ACCEPTED FOR INSURANCE



FHA Underwriting

- Individual mortgages are evaluated for risk of default prior to underwriting.
 - Individual risk
 - Property and neighborhood risk
- Published Underwriting Manual
 - First manual issued in 1935
 - Supported use of racial covenants
 - Focus on stability in neighborhood composition
- HOLC rated entire neighborhoods, FHA appraised individual mortgages.
- FHA is major focus of work/concern vis-à-vis redlining.

FHA and the HOLC maps

- Fifty to sixty copies of each HOLC map made.
- No copies were supposed to be given to “private interests” (Hillier, 2003).
- A copy of each city’s HOLC map provided to FHA.
- FHA carried out several different research studies that generated their own maps and reports.
 - National Housing Act of 1934 required FHA to do such research.
- In contrast to HOLC maps, almost all FHA maps are lost to history

Importance of FHA Lending in our Sample

- At most, 58,822 existing homes in our 10-city sample received FHA-insured mortgages between 1935 and 1940.
 - Statistic is for “metropolitan areas” encompassing our primary city sample.
- Our 10-city sample contained 2,432,250 housing units in 1930.
- **At most** 2% of houses in our sample cities had received FHA-insured mortgages as of 1940 (but probably significantly less).

Recap of history

- Great Depression ushered in structural changes in home lending.
 - Longer-term mortgages.
 - Increased distance between larger lenders and borrowers.
- Largely an acceleration of private market trends.
- Result is an increase in focus on neighborhood/asset risk.
- HOLC (& FHA) faced with need to systematize analysis of this risk.
 - HOLC & FHA maps
 - FHA Underwriting Manual

Race and Neighborhood Value

“Among the traits and characteristics of people which influence land values, racial heritage and tendencies seem to be of paramount importance.”

“Most of the variations and differences between people are slight and value declines are, as a result, gradual. But there is one difference in people, namely race, which can result in a very rapid decline. Usually such declines can be partially avoided by segregation and this device has always been in common usage in the South where white and negro populations have been separated. ”

- Frederick M. Babcock, *The Value of Real Estate* (1932)

Race and Neighborhood Value

- Some factors to observe in making an appraisal
 - “What is the general social character of the neighborhood?”
 - **“Are there undesirable racial elements in the neighborhood, and if so, are they likely to expand in a way that may injure the property?”**
 - “Are properties in the neighborhood owned or rented by occupants? State percentage.”
 - “Are there undue vacancies in the section? Why?”
 - “What is the general cost and character of neighboring properties?”

- Stanley L. McMichael, McMichael's Appraising Manual (1931)

Sociologists and other Academics

Viewed cities as a composition of zones and document that property values can be impacted by the succession process

1. Invasion of new demographic group
2. Reactions from the inhabitants
3. An influx of newcomers/abandonment of the area by its old-time residents.
4. The achievement of a new equilibrium of communal stability

- Burgess (1928), Cressey (1938), Gibbard (1941), Schietinger (1951, 1954)

“The entrance of the Negro into a white community results in an immediate apparent depreciation in land values. This also results, but not always so rapidly, from any other racial or immigrant intrusion or from commercial and industrial encroachment.”

- Burgess (1928)

Akbar et al. study block-level housing price dynamics

- City blocks that transitioned from white to black saw soaring rents (50 percent higher) and occupancy rates.
- Black homebuyers paid a large premium (35 percent) to induce whites to sell. Then homes lost 10 of original value during transition process.
- Timing suggests maximum disadvantage for black families. Eroded gains to migrating North in interwar era,
- Not driven by HOLC, which we discuss next.

AREA DESCRIPTION

1. NAME OF CITY Pittsburgh SECURITY GRADE D AREA NO. 7
2. DESCRIPTION OF TERRAIN. Hilly
3. FAVORABLE INFLUENCES. Good transportation in Southern end. Near employment
4. DETRIMENTAL INFLUENCES. Poor class of small houses in poor condition.
5. INHABITANTS:
 a. Type Labor-mechanics ; b. Estimated annual family income \$ 200-1500
 c. Foreign-born Italian ; 20 %; d. Negro Yes ; 10-15 %;
 (Nationality) (Yes or No)
 e. Infiltration of Italian Negro ; f. Relief families heavy ;
 g. Population is increasing _____ ; decreasing _____ ; static. yes
6. BUILDINGS:
 a. Type or types Single-rows ; b. Type of construction brick & frame ;
 c. Average age 35 yrs. ; d. Repair Poor
7. HISTORY:
- | YEAR | SALE VALUES | | | RENTAL VALUES | | |
|--------------------|---------------------|--------------------|-------------|---------------|--------------------|-------------|
| | RANGE | PREDOM-
INATING | % | RANGE | PREDOM-
INATING | % |
| 1929 level | <u>1800 to 7500</u> | <u>4500</u> | <u>100%</u> | <u>30-60</u> | <u>40</u> | <u>100%</u> |
| <u>1933-35</u> low | <u>900 to 4000</u> | <u>2500</u> | <u>55</u> | <u>17-30</u> | <u>30</u> | <u>50</u> |
| current | <u>1000 to 4500</u> | <u>2800</u> | <u>50</u> | <u>20-35</u> | <u>27</u> | <u>67</u> |
- Peak sale values occurred in 1926 and were 105 % of the 1929 level.
Peak rental values occurred in 1929 and were 100 % of the 1929 level.
8. OCCUPANCY: a. Land 98 %; b. Dwelling units 100 %; c. Home owners 25-30 %
9. SALES DEMAND: a. Poor ; b. _____ ; c. Activity is Poor
10. RENTAL DEMAND: a. Good ; b. Anything @ \$25-30 ; c. Activity is Good
11. NEW CONSTRUCTION: a. Types None ; b. Amount last year _____
12. AVAILABILITY OF MORTGAGE FUNDS: a. Home purchase Very limited ; b. Home building no
13. TREND OF DESIRABILITY NEXT 10-15 YEARS Downward
14. CLARIFYING REMARKS: This is a good 4th grade section. Some Polish people built here about 4 yrs. ago along Kincaid.
15. Information for this form was obtained from Ralph George

HOLC
operationalized
these ideas with
neighborhood
surveys.

NS FORM-9
8-28-37

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(Nationality) (Yes or No)

e. Infiltration of Italian Negro ; f. Relief families heavy ;

g. Population is increasing _____ ; decreasing _____ ; static. yes

6. BUILDINGS:

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7. HISTORY:

YEAR	SALE VALUES			RENTAL VALUES		
	RANGE	PREDOM- INATING	%	RANGE	PREDOM- INATING	%
1929 level	<u>1800 to 7500</u>	<u>4500</u>	<u>100%</u>	<u>30-50</u>	<u>40</u>	<u>100%</u>
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Date July 1937

Data

- Ten sample cities
 - Baltimore, Boston, Brooklyn, Chicago, Cleveland, Detroit, Manhattan, Philadelphia, Pittsburgh, St. Louis
- HOLC survey data
 - Digitized residential security maps and surveys
 - Housing characteristics, population characteristics, future trend desirability of neighborhood
- Census data
 - Geocoded addresses from 1930 and 1940 censuses (Akbar et al. 2018)
 - Assigned each address to its corresponding HOLC zone
 - Calculated the distance from each address to the nearest HOLC boundary

Survey Summary Statistics

	Zone A	Zone B	Zone C	Zone D
Family Income	16760 (20274)	6064 (7459)	2952 (5403)	1385 (717)
House Value	15566 (10047)	10005 (4805)	6751 (8692)	3700 (2225)
Rent	76.78 (33.83)	60.94 (60.94)	39.55 (39.55)	23.85 (9.86)
Share Black	0 (0.000)	0 (0.001)	0.005 (0.025)	0.165 (0.276)
Share Foreign	0.02 (0.05)	0.07 (0.14)	0.24 (0.27)	0.45 (0.29)
Share of Houses Occupied	98.47 (2.51)	97.32 (6.32)	97.32 (2.85)	95.21 (4.86)
Share Owner Occupied	56.76 (47.11)	54.19 (41.04)	58.27 (31.96)	43.66 (34.06)
Observations	57	189	385	296

Survey Summary Statistics

	Zone A	Zone B	Zone C	Zone D
Construction Type				
Brick	0.873 (0.336)	0.718 (0.451)	0.488 (0.501)	0.359 (0.481)
Frame	0.073 (0.262)	0.237 (0.427)	0.496 (0.501)	0.623 (0.485)
Other	0.06 (0.229)	0.05 (0.208)	0.02 (0.125)	0.02 (0.132)
Repair				
Excellent	0.389 (0.492)	0.080 (0.271)	0.008 (0.090)	0 (0.000)
Good	0.61 (0.49)	0.78 (0.42)	0.22 (0.41)	0.03 (0.18)
Fair	0 (0.000)	0.14 (0.344)	0.75 (0.434)	0.47 (0.500)
Poor	0 (0.00)	0.01 (0.08)	0.02 (0.15)	0.50 (0.50)
Observations	57	189	385	296

Survey Summary Statistics

	Zone A	Zone B	Zone C	Zone D
Future Trend Desirability				
Upward	0.419 (0.502)	0.186 (0.391)	0.030 (0.171)	0 (0.000)
Slightly Upward	0.226 (0.425)	0.216 (0.414)	0.024 (0.154)	0.031 (0.173)
Static	0.355 (0.486)	0.392 (0.491)	0.217 (0.413)	0.321 (0.469)
Slightly Downward	0 (0.000)	0.093 (0.292)	0.114 (0.319)	0.084 (0.278)
Downward	0 (0.000)	0.113 (0.319)	0.614 (0.488)	0.565 (0.498)
Observations	57	189	385	296

