Pockets of Poverty: The Long-Term Effects of Redlining

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Introduction

- Long history of discrimination in finance...
  - Gender
  - Race/ethnicity
  - Geographic areas

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  - Gender
  - Race/ethnicity
  - Geographic areas
- Particularly notorious in housing markets
- Seen by many as a fundamental cause of urban decay and disparate economic outcomes

Our question

Does discriminatory credit rationing have persistent effects over time?

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- Our focus: **redlining**

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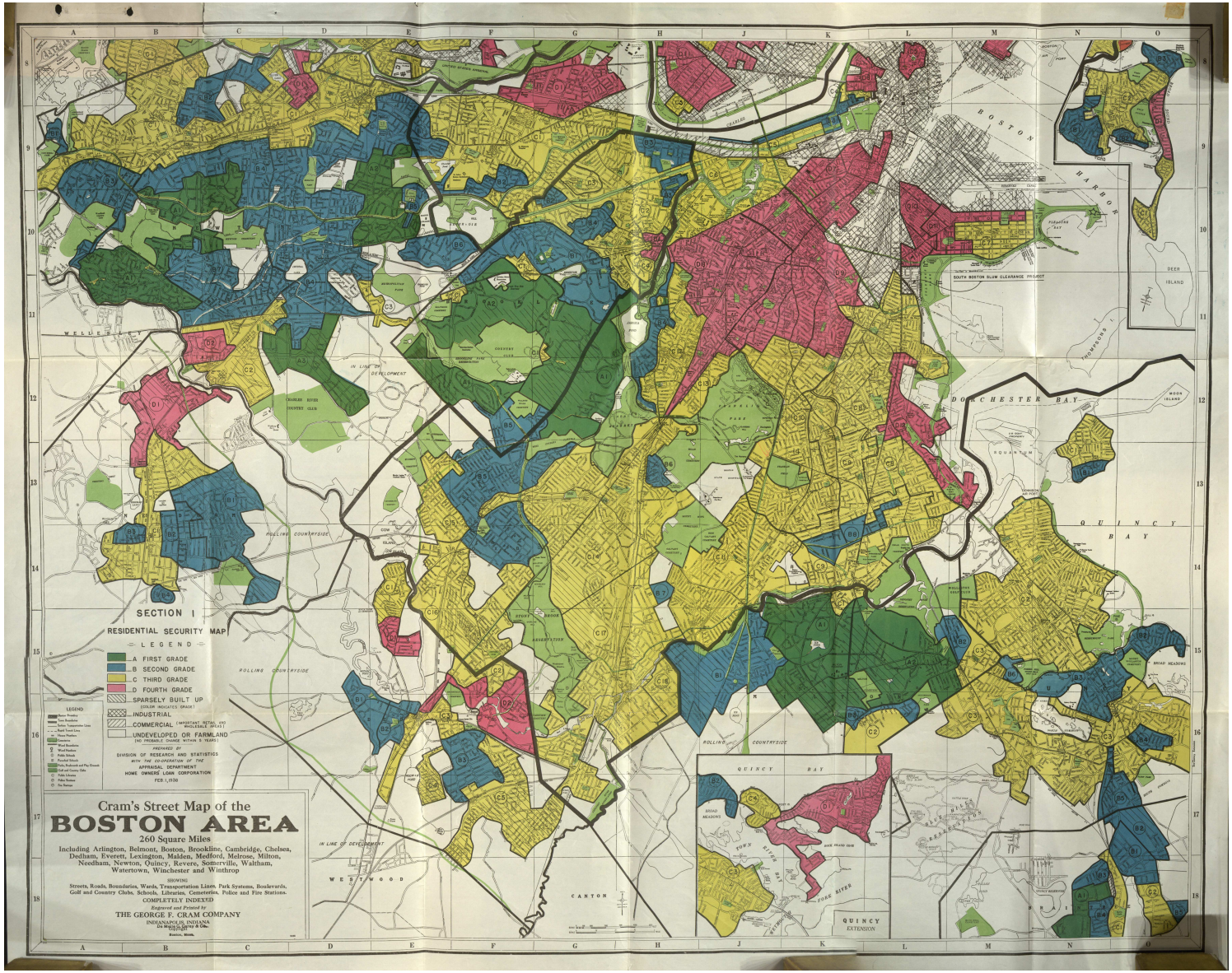
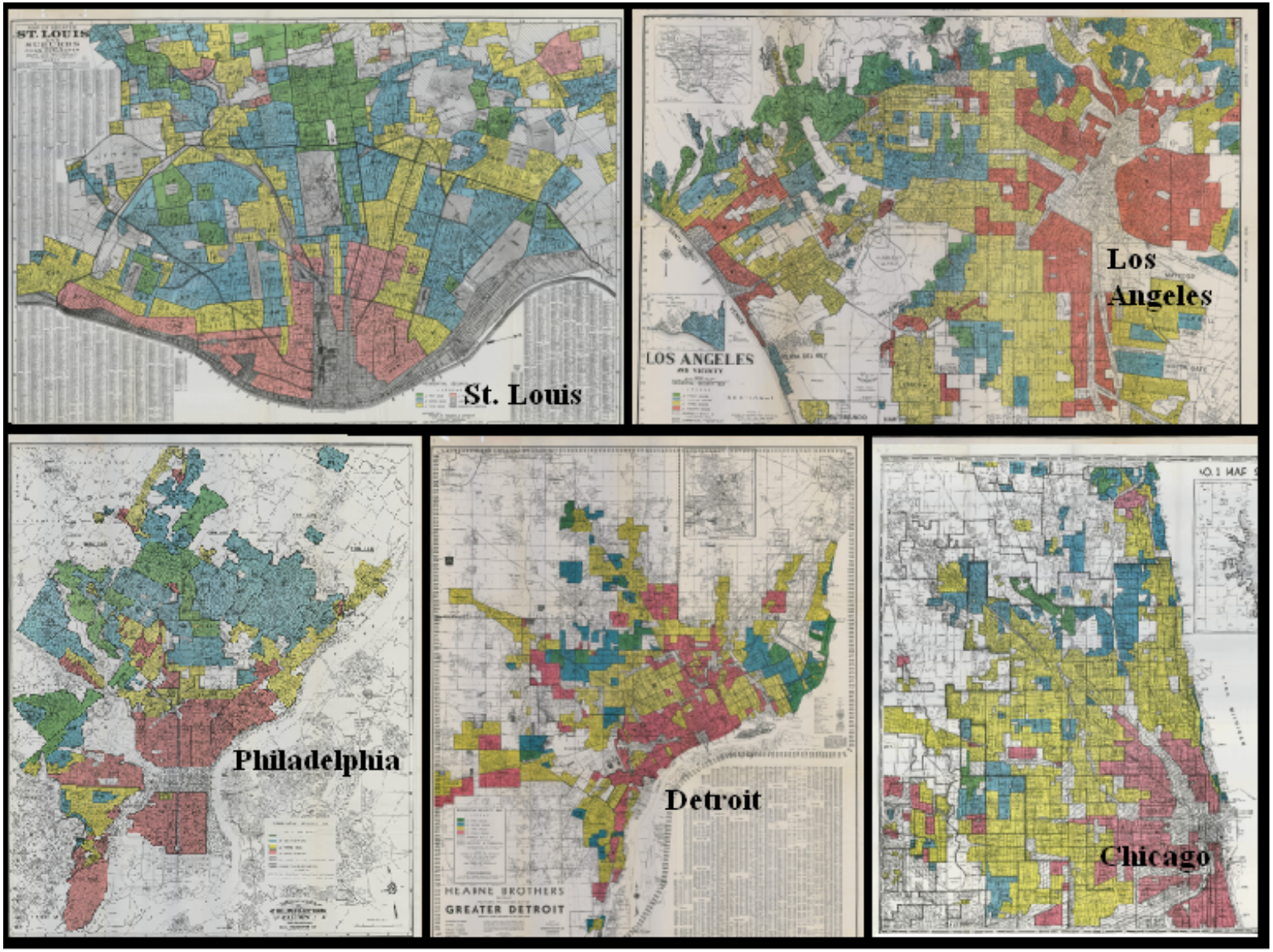
Does discriminatory credit rationing have persistent effects over time?

- Our focus: **redlining**
- Theoretically unclear if credit rationing should have a lasting impact
  - May not affect aggregate credit supply *(Becker (1957), Stiglitz & Weiss (1981))*
  - But may lead to uncertainty regarding prices *(Lang & Nakamura (1993))*

HOLC security map, Boston



HOLC security maps



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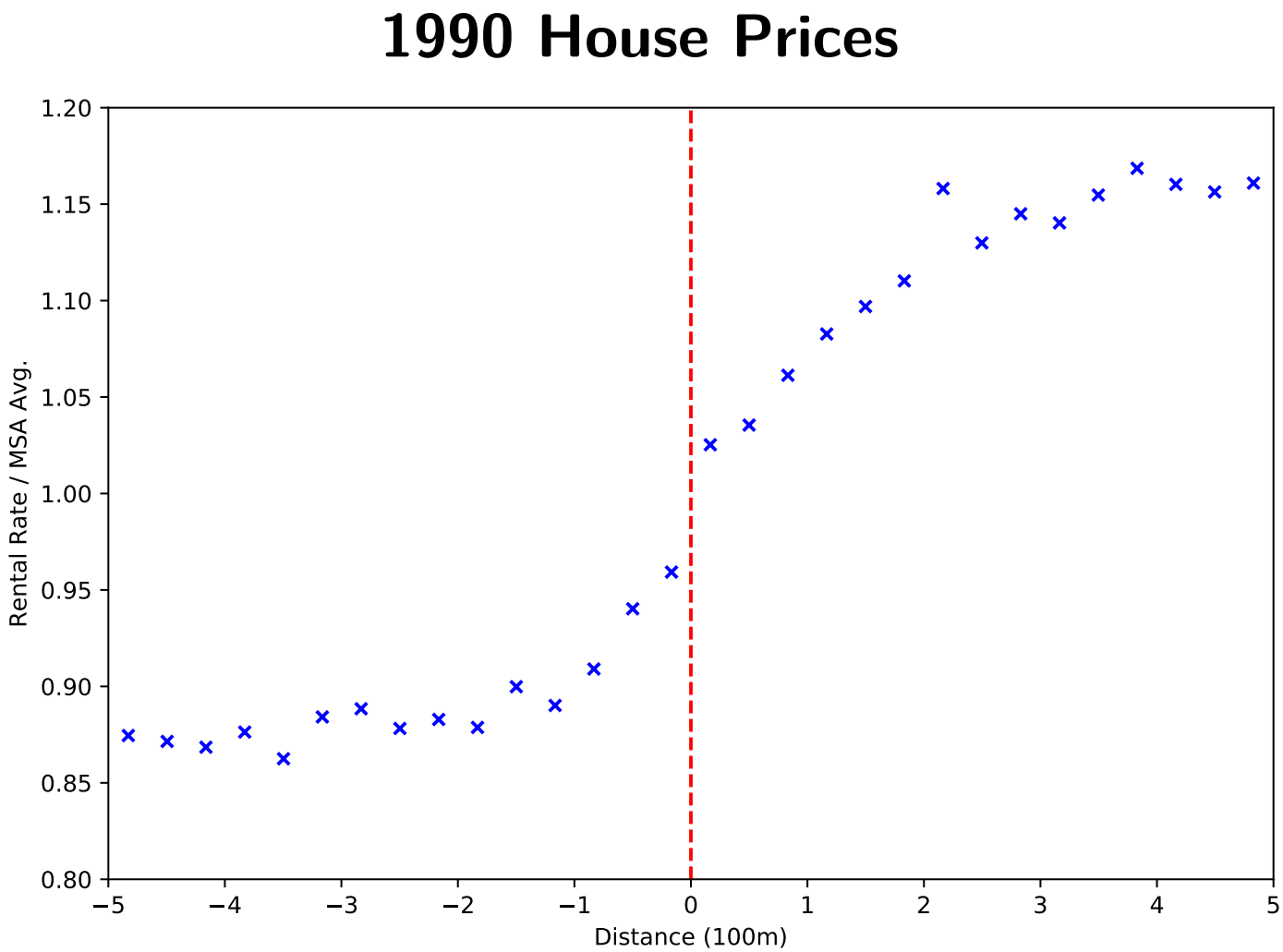
- **Identification strategy**: **Geographic RDD**
  - Exploit the boundary between adjacent areas with different ratings
- **Identification assumption:** Initial unobservable characteristics vary smoothly at the boundaries

Main finding in one picture!