Census Data Summary Statistics

	1930				1940			
	Zone A	Zone B	Zone C	Zone D	Zone A	Zone B	Zone C	Zone D
Household Size	3.78 (1.54)	4.09 (1.70)	4.31 (1.85)	4.57 (2.08)	3.64 (1.46)	3.85 (1.60)	4 (1.73)	4.24 (1.96)
Family Size	3.62 (1.49)	3.92 (1.67)	4.09 (1.82)	4.17 (2.06)	3.47 (1.40)	3.69 (1.57)	3.82 (1.72)	3.94 (1.94)
Occupation Score	33.2 (11.12)	31.48 (10.04)	29.52 (9.41)	26.52 (9.38)	34.7 (12.52)	31.55 (10.57)	29.3 (9.63)	26.07 (8.92)
House Value	9397 (4057)	8227 (3688)	7075 (3368)	5377 (2968)	7588 (3888)	5706 (2853)	4280 (2191)	3071 (1788)
Rent	48.75 (19.80)	48.40 (18.68)	42.32 (17.09)	33.65 (15.03)	47.99 (21.19)	39.48 (16.60)	31.89 (13.24)	24.08 (10.44)
Share Black	0.002 (0.046)	0.003 (0.051)	0.009 (0.093)	0.135 (0.342)	0.002 (0.041)	0.002 (0.046)	0.008 (0.089)	0.153 (0.360)
Share Foreign	0.19 (0.39)	0.27 (0.44)	0.38 (0.49)	0.41 (0.49)	0.16 (0.37)	0.23 (0.42)	0.33 (0.47)	0.35 (0.48)
Sh Owner Occupied	0.82 (0.39)	0.79 (0.41)	0.7 (0.46)	0.56 (0.50)	0.79 (0.41)	0.67 (0.47)	0.6 (0.49)	0.48 (0.50)
Observations	9866	120232	289011	244049	17743	136744	280366	213587

Statistical Analysis

- Focus on C/D Boundary
- From HOLC Documents:
 - Green (A) - lenders are willing to make their maximum loans (75-80% of the appraisal) to be amortized over a 10-15 year period
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Statistical Analysis

Main Empirical Questions

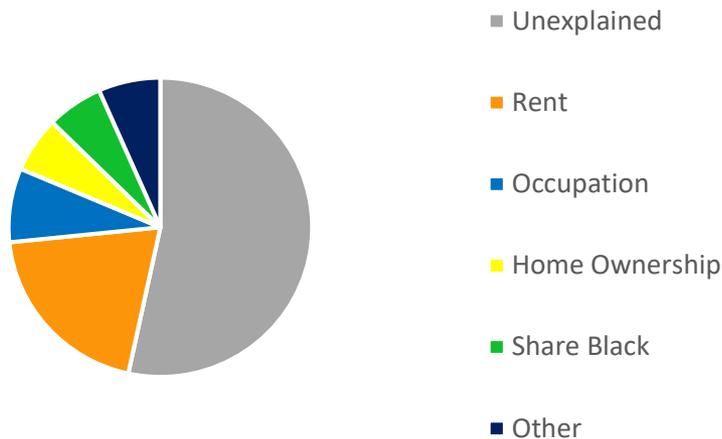
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Decomposing Grade Determinants

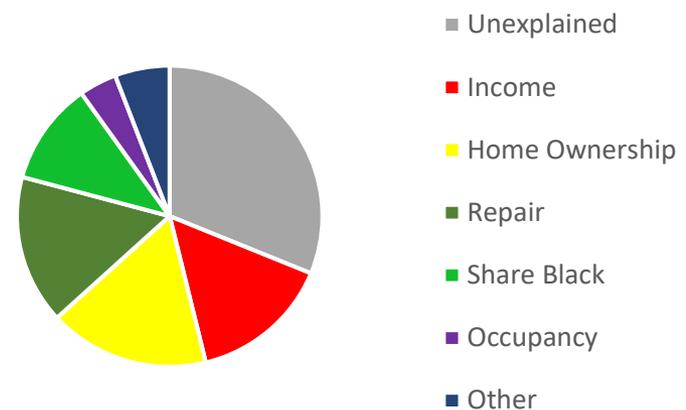
- Run OLS regression on the rank of neighborhoods ($C=1, D=0$) on the listed correlates.
- Compute the predicted difference between C and D zones based on differences in the zone's mean correlates.
- Relative magnitudes of the predicted differences across correlates reflects differences in importance for classification.

Decomposition of Differences in Grades

Census ED Data



HOLC Survey Data



Role of Race

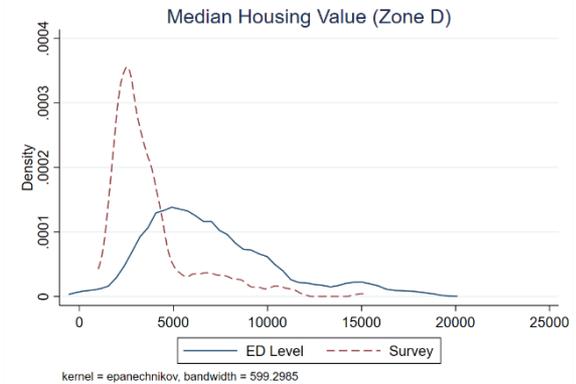
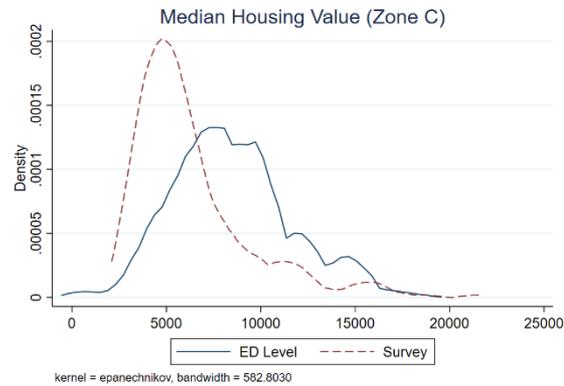
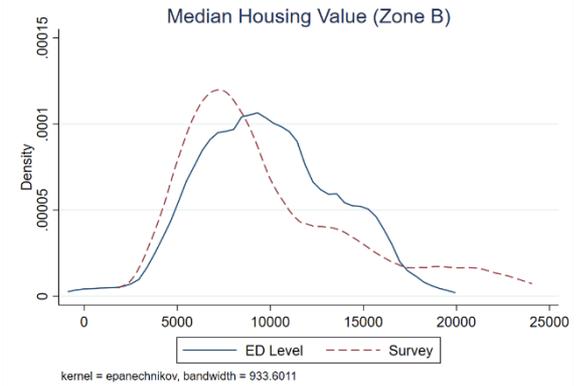
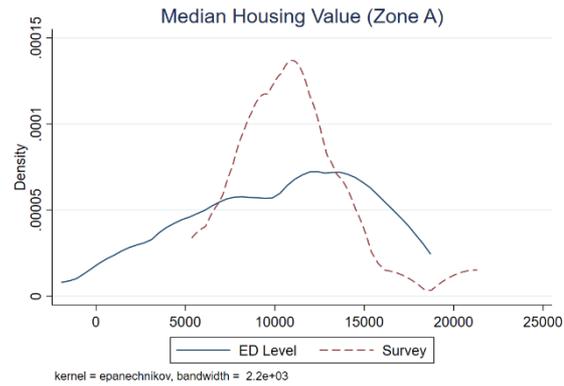
- Less than 10% of the difference in C and D ratings can be attributed to race.
- Of the 225 D rated zones in our 10 sample cities,
 - Over 50% (114) of them were reported by surveyors to have no black residents.
 - Over 50% (125) of them had a less than 1% share of black residents according to census data.
- Role of other factors in determining where blacks could live.

Statistical Analysis

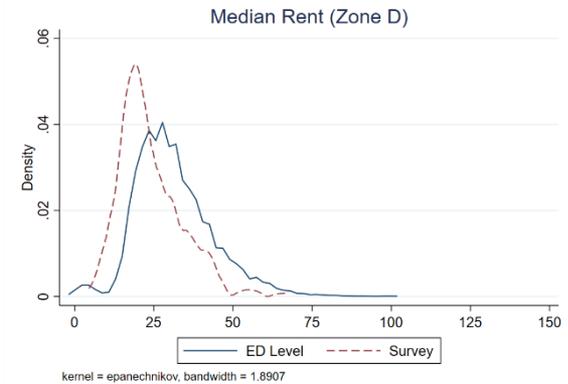
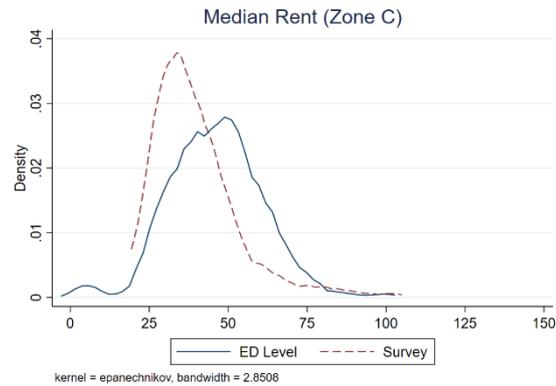
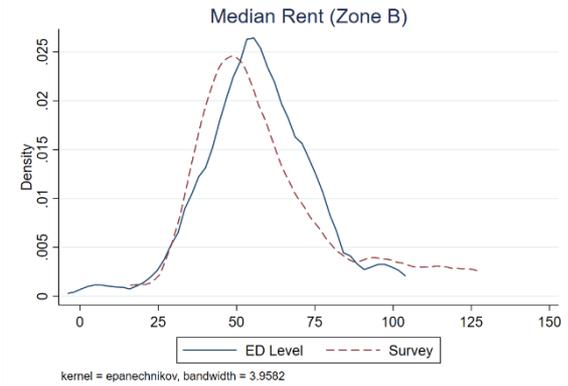
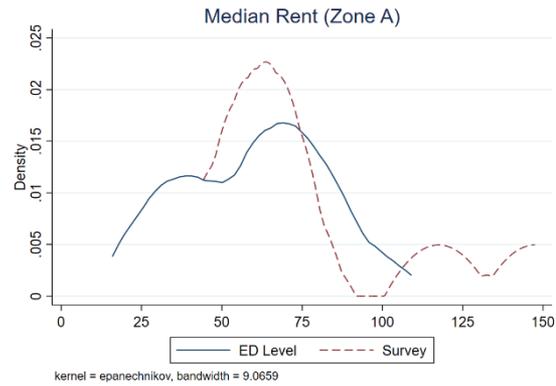
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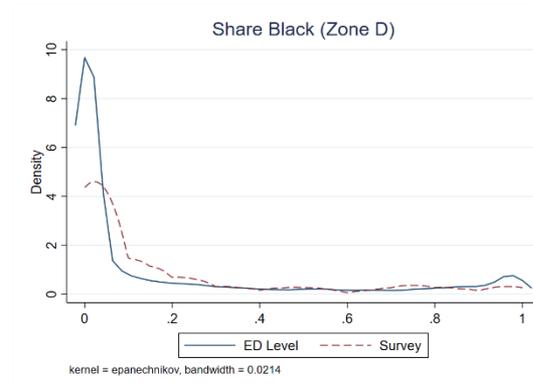
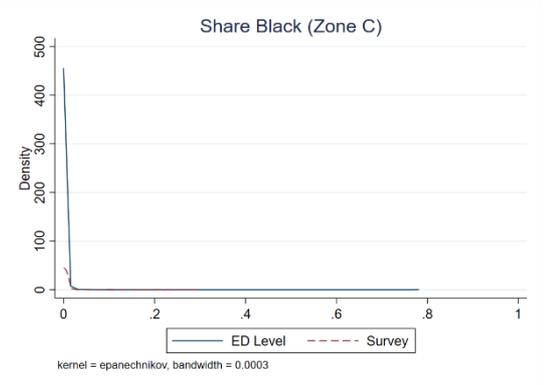
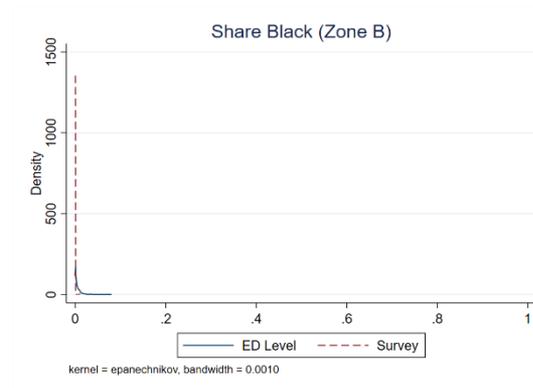
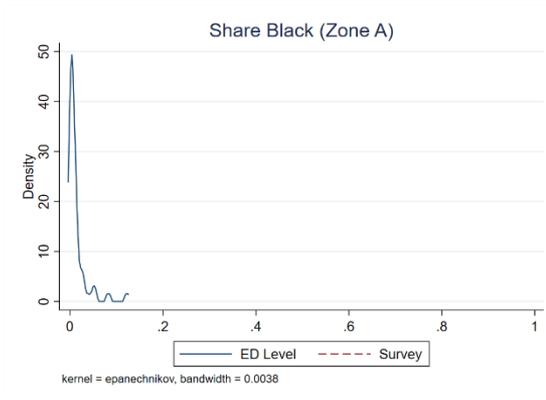
Density Plots – Housing Value