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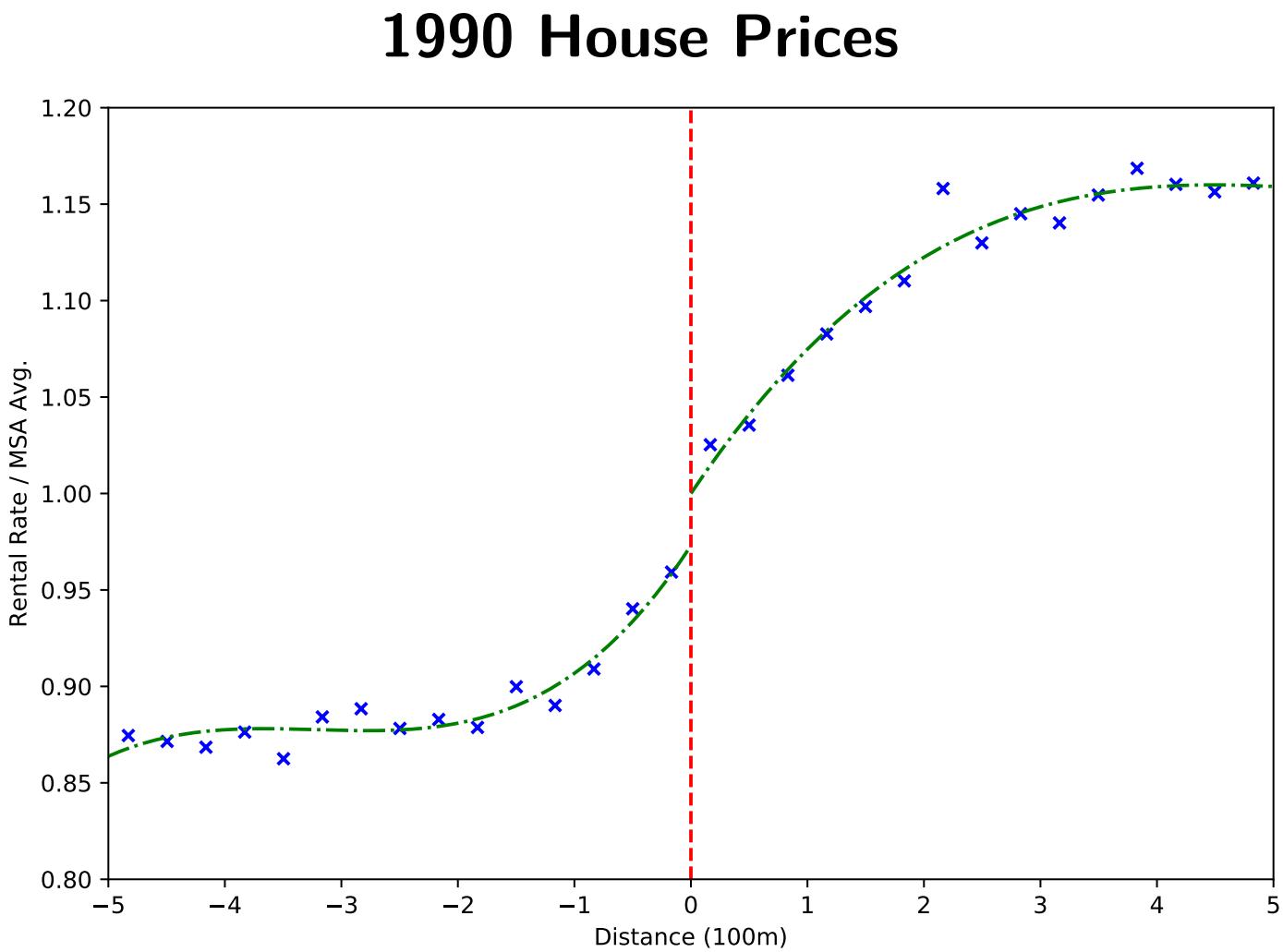
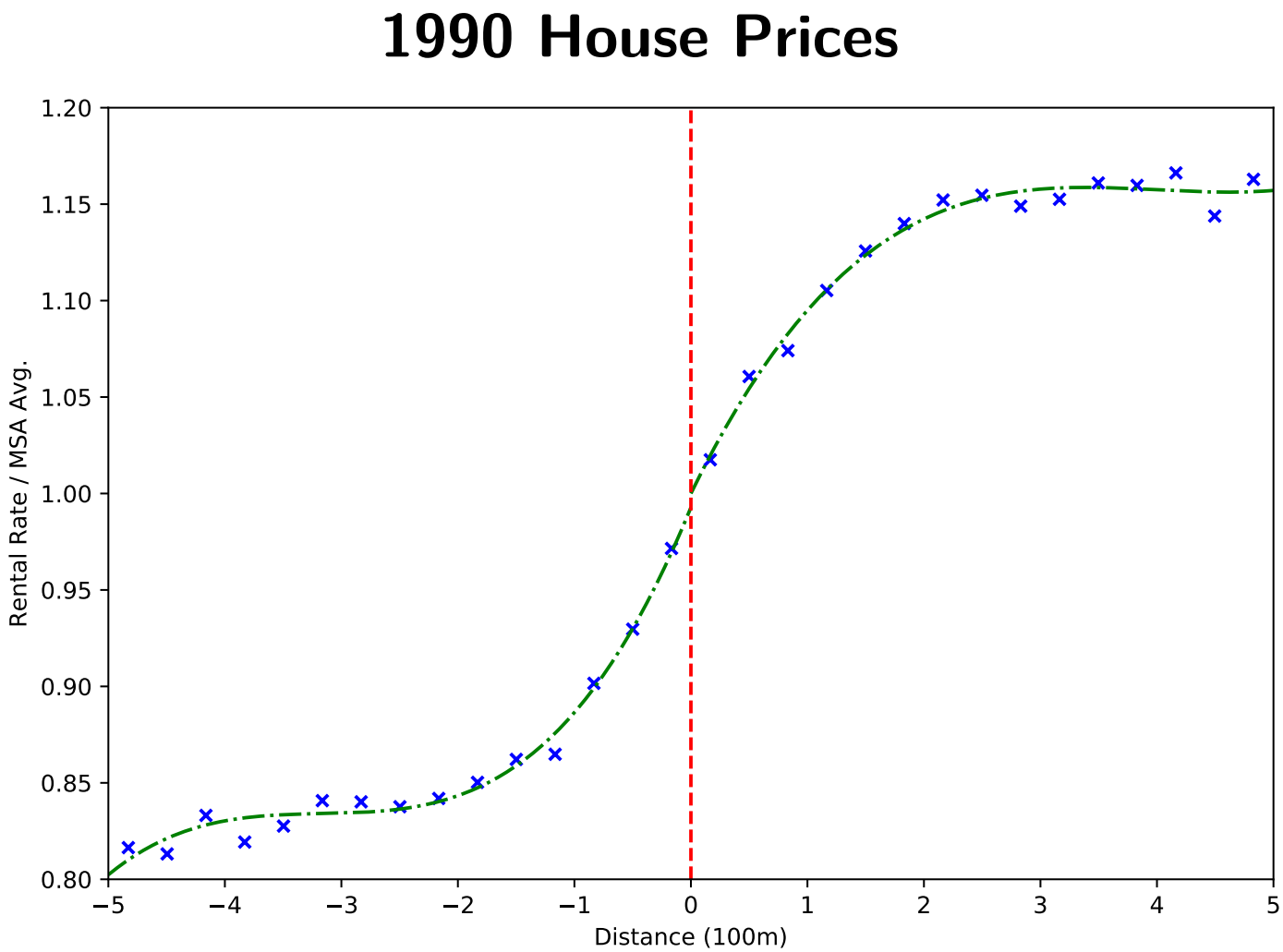


...well, maybe two



Preview of results

- Relative to adjacent areas, redlined neighborhoods have 2.7% lower 1990 house prices
- Effect is not being driven by the worst credit grade (red)
- Housing characteristics from 1940 do not exhibit a discontinuity

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- Relative to adjacent areas, redlined neighborhoods have 2.7% lower 1990 house prices
- Effect is not being driven by the worst credit grade (red)
- Housing characteristics from 1940 do not exhibit a discontinuity
- Evidence consistent with a financing channel
  - $\rightarrow$ Effect increases with distance to the nearest (historical) bank branch
  - $\rightarrow$ More vacant homes and renters; no evidence of differences in racial makeup

Outline

1. **Institutional background**
2. Data and empirical strategy
3. Results
4. Conclusion

Role of the HOLC

- Home Owners' Loan Corporation (HOLC) formed in 1933
  - Government "bad bank"
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  - Government "bad bank"
  - Underwrote loans for 10% of owner-occupied homes during Depression
- Introduced a number of innovations to mortgage markets:
  - Fully amortized loans
  - Longer terms (15–20 years)
  - **Uniform appraisal standards**: HOLC Security Maps
    - Completed between 1936 and 1940

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A (Green)

- *"Homogeneous" population (i.e., white, upper class, native-born)*

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- *Definitely declining; "trend in type of population to a lower grade"*

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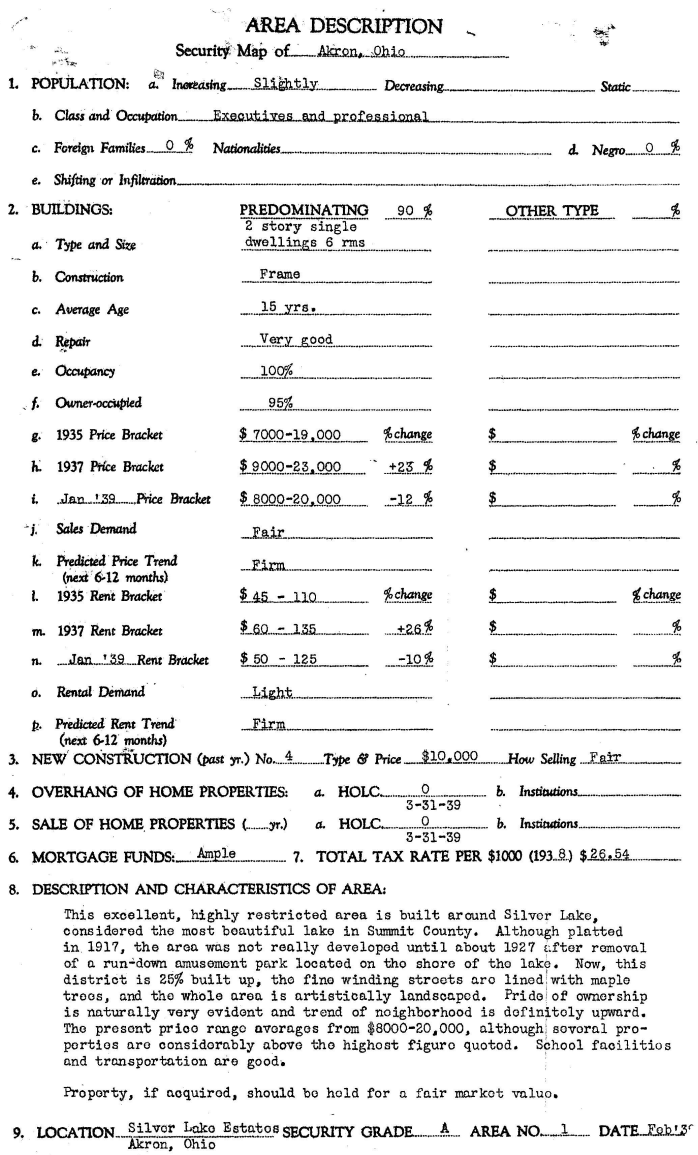
C (Yellow)