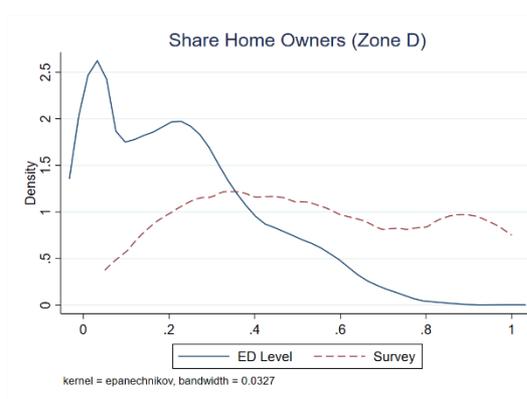
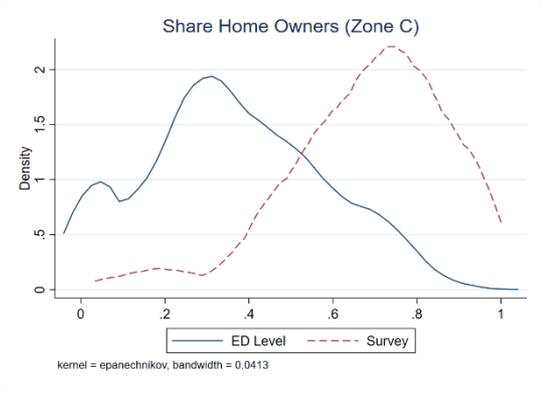
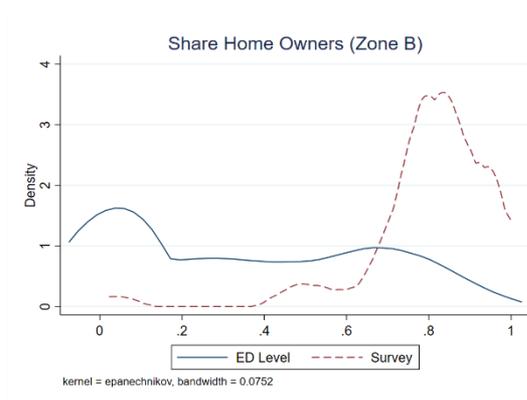
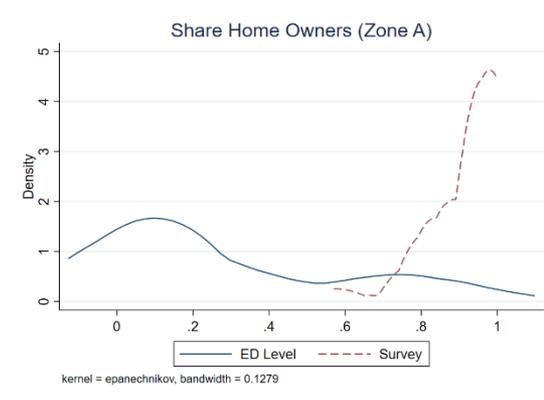
Density Plots – Rents



Density Plots – Share Black



Density Plots – Home Ownership Rates



Statistical Analysis

Main Empirical Questions

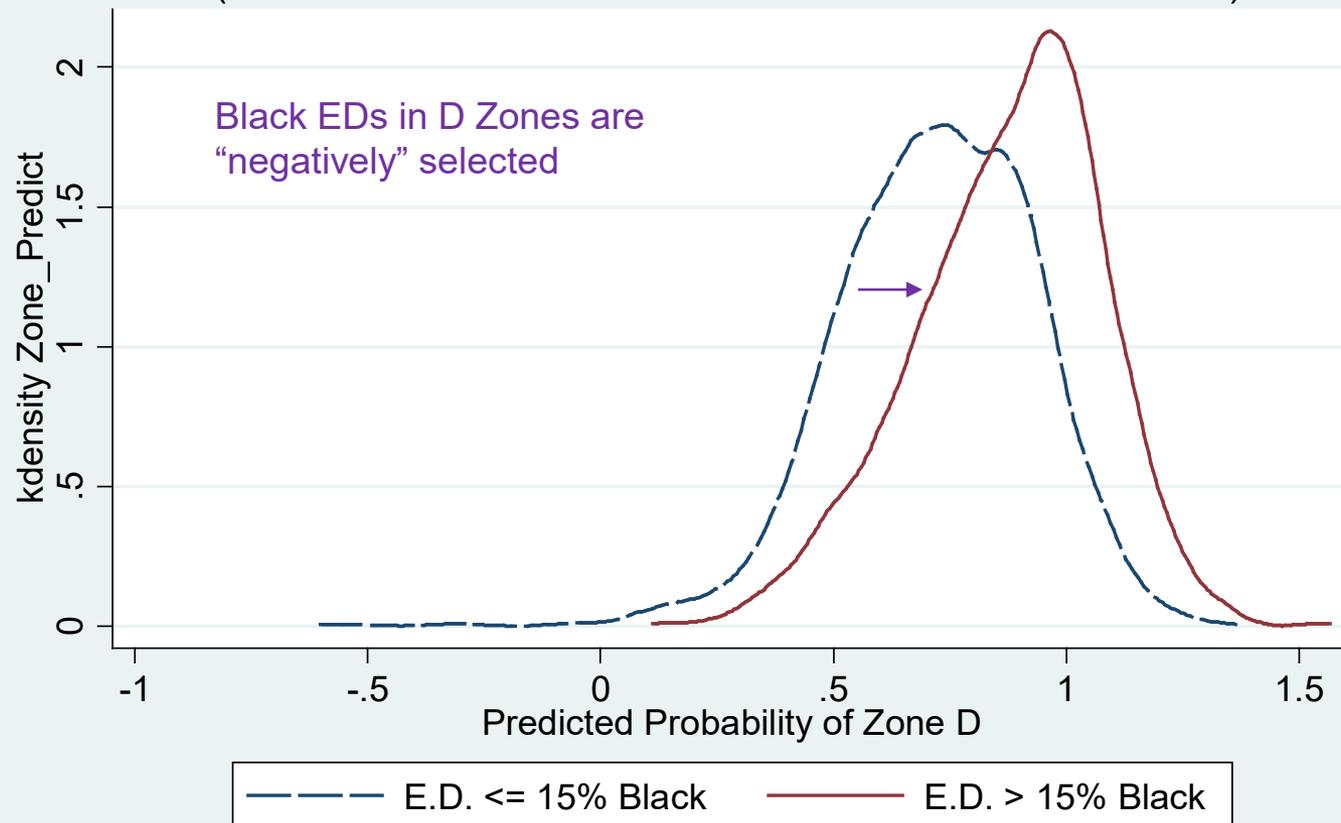
1. To what extent did grades reflect neighborhood demographics and prices?
2. How accurate were agents in their assessments of neighborhood characteristics?
3. **Were agents discriminating on the basis of race?**
4. Were agents able to accurately delineate neighborhood boundaries and predict neighborhood trajectories?

Race and Selection on Observables

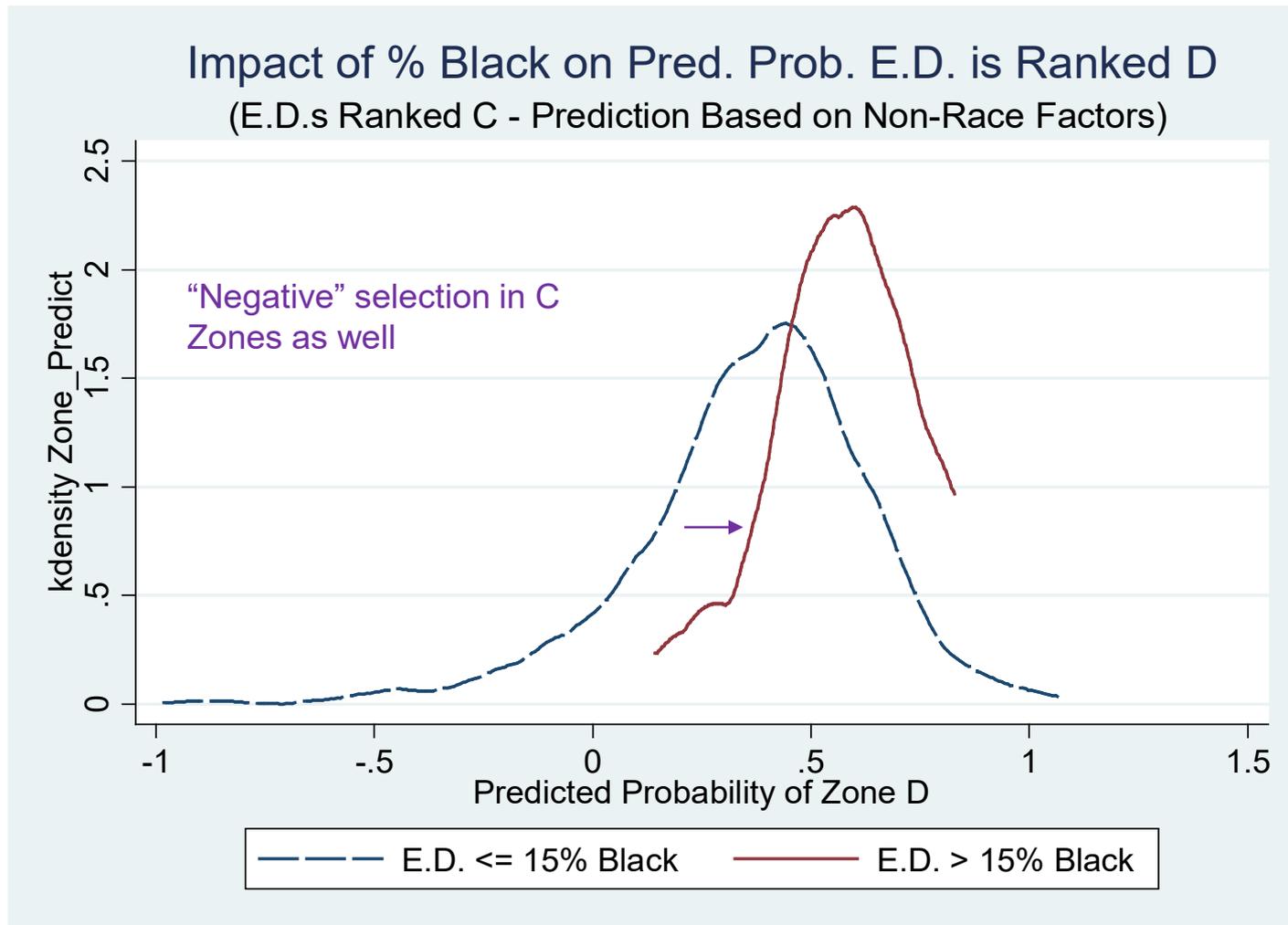
1. Use Enumeration District (ED) data for zones C & D to predict probability of being in zone D.
 - Ignore race
 - Only include EDs that are at least 95% contained in one zone
 - Robust to 50% - 100% as cutoff
 - Linear Probability Model
 - Share Foreign Born
 - Share Owner Occupied
 - Share in Labor Force
 - Average Rents and Prices
2. Divide sample by percent black in ED
 - Use 15% as cutoff
 - Robust to broad range of cutoffs

Race and Selection on Observables

Impact of % Black on Pred. Prob. E.D. is Ranked D
(E.D.s Ranked D - Prediction Based on Non-Race Factors)