- *Definitely declining; "trend in type of population to a lower grade"*

D (Red)

- *Hazardous; "a good mortgage man would probably not consider any loans at all"*

HOLC area descriptions: Example #1



AREA DESCRIPTION

Security Map of Akron, Ohio

1. POPULATION: a. Increasing Slightly Decreasing Static
   b. Class and Occupation Executives and professional
   c. Foreign Families 0 % Nationalities d. Negro 0 %
   e. Shifting or Infiltration

2. BUILDINGS:	PREDOMINATING	90 %	OTHER TYPE	%
a. Type and Size	2 story single dwellings 6 rms			
b. Construction	Frame			
c. Average Age	15 yrs.			
d. Repair	Very good			
e. Occupancy	100%			
f. Owner-occupied	95%			
g. 1935 Price Bracket	$ 7000-19,000	% change	$	% change
h. 1937 Price Bracket	$ 9000-23,000	+23 %	$	%
i. Jan '39 Price Bracket	$ 8000-20,000	-12 %	$	%
j. Sales Demand	Fair			
k. Predicted Price Trend (next 6-12 months)	Firm			
l. 1935 Rent Bracket	$ 45 - 110	% change	$	% change
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3. NEW CONSTRUCTION (past yr.) No. 4 Type & Price $10,000 How Selling Fair
4. OVERHANG OF HOME PROPERTIES: a. HOLC 0 (3-31-39) b. Institutions
5. SALE OF HOME PROPERTIES (yr.) a. HOLC 0 (3-31-39) b. Institutions
6. MORTGAGE FUNDS: Ample 7. TOTAL TAX RATE PER $1000 (193 8.) $26.54
8. DESCRIPTION AND CHARACTERISTICS OF AREA:

This excellent, highly restricted area is built around Silver Lake, considered the most beautiful lake in Summit County. Although platted in 1917, the area was not really developed until about 1927 after removal of a run-down amusement park located on the shore of the lake. Now, this district is 25% built up, the fine winding streets are lined with maple trees, and the whole area is artistically landscaped. Pride of ownership is naturally very evident and trend of neighborhood is definitely upward. The present price range averages from $8000-20,000, although several properties are considerably above the highest figure quoted. School facilities and transportation are good.

Property, if acquired, should be held for a fair market value.

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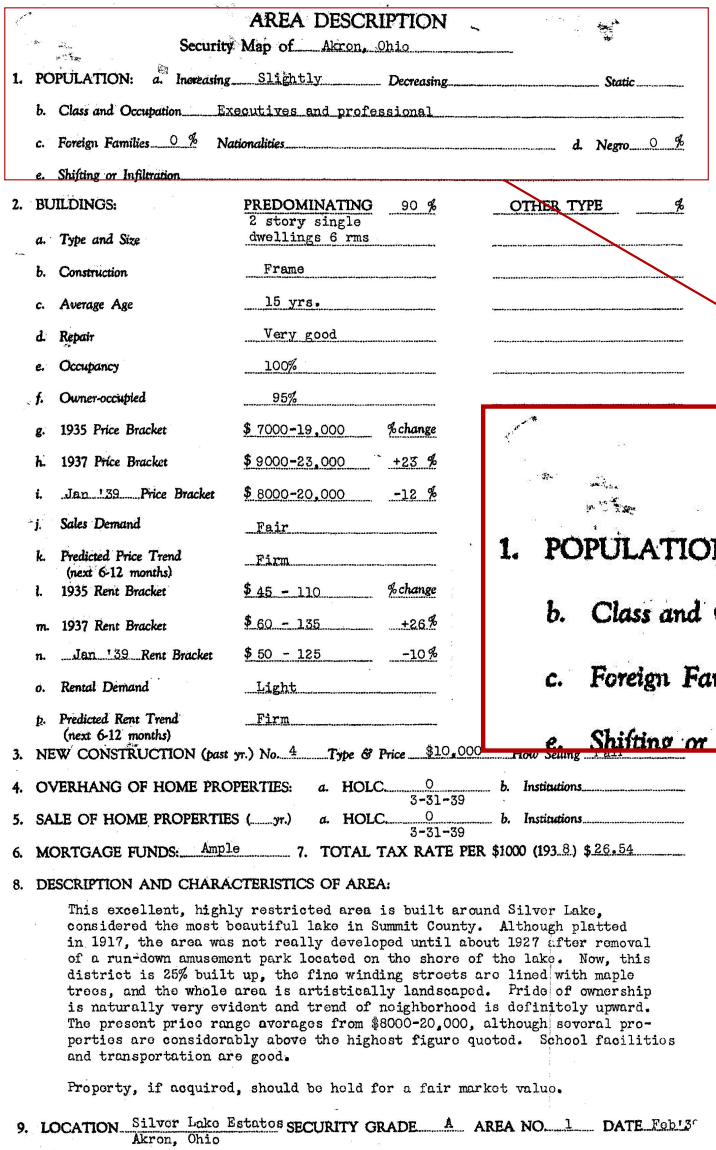

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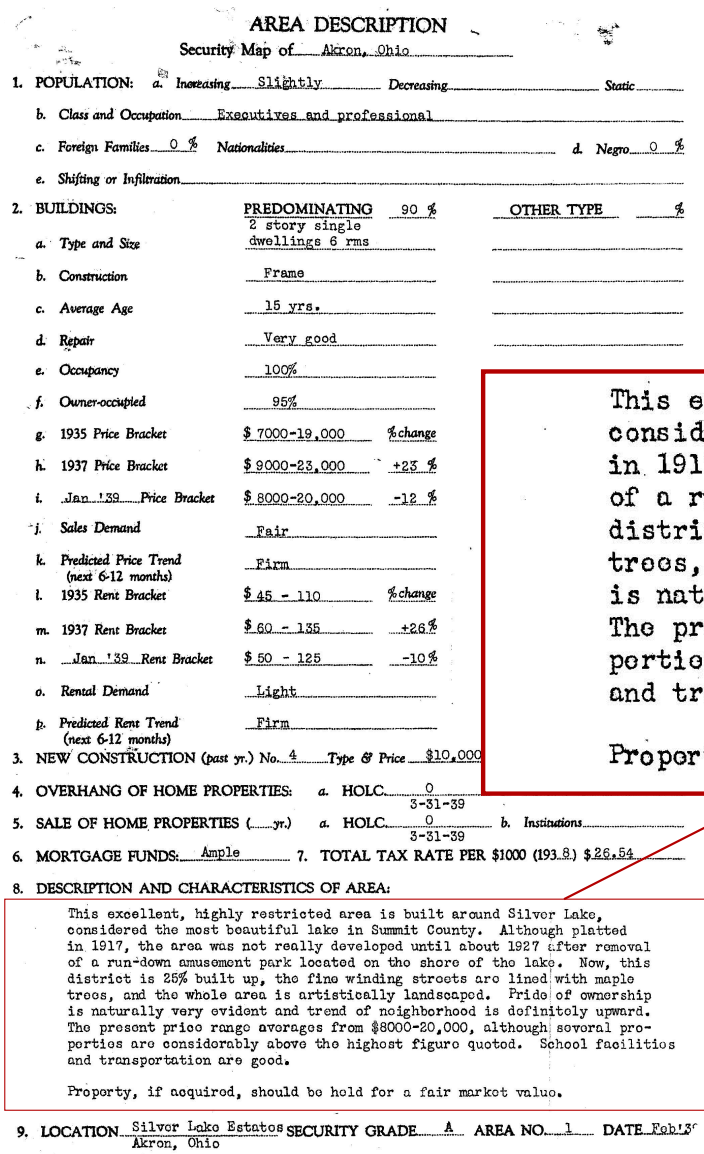