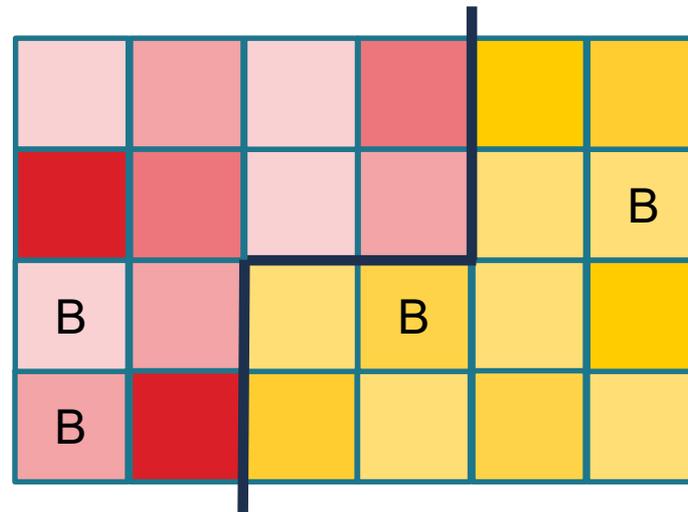


Race and Selection on Observables



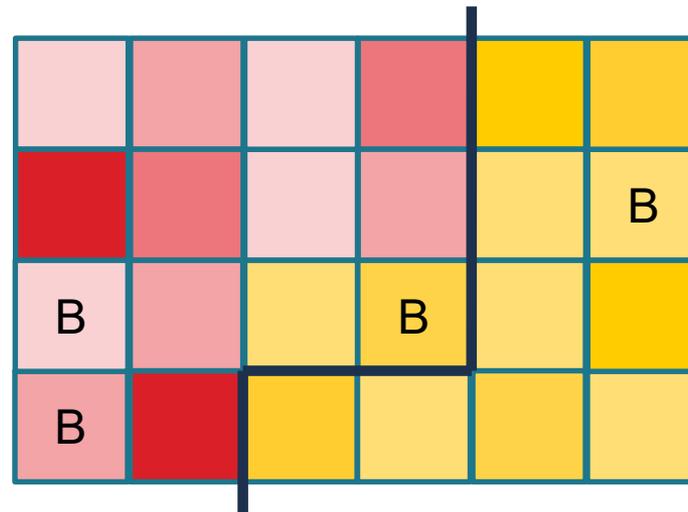
HOLC Discrimination and Boundary Choice

Unbiased Map

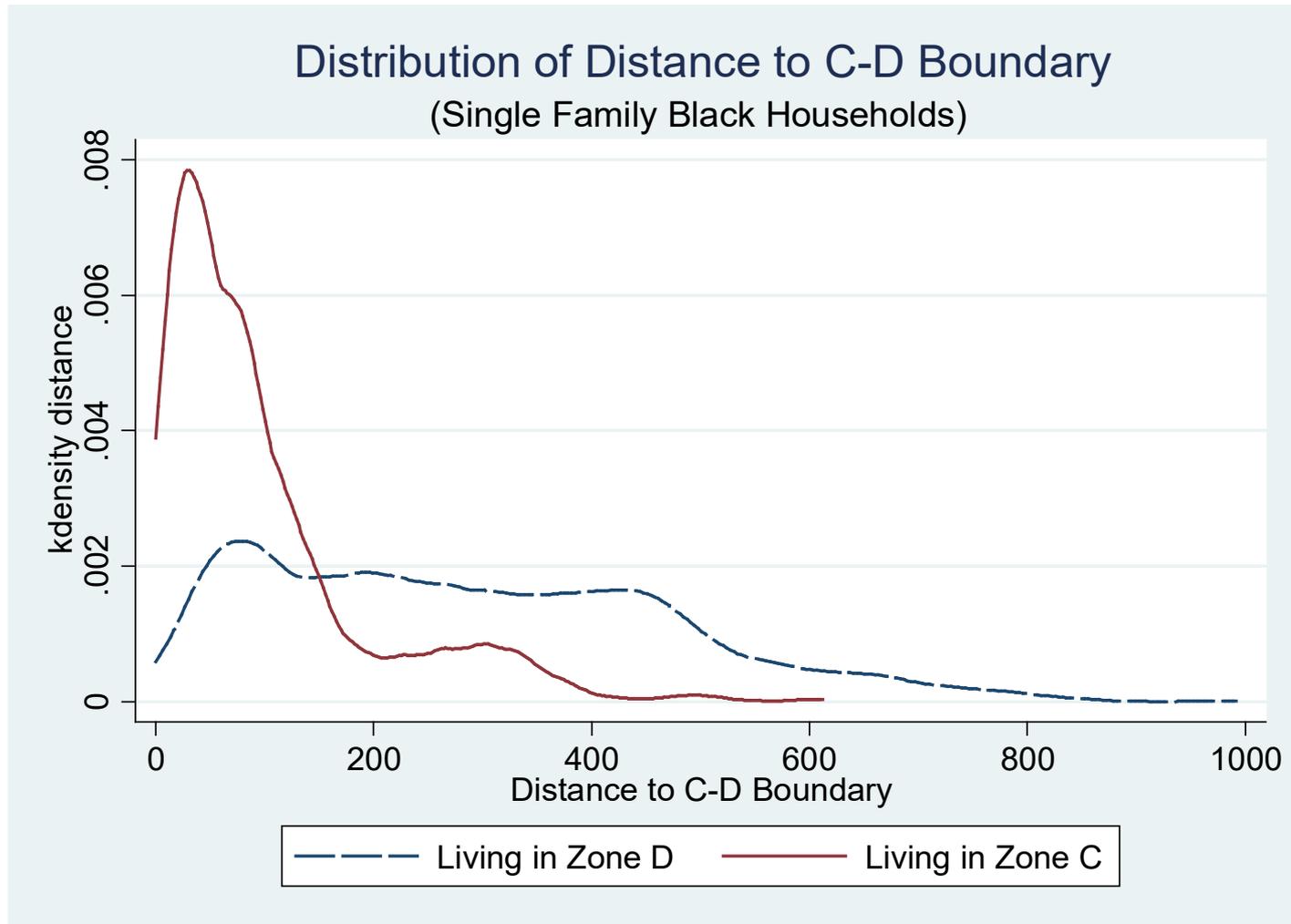


HOLC Discrimination and Boundary Choice

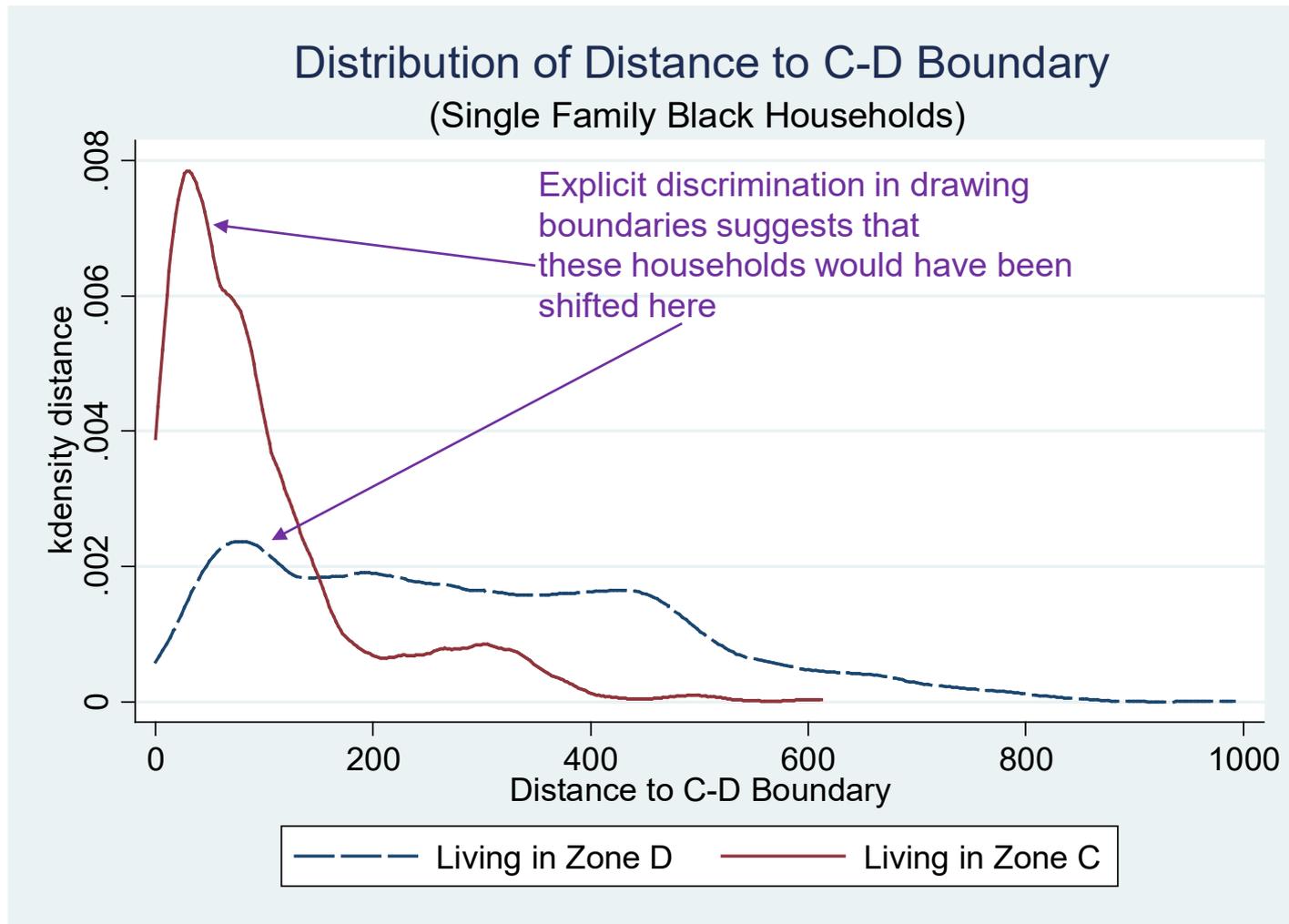
Biased Map



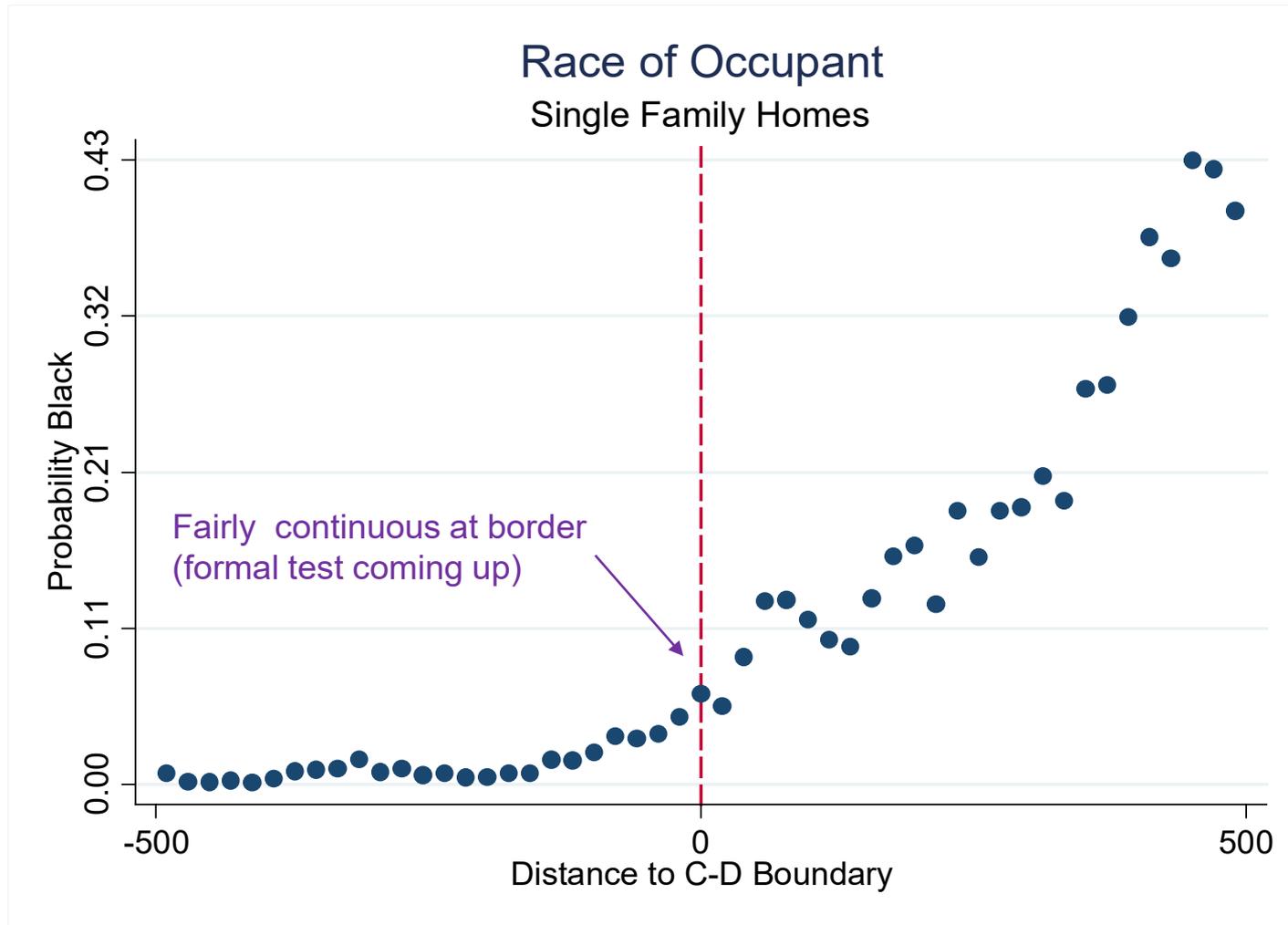
HOLC Discrimination and Boundary Choice



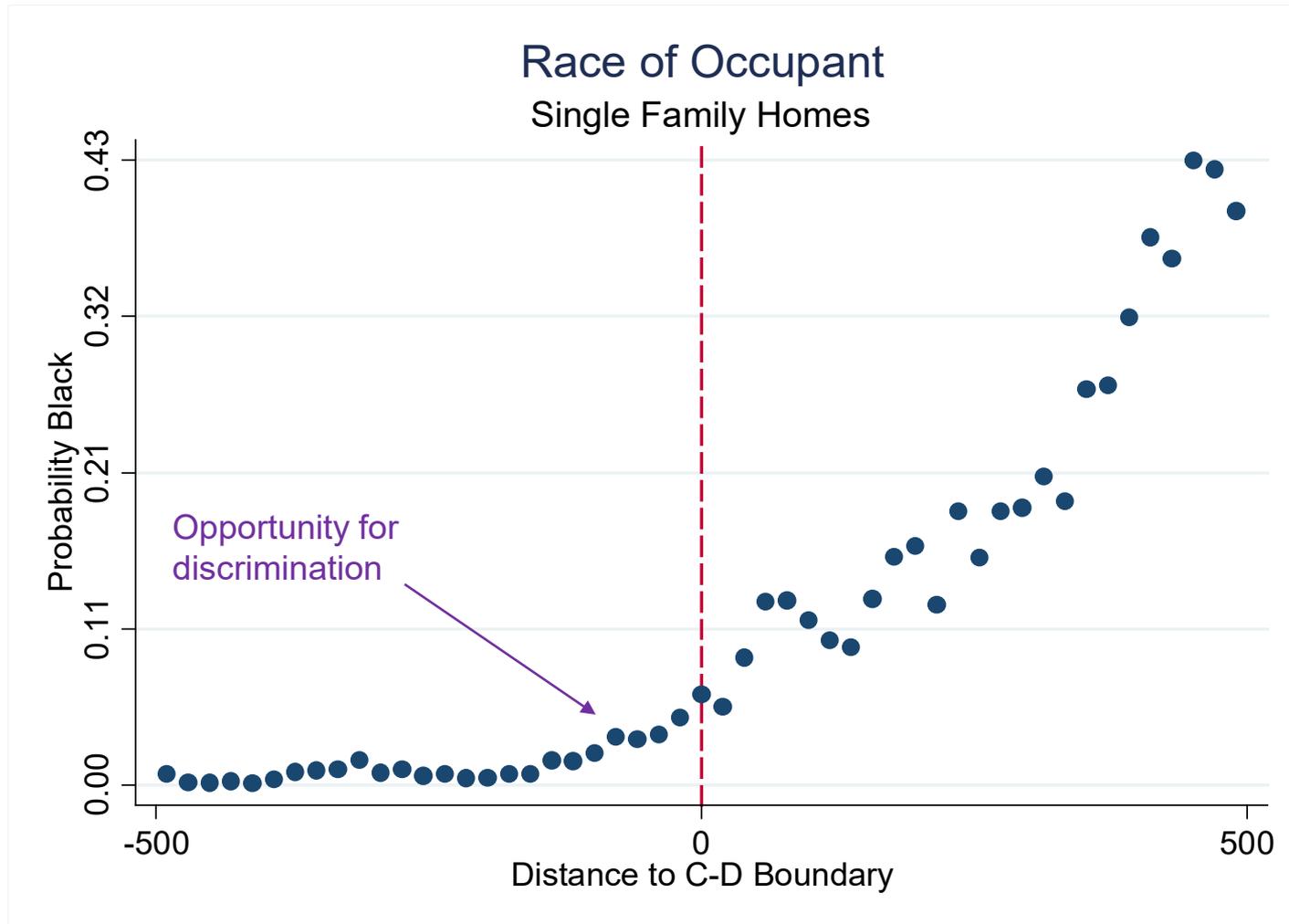
HOLC Discrimination and Boundary Choice



HOLC Discrimination and Boundary Choice



HOLC Discrimination and Boundary Choice

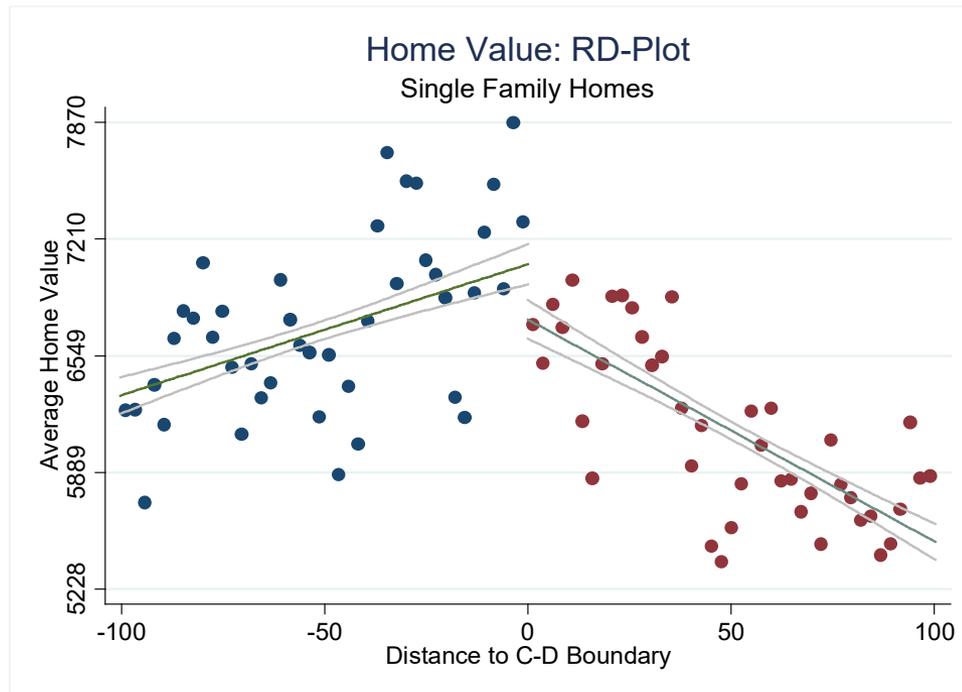


Statistical Analysis

Main Empirical Questions

1. To what extent did grades reflect neighborhood demographics and prices?
2. How accurate were agents in their assessments of neighborhood characteristics?
3. Were agents discriminating on the basis of race?
4. **Were agents able to accurately delineate neighborhood boundaries and predict neighborhood trajectories?**

R-D Analysis, Optimal Bandwidth*: Home values

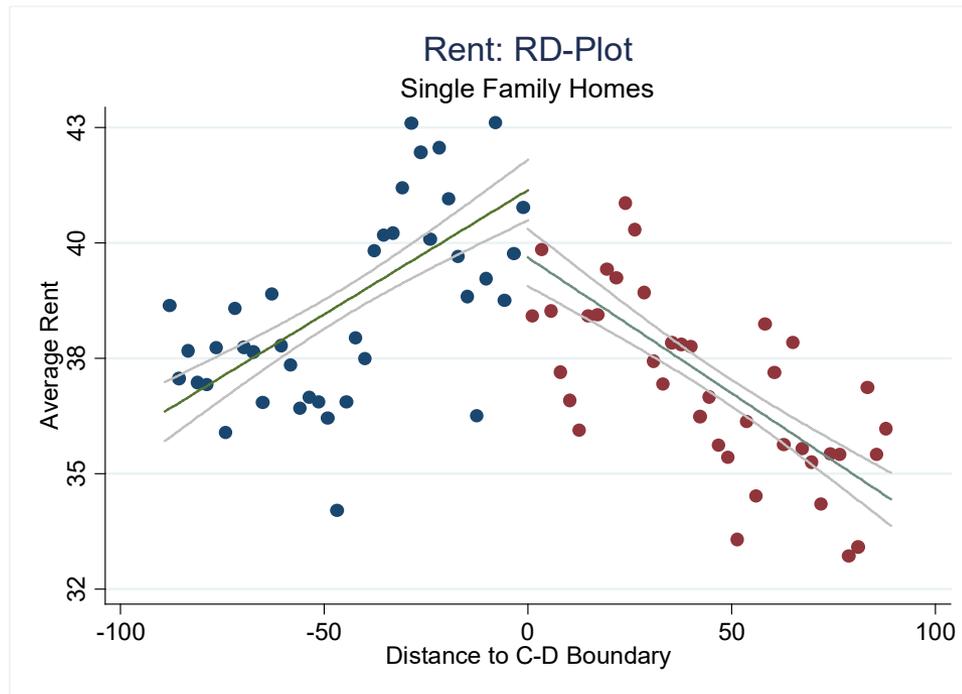


Boundary Differential

Estimate: -212.41**
Standard Error: (90.073)

*Calonico, Cattaneo, and Titiunik (2014)

R-D Analysis, Optimal Bandwidth*: Rents

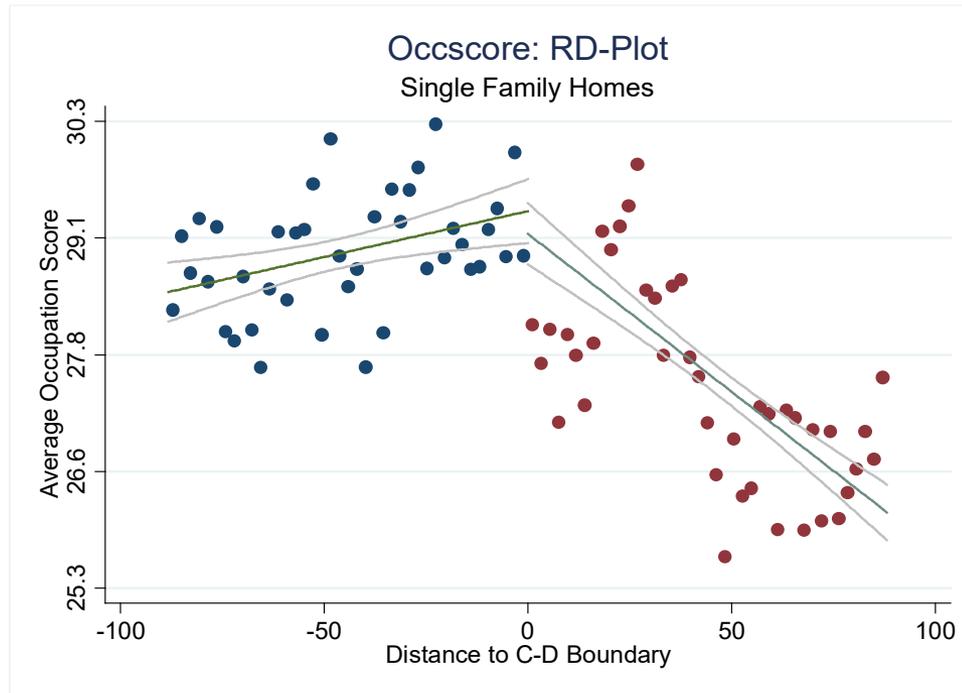


Boundary Differential

Estimate: -1.82^{***}
Standard Error: $(.5751)$

*Calonico, Cattaneo, and Titiunik (2014)

R-D Analysis, Optimal Bandwidth*: Occupational score

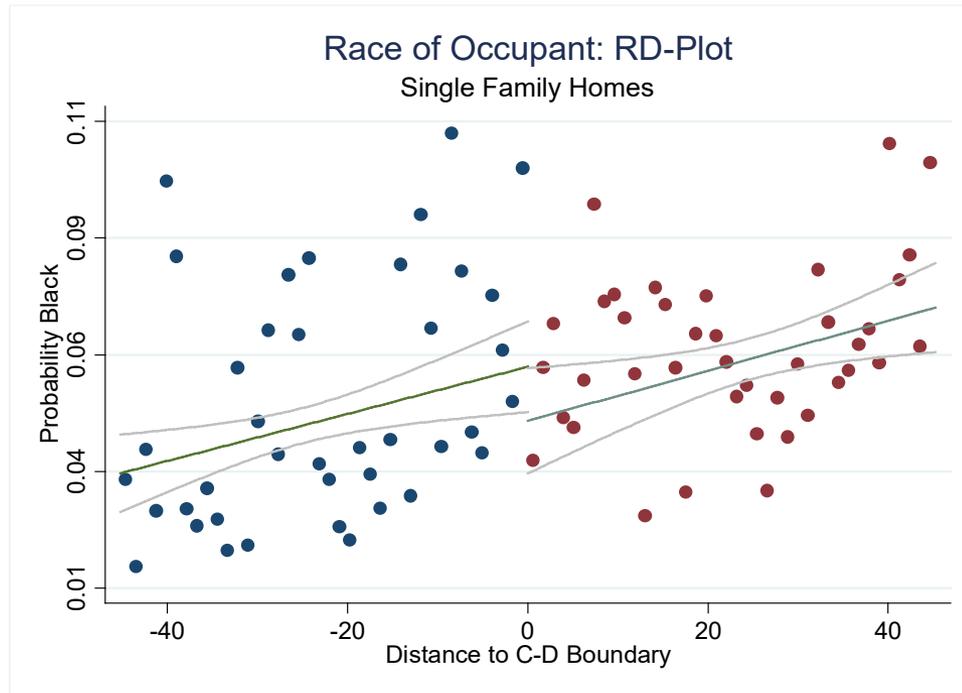


Boundary Differential

Estimate: -.168
Standard Error: (.2756)

*Calonico, Cattaneo, and Titiunik (2014)

R-D Analysis, Optimal Bandwidth*: Race



Boundary Differential

Estimate: -.0076
Standard Error: (.00931)

*Calonico, Cattaneo, and Titiunik (2014)

Statistical Analysis

Main Empirical Questions

1. To what extent did grades reflect neighborhood demographics and prices?
2. How accurate were agents in their assessments of neighborhood characteristics?
3. Were agents discriminating on the basis of race?
4. Were agents able to accurately delineate neighborhood boundaries and **predict neighborhood trajectories**?

Typical Survey

7. HISTORY:

YEAR	SALE VALUES			RENTAL VALUES		
	RANGE	PREDOM- INATING	%	RANGE	PREDOM- INATING	%
1929 level	1800 to 7500	4500	100%	30-60	40	100%
1933-35 low	900 to 4000	2500	55	17-30	20	50
current	1000 to 4500	2800	60	20-35	27	67

Peak sale values occurred in 1926 and were 105 % of the 1929 level.

Peak rental values occurred in 1929 and were 100 % of the 1929 level.