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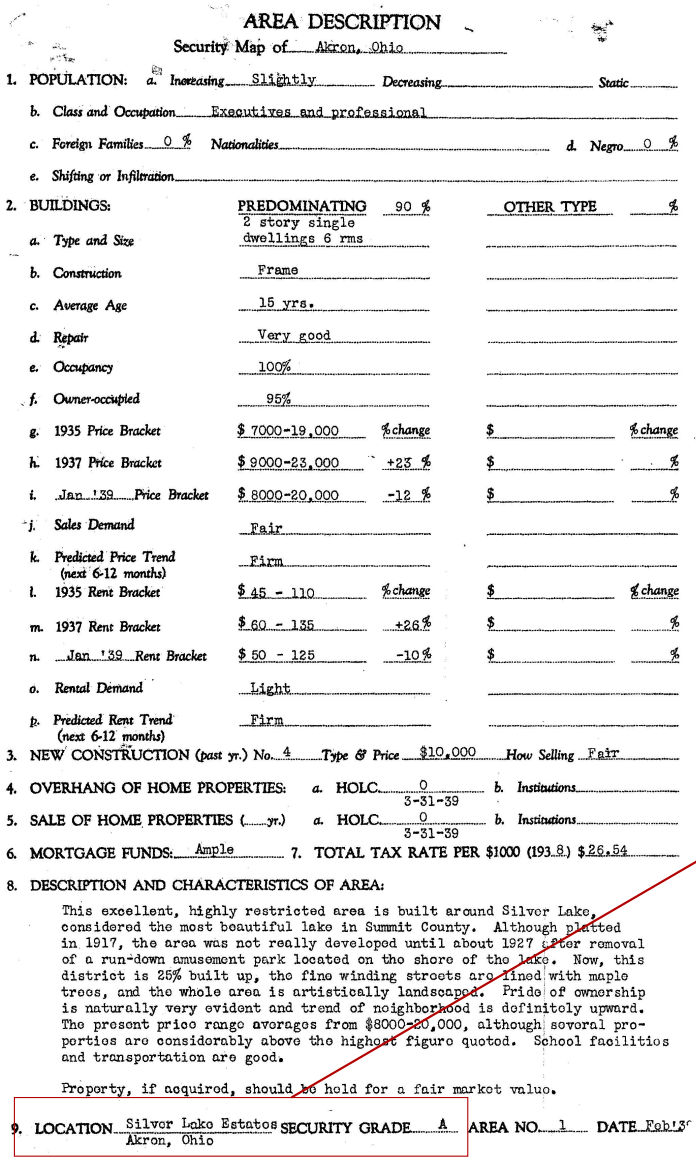

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   Akron, Ohio

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HOLC area descriptions: Example #2

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2. BUILDINGS:	PREDOMINATING 95 %	OTHER TYPE %
a. Type and Size	2 story single family 6 rooms	
b. Construction	Frame	
c. Average Age	30	
d. Repair	Fair only	
e. Occupancy	96%	
f. Owner-occupied	50%	
g. 1935 Price Bracket	$ 1500-2500	% change
h. 1937 Price Bracket	$ 1600-2800	+10 %
i. Jan. '39 Price Bracket	$ 1500-2500	- 9 %
j. Sales Demand	Slow	
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o. Rental Demand	Good	
p. Predicted Rent Trend (next 6-12 months)	Static to downward	

3. NEW CONSTRUCTION (past yr.) No. 0 Type & Price ____ How Selling ____
4. OVERHANG OF HOME PROPERTIES: a. HOLC 12 (3-31-39) b. Institutions ____
5. SALE OF HOME PROPERTIES (__ yr.) Very little, a. HOLC 1 (3-31-39) b. Institutions ____
6. MORTGAGE FUNDS: if any 7. TOTAL TAX RATE PER $1000 (193_8) $ 28.90

8. DESCRIPTION AND CHARACTERISTICS OF AREA:

Laid out about 1905; known as main Jewish shopping district; paved streets; good transportation; convenient to schools, churches, and stores; located just south of Perkins Park; level terrain. Most of the area lying south of Bartges Street has soft foundation due to nearby Summit Lake (southern boundary).

Homes located on Norka, Raymond and the south end Snyder, Schock, Metzger and Bowory Street are out of "plumb" owing to the shifting foundation. Heavy traffic along Wooster Avenue, Thornton and Bowory Streets. District affected by odors, smoke, and dirt from nearby Goodrich Rubber Company plant. Acquired property if not sold immediately will suffer from vandalism.

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9. LOCATION Akron, Ohio SECURITY GRADE D AREA NO. 4 DATE Feb'39

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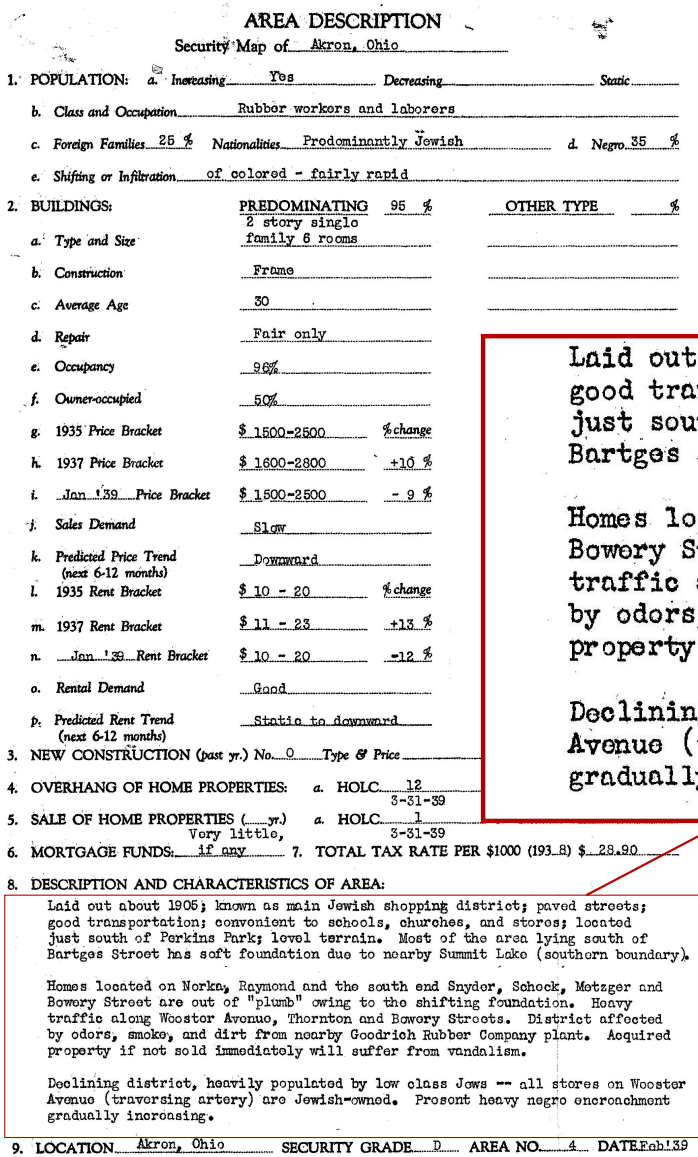

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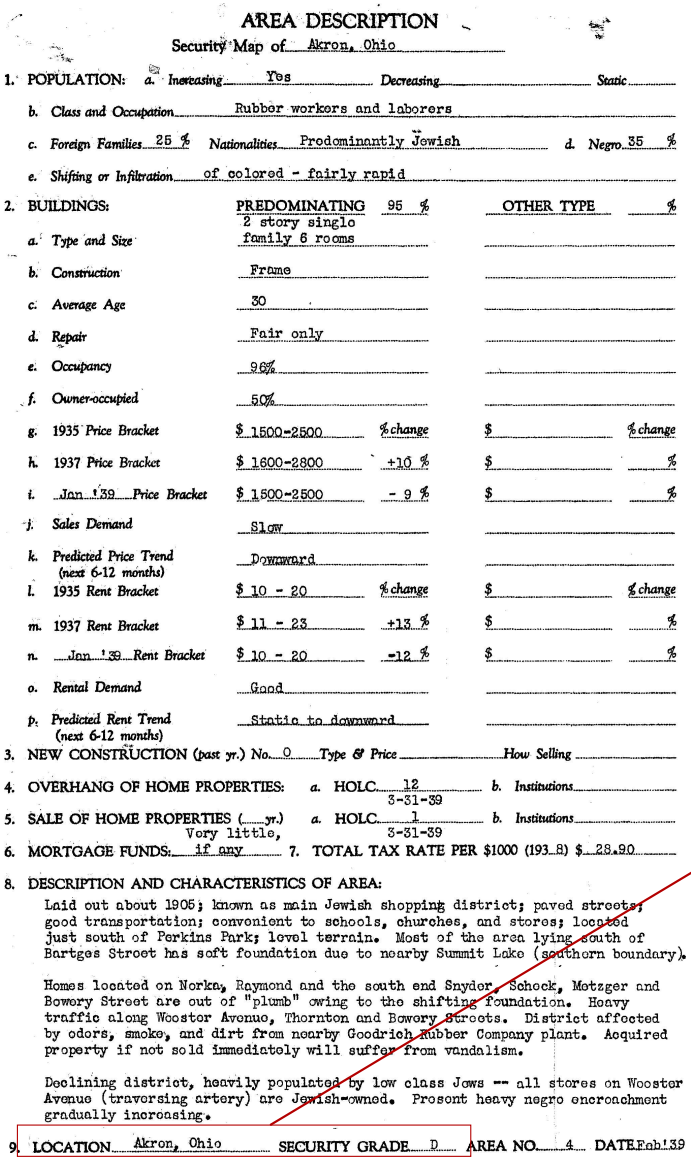

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LOCATION Akron, Ohio SECURITY GRADE D

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- Historians point out 2 potential reasons:
  1. Use by Federal Housing Administration (FHA)
  2. Use by private lenders and real estate brokers

HOLC maps and the FHA

Evidence suggests HOLC maps influenced neighborhood appraisals:

- FHA used the same classification system and "emulated HOLC guidelines" *[Schill and Wachter, 1995]*
- "The FHA cooperated with the HOLC and followed HOLC appraisal practices" *[Jackson, 1980]*

HOLC maps and private lenders

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  - LA: 26 realtors
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  - LA: 26 realtors
  - Brooklyn: reps from 9 financial institutions

- Anecdotal evidence suggests maps contained valuable info for private lenders:

  "Incidentally...I hope to be able to 'borrow' a map from your portfolio when you are not looking during your journey to Chicago."

The end of redlining (?)

Housing discrimination banned through a series of gov actions:

- Executive Order 11063 (1962)
- Fair Housing Act (1968)
- Equal Credit Opportunity Act (1974)

Outline

1. Institutional background
2. **Data and empirical strategy**
3. Results
4. Conclusion

Data sources

HOLC maps

- 58 maps covering 48 MSAs
- Georeferenced and HOLC neighborhood grades extracted as polygons

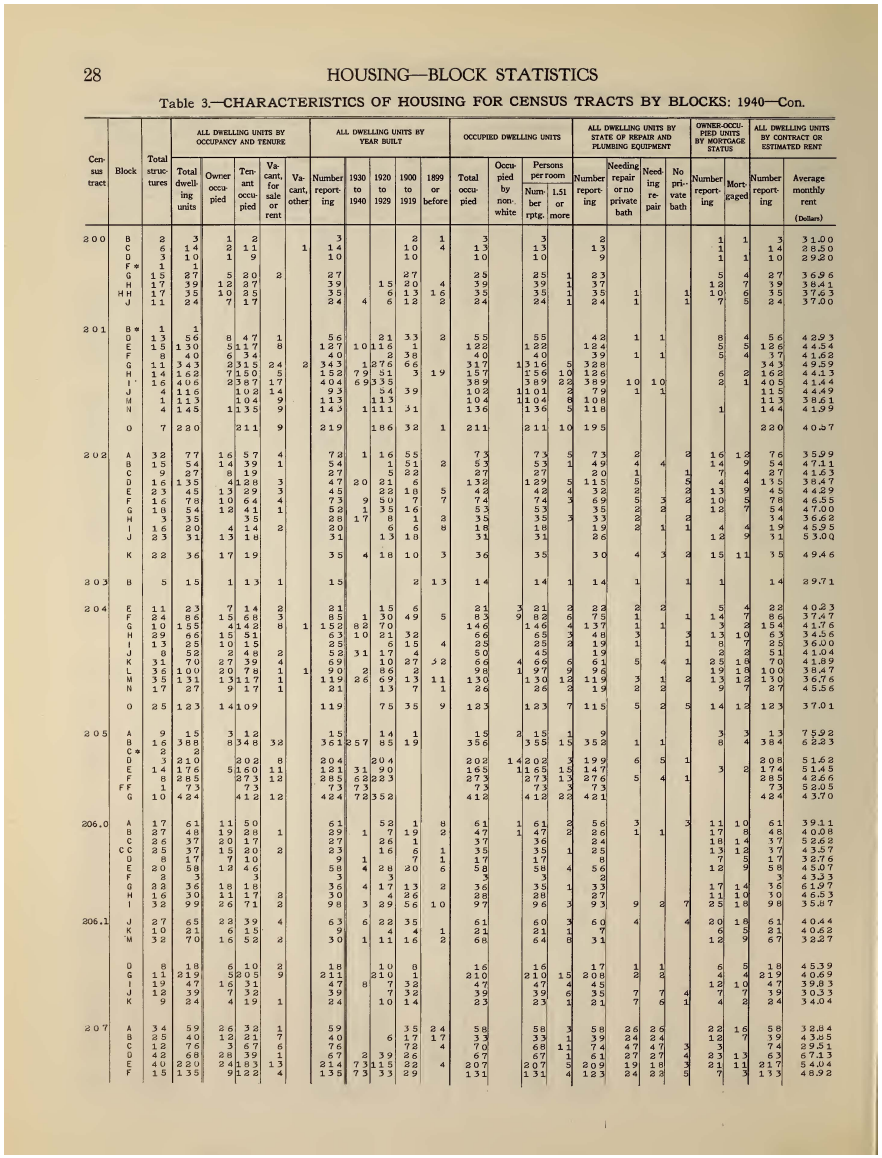
21st Census of the United States (1990)

- Key statistics collected at the census-block level
- Digitized by the NHGIS (MPC)
- *Last census with block-level home prices*

16th Census of the United States (1940)

- *Block Statistics Supplement to the First Series Housing Bulletin*
- 2,325 pages
- 190,000 census-block observations