8. OCCUPANCY: a. Land 98 %; b. Dwelling units 100 %; c. Home owners 25-30 %

9. SALES DEMAND: a. Poor; b. _____; c. Activity is Poor

10. RENTAL DEMAND: a. Good; b. Anything @ \$25-30; c. Activity is Good

11. NEW CONSTRUCTION: a. Types None; b. Amount last year _____

12. AVAILABILITY OF MORTGAGE FUNDS: a. Home purchase Very limited; b. Home building no

13. TREND OF DESIRABILITY NEXT 10-15 YEARS Downward

14. CLARIFYING REMARKS: This is a good 4th grade section. Some Polish people built here about 4 yrs. ago along Kincaid.

Did HOLC Successfully Predict Trends?

$$y_{ic1940} = \alpha + \beta desirability_{ic} + y_{ic1930} + \gamma_c + \epsilon_{ic}$$

- y_{ic1940} is an outcome for **zone** i in city c in 1940 and
- y_{ic1930} is the lagged value of the outcome variable;
- $desirability_{ic}$ is a categorical variable indicating if the zone was perceived to be trending downward, slightly downward, slightly upward, upward, or remain static;
- γ_c are city fixed effects

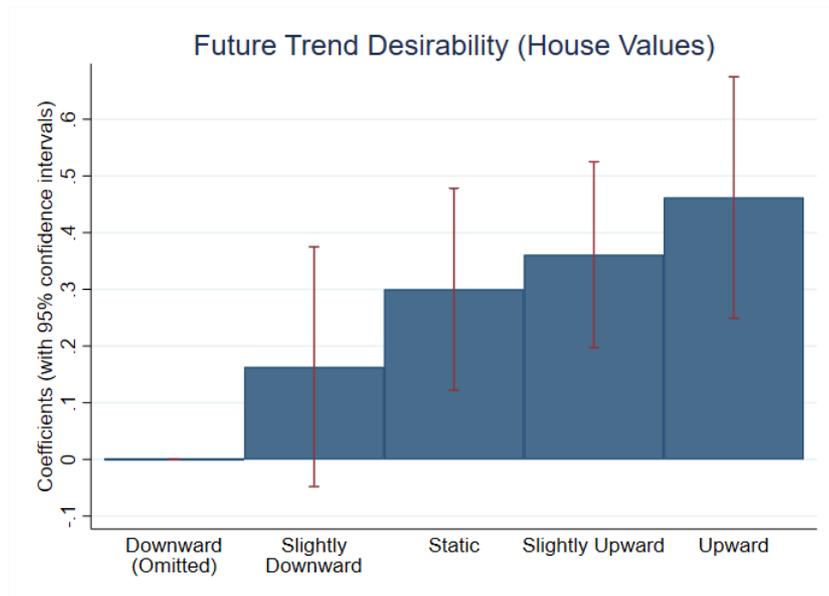
Did HOLC itself cause differential trends?

Unlikely.

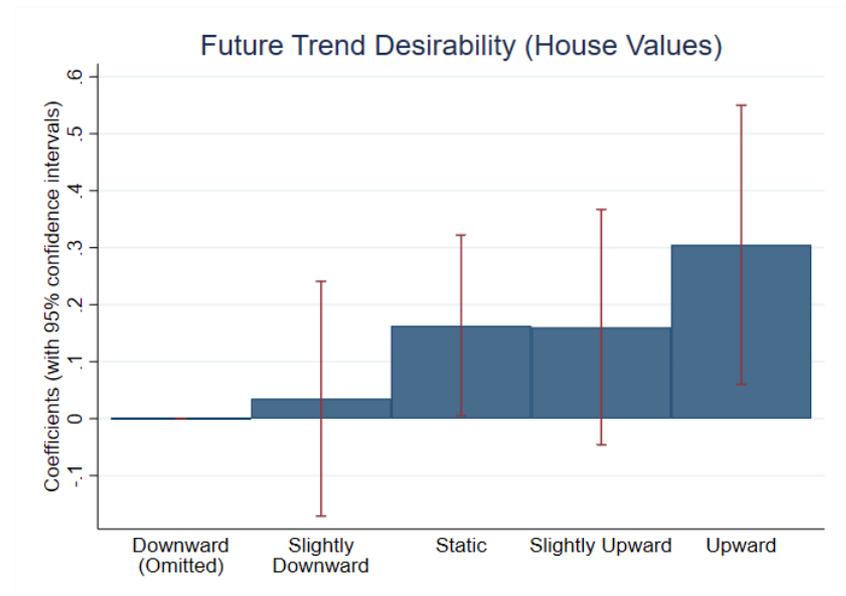
- Maps drawn after all HOLC lending activity had ceased.
- FHA underwriting
 - More focused on new construction
 - Still at overall low level in the late 1930s
 - Conservative upper-bound: 2% of sample had FHA insured mortgages

Future Trend Desirability (Housing Values)

A. No controls for Zone

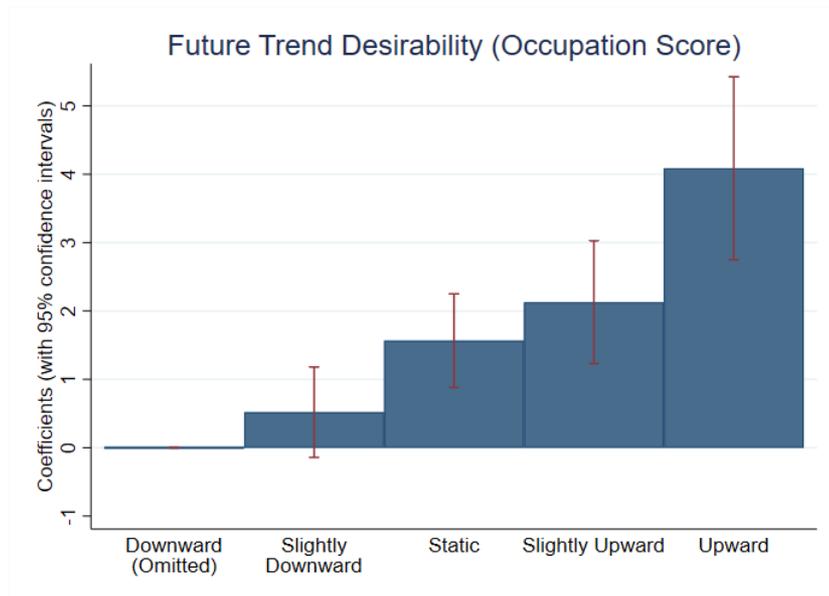


B. Controls for Zone

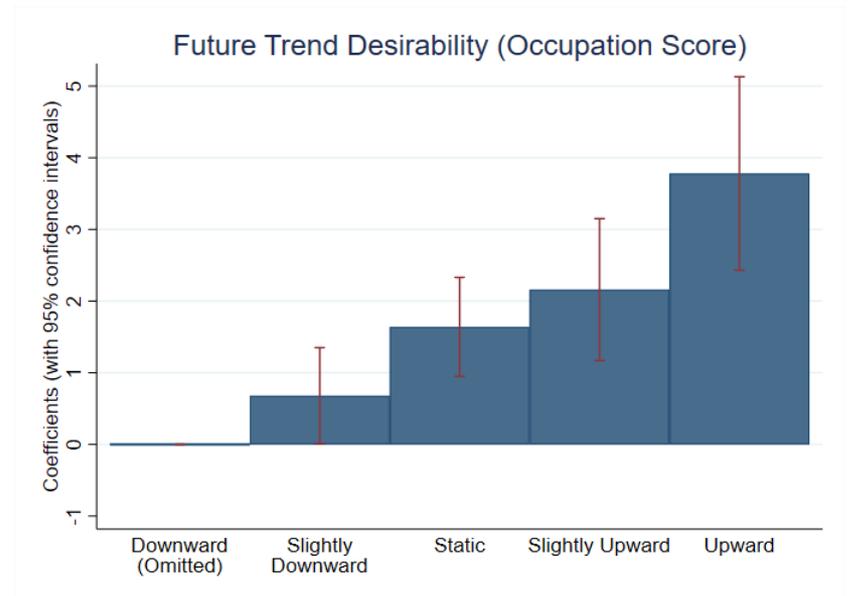


Future Trend Desirability (Occupation Score)

A. No controls for Zone

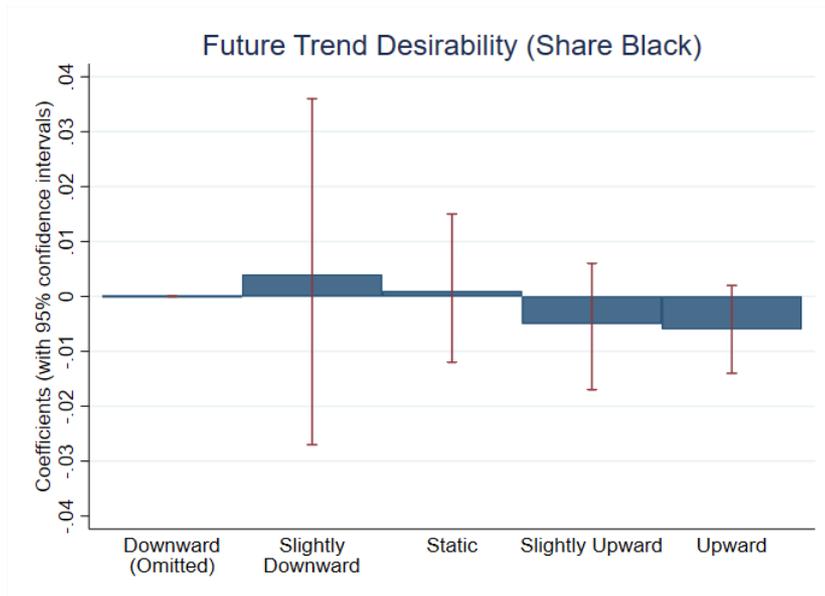


B. Controls for Zone

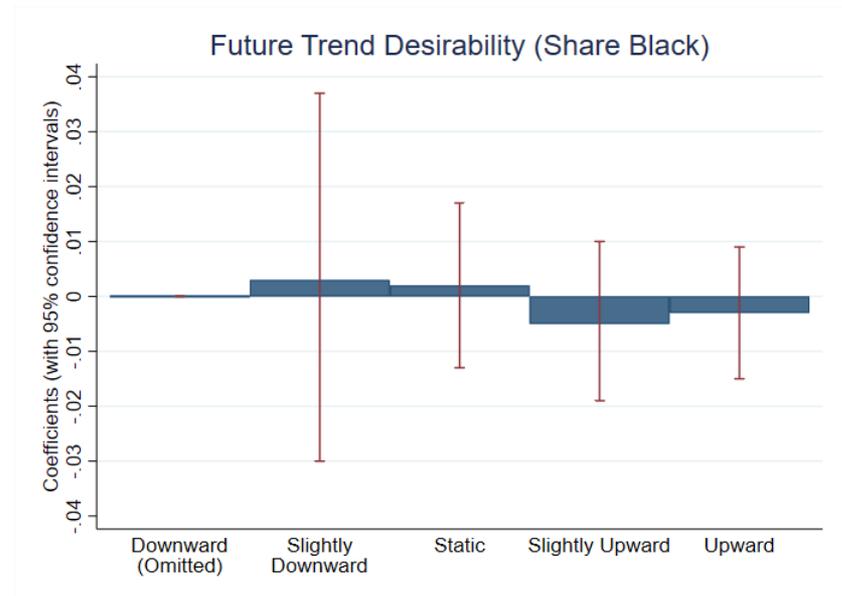


Future Trend Desirability (Share Black)