Historical census data

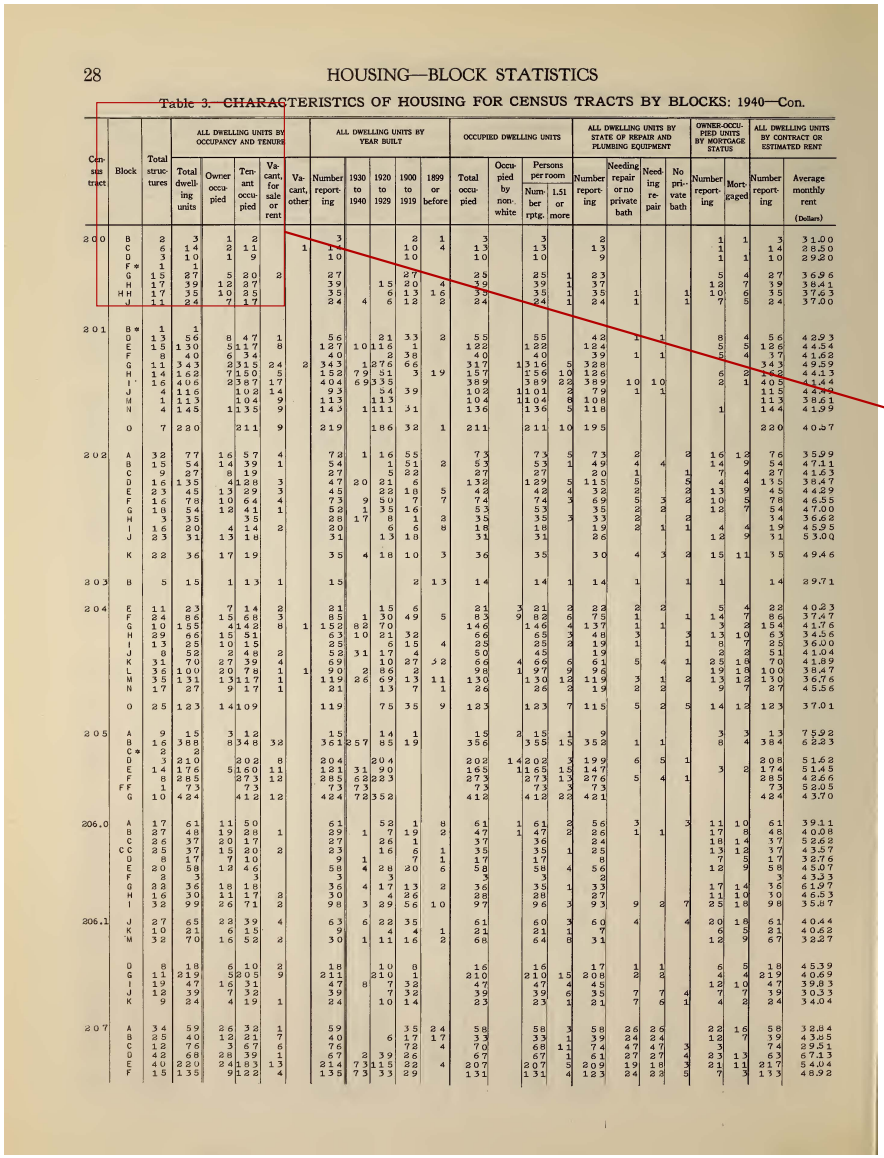


28 HOUSING—BLOCK STATISTICS

Table 3.—CHARACTERISTICS OF HOUSING FOR CENSUS TRACTS BY BLOCKS: 1940—Con.

Census tract	Block	Total structures	ALL DWELLING UNITS BY OCCUPANCY AND TENURE: Total dwelling units	Owner occupied	Tenant occupied	Vacant, for sale or rent	Vacant, other	ALL DWELLING UNITS BY YEAR BUILT: Number reporting	1930 to 1940	1920 to 1929	1900 to 1919	1899 or before	OCCUPIED DWELLING UNITS: Total occupied	Occupied by nonwhite	Persons per room: Number rptg.	Persons per room: 1.51 or more	ALL DWELLING UNITS BY STATE OF REPAIR AND PLUMBING EQUIPMENT: Number reporting	Needing repair or no private bath	Needing repair	No private bath	OWNER-OCCUPIED UNITS BY MORTGAGE STATUS: Number reporting	Mortgaged	ALL DWELLING UNITS BY CONTRACT OR ESTIMATED RENT: Number reporting	Average monthly rent (Dollars)
200	B	2	3	1	2			3			2	1	3		3		2				1	1	3	31.00
	C	6	14	2	11		1	14			10	4	13		13		13				1		14	26.50
	D	3	10	1	9			10			10		10		10		9				1	1	10	29.20
	F*	1	1																					
	G	15	27	5	20	2		27			27		25		25	1	23				5	4	27	36.96
	H	17	39	12	27			39		15	20	4	39		39	1	37				12	7	39	38.41
	HH	17	35	10	25			35		6	13	16	35		35	1	35	1		1	10	6	35	37.63
	J	11	24	7	17			24	4	6	12	2	24		24	1	24	1		1	7	5	24	37.00
201	B*	1	1																					
	D	13	56	8	47	1		56		21	33	2	55		55		42	1	1		8	4	56	42.93
	E	15	130	5	117	8		127	10	116	1		122		122		124				5	5	126	44.54
	F	8	40	6	34			40		2	38		40		40		39	1	1		5	4	37	41.62
	G	11	343	2	315	24	2	343		276	66		317		316	5	328						343	49.59
	H	14	162	7	150	5		152	79	51	3	19	157		156	10	126				6	2	163	44.13
	I	16	406	2	387	17		404	69	335			389		389	22	389	10	10		2	1	405	41.44
	J	4	116		102	14		93		54	39		102		79	2	79	1	1				115	44.49
	M	1	113		104	9		113		113			104		104	8	108						113	38.61
	N	4	145	1	135	9		143	1	111	31		136		136	5	118				1		144	41.99
	O	7	230		211	9		219		186	32	1	211		211	10	195						220	40.57
202	A	32	77	16	57	4		72	1	16	55		73		73	5	73	2		2	16	13	76	35.99
	B	15	54	14	39	1		54		1	51	2	53		53	1	49	4	4		14	9	54	47.11
	C	9	27	8	19			27		5	22		27		27		20	1		1	7	4	27	41.63
	D	16	135	4	128	3		47	20	21	6		132		129	5	115	5		5	4	4	135	38.47
	E	23	45	13	29	3		45		22	18	5	42		42	4	32	2		2	13	9	45	44.29
	F	16	78	10	64	4		73	9	50	7	7	74		74	3	69	5	3	2	10	5	78	46.55
	G	18	54	12	41	1		52	1	35	16		53		53		35	2	2		12	7	54	47.00
	H	3	35		35			28	17	8	1	2	35		35	3	33	2		2			34	36.82
	I	16	20	4	14	2		20		6	6	8	18		18		19	2	1	1	4	4	19	45.95
	J	23	31	13	18			31		13	18		31		31		26				12	9	31	53.00
	K	22	36	17	19			35	4	18	10	3	36		35		30	4	3	2	15	11	35	49.46
203	B	5	15	1	13	1		15			2	13	14		14	1	14	1		1	1		14	29.71
204	E	11	23	7	14	2		21		15	6		21	3	21	2	22	2	2		5	4	22	40.23
	F	24	86	15	68	3		85	1	30	49	5	83	9	82	6	75	1		1	14	7	86	37.47
	G	10	195	4	148	8	1	152	82	70			146		146	4	137	1	1		3	2	154	41.76
	H	29	66	15	51			63	10	21	32		66		65	3	48	3		3	13	10	63	34.56
	I	13	25	10	15			25		6	15	4	25		25	2	19	1		1	8	7	25	36.00
	J	8	52	2	48	2		52	31	17	4		50		45		19				2	2	51	41.04
	K	31	70	27	39	4		69		10	27	32	66	4	66	6	61	5	4	1	25	18	70	41.89
	L	36	100	20	78	1	1	90	2	86	2		98	1	97	9	96				19	18	100	38.47
	M	35	131	13	117	1		119	26	69	13	11	130		130	12	119	3	1	2	13	12	130	36.76
	N	17	27	9	17	1		21		13	7	1	26		26	2	19	2	2		9	7	27	45.56
	O	25	123	14	109			119		75	35	9	123		123	7	115	5	2	5	14	12	123	37.01
205	A	9	15	3	12			15		14	1		15	2	15	1	9				3	3	13	75.92
	B	16	388	8	348	32		361	257	85	19		356		355	15	352	1	1		8	4	384	62.33
	C*	2	2																					
	D	3	210		202	8		204		204			202	14	202	3	199	6	5	1			208	51.62
	E	14	176		150	11		121	31	90			165		165	16	147				3	2	174	51.45
	F	8	285		273	12		285	62	223			273		273	13	276	5	4	1			285	42.66
	FF	1	73		73			73	73				73		73	3	73						73	52.05
	G	10	424		412	12		424	72	352			412		412	23	421						424	43.70
206.0	A	17	61	11	50			61		52	1	8	61	1	61	2	56	3		3	11	10	61	39.11
	B	27	48	19	28	1		29	1	7	19	2	47	1	47	2	26	1	1		17	8	48	40.08
	C	26	37	20	17			27		26	1		37		36		24				18	14	37	52.62
	CC	25	37	15	20	2		23		16	6	1	35		35	1	25				13	12	37	43.57
	D	8	17	7	10			9	1		7	1	17		17		8				7	5	17	32.76
	E	20	58	12	46			58	4	28	20	6	58		58	4	56				12	9	58	48.07
	F	3	3		3			3		3			3		3		2						3	43.33
	G	32	36	18	18			36	4	17	13	2	36		35	1	33				17	14	36	61.97
	H	15	30	11	17	2		30		4	26		28		28		27				11	10	30	46.53
	I	32	99	26	71	2		98	3	29	56	10	97		96	3	93	9	2	7	25	18	98	35.87
206.1	J	27	65	23	39	4		63	6	22	35		61		60	3	60	4		4	20	18	61	40.44
	K	10	21	6	15			9		4	4	1	21		21	1	7				6	5	21	40.62
	M	32	70	16	52	2		30	1	11	16	2	68		64	8	31				12	9	67	32.27
	O	8	18	6	10	2		18		10	8		16		16		17	1	1		6	5	18	45.39
	G	11	219	2	205	9		211		210	1		210		210	15	208	2	2		4	4	219	40.69
	I	19	47	16	31			47	8	7	32		47		47	4	45				12	10	47	39.83
	J	12	39	7	32			39		7	32		39		39	6	35	7	7	4	7	7	39	30.33
	K	9	24	4	19	1		24		10	14		23		23	1	21	7	6	1	4	2	24	34.04
207	A	34	59	26	32	1		59			35	24	58		58	3	58	26	26		22	16	58	32.84
	B	25	40	12	21	7		40		6	17	17	33		33	1	39	24	24		12	7	39	43.55
	C	12	76	3	67	6		76			72	4	70		68	11	74	47	47	3	3		74	29.51
	D	42	68	28	39	1		67	2	39	26		67		67	1	61	27	27	4	23	13	63	67.13
	E	40	220	24	183	13		214	73	115	22	4	207		207	5	209	19	18	3	21	11	217	54.04
	F	15	135	9	122	4		135	73	33	29		131		131	4	123	24	23	5	7	3	133	48.92