A. No controls for Zone

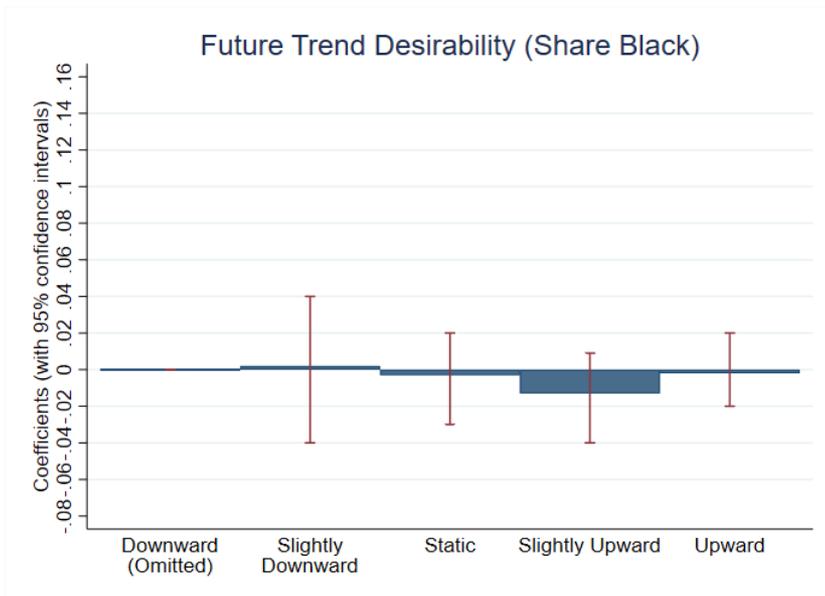


B. Controls for Zone

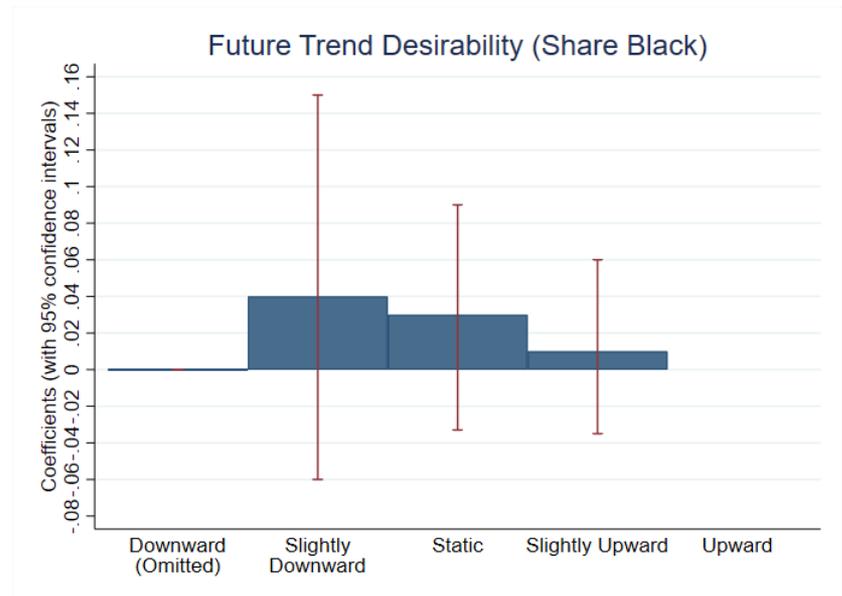


Share Black by Zone

A. Zones C and D Only



B. Zone D Only



Identification issues

- All of the above was aggregate level data.
 - Might worry about selection on unobservables.
- Use a set of matched addresses between 1930 and 1940 (Akbar et al., 2018).
 - To create this dataset, we develop an algorithm following the individual matching literature.
 - Allows us to control for observable, preexisting differences between red-lined and yellow-lined addresses.
- A regression discontinuity design is used to control for unobservables that vary continuously across HOLC boundaries.

Accuracy of Risk Evaluations

$$y_{ij1940} = \alpha + \beta redlined_{ij} + \delta y_{ij1930} + \rho dist_{ij} + \varphi dist_{ij} * lgs_{ij} + \gamma_j + \epsilon_{ij}$$

- y_{ic1940} is an outcome for **address** i on boundary j in 1940
 - y_{ic1930} is the lagged value of the outcome variable
 - $dist_{ij}$ is a measure of the distance of address i to boundary j
 - $redlined_{ij}$ equals 1 if address i is on the redlined side of CD boundary j
 - γ_j are boundary fixed effects
 - ϵ is the error term
-
- Outcomes of interest: Housing values and occupation scores

Accuracy of Risk Evaluations (Percent Change Housing Value): Full Zones

	(1)	(2)	(3)	(4)
Redlined Side	-0.134*** (0.025)	-0.127*** (0.018)	-0.132*** (0.022)	-0.098*** (0.018)
Lagged Value				0.289 (0.016)
Boundary Restriction	None	None	None	None
Matched Sample	No	No	Yes	Yes
Boundary FE	No	Yes	Yes	Yes
1930 difference (in logs)	0.128	0.128	0.140	0.140
P-value	[0.000]	[0.000]	[0.000]	[0.000]
Observations	109764	109764	55909	55909
R2	0.02	0.16	0.19	0.25

Accuracy of Risk Evaluations (Percent Change Housing Value) R-D 500 M

	(1)	(2)	(3)	(4)
Redlined Side	-0.123*** (0.0249)	-0.106*** (0.0188)	-0.115*** (0.0229)	-0.0844*** (0.0196)
Lagged Value				0.289*** (0.0164)
Boundary Restriction	500m	500m	500m	500m
Matched Sample	No	No	Yes	Yes
Boundary FE	No	Yes	Yes	Yes
1930 difference (in logs)	0.114	0.114	0.125	0.125
P-value	[0.000]	[0.000]	[0.000]	[0.000]
Observations	92685	92685	47197	47197
R2	0.016	0.167	0.209	0.265

Accuracy of Risk Evaluations (Percent Change Housing Value) R-D 250 M

	(1)	(2)	(3)	(4)
Redlined Side	-0.089*** (0.0249)	-0.061*** (0.020)	-0.059** (0.025)	-0.037* (0.0196)
Lagged Value				0.277*** (0.018)
Boundary Restriction	250m	250m	250m	250m
Matched Sample	No	No	Yes	Yes
Boundary FE	No	Yes	Yes	Yes
1930 difference (in logs)	0.128	0.128	0.140	0.140
P-value	[0.000]	[0.000]	[0.000]	[0.000]
Observations	59868	59868	30192	30192
R2	0.013	0.169	0.212	0.262

Accuracy of Risk Evaluations (Occupation Score trends) Full Zones

	(1)	(2)	(3)	(4)
Redlined Side	-1.58***	-1.65***	-1.60***	-1.02***
	(0.23)	(0.22)	(0.25)	(0.17)
Lagged Value				0.32***
				(0.01)
Boundary Restriction	None	None	None	None
Matched Sample	No	No	Yes	Yes
Boundary FE	No	Yes	Yes	Yes
1930 Difference	2.13	2.13	2.02	2.02
P-value	[0.000]	[0.000]	[0.000]	[0.000]
Observations	170293	170293	65363	65363
R2	0.02	0.05	0.06	0.16

Accuracy of Risk Evaluations (Occupation Score trends) R-D 500 M

	(1)	(2)	(3)	(4)
Redlined Side	-1.18***	-1.25***	-1.29***	-0.82***
	(0.21)	(0.19)	(0.24)	(0.17)
Lagged Value				0.33***
				(0.01)
Boundary Restriction	500m	500m	500m	500m
Matched Sample	No	No	Yes	Yes
Boundary FE	No	Yes	Yes	Yes
1930 Difference	2.07	2.07	1.99	1.99
P-value	[0.000]	[0.000]	[0.000]	[0.000]
Observations	143122	143122	54767	54767
R2	0.01	0.05	0.06	0.16

Accuracy of Risk Evaluations (Occupation Score trends) R-D 250 M

	(1)	(2)	(3)	(4)
Redlined Side	-0.81***	-0.78***	-0.87***	-0.58**
	(0.22)	(0.19)	(0.28)	(0.23)
Lagged Value				0.32***
				(0.01)
Boundary Restriction	250m	250m	250m	250m
Matched Sample	No	No	Yes	Yes
Boundary FE	No	Yes	Yes	Yes
1930 Difference	1.86	1.86	1.86	1.86
P-value	[0.000]	[0.000]	[0.000]	[0.000]
Observations	92919	92919	35329	35329
R2	0.01	0.05	0.07	0.16

Conclusion

- HOLC & subsequently FHA adopted and standardized “best practices” in risk assessment.
- While clearly important, race doesn’t appear to have been the determining factor in grade assignment.
- Neighborhoods that received different security grades were distinct and on different trajectories in the 1930s as a result of activity in the private market.
- The government’s actions during this period can be described as malignant neglect in terms of institutionalizing the behavior of the private market.
- These neighborhoods would look different today even if the maps had never been drawn.

Frederick Babcock's Assessment

“Mortgage lending policy is a broad field....The manner and extent to which lending policies have been influenced by the Federal Housing Administration are problematic because this governmental agency is itself a creature of influences and attitudes in this field of investment. In other words, it would be difficult to try and determine which aspects of the agency are caused by and which are the effects of changed conditions.”

Babcock, Frederick M. "Influence of the Federal Housing Administration on Mortgage Lending Policy." *The Journal of Land & Public Utility Economics* 15.1 (1939): 1-5.