Historical census data



28 HOUSING—BLOCK STATISTICS

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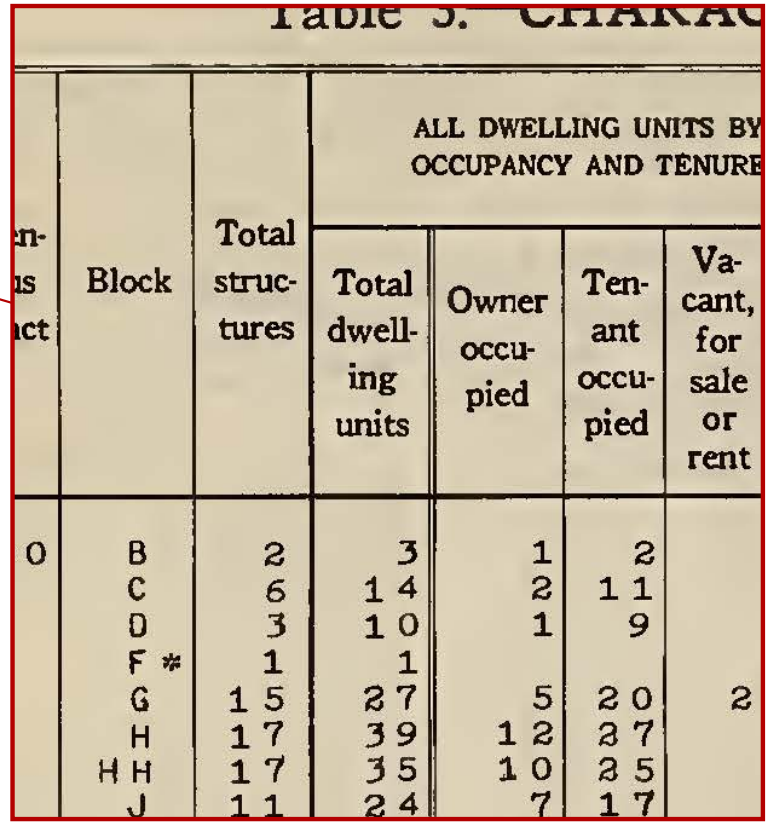
200	B	2	3	1	2			3			2	1	3		3		2				1	1	3	31.00
	C	6	14	2	11		1	14			10	4	13		13		13				1		14	26.50
	D	3	10	1	9			10			10		10		10		9				1	1	10	29.20
	F *	1	1																					
	G	15	27	5	20	2		27			27		25		25	1	23				5	4	27	36.96
	H	17	39	12	27			39		15	20	4	39		39	1	37				12	7	39	38.41
	H H	17	35	10	25			35		6	13	16	35		35	1	35	1		1	10	6	35	37.63
	J	11	24	7	17			24	4	6	12	2	24		24	1	24	1		1	7	5	24	37.00
201	B *	1	1																					
	D	13	56	8	47	1		56		21	33	2	55		55		42		1		8	4	56	42.93
	E	15	130	5	117	8		127	10	116	1		128		128		124				5	5	126	44.54
	F	8	40	6	34			40		2	38		40		40		39	1	1		5	4	37	41.62
	G	11	343	2	315	24	2	343		1	276	66	317		316	5	328						343	49.59
	H	14	162	7	150	5		152	79	51	3	19	157		156	10	126				6	2	152	44.13
	I	16	406	2	387	17		404	69	335			389		389	22	389	10	10		2	1	405	41.44
	J	4	116		102	14		93		34	39		102		101	2	79	1	1				115	42.94
	M	9	113		104	9		113		113			104		104	8	108						113	38.61
	N	4	145	1	135	9		143	1	111	31		136		136	5	118				1		144	41.99
	O	7	230		211	9		219		186	32	1	211		211	10	195						220	40.27
202	A	32	77	16	57	4		72	1	16	55		73		73	5	73	2		2	16	13	76	35.99
	B	15	54	14	39	1		54		1	51	2	53		53	1	49	4	4		14	9	54	47.11
	C	9	27	8	19			27		5	22		27		27		20	1		1	7	4	27	41.63
	D	16	135	4	128	3		47	20	21	6		132		129	5	115	5		5	4	4	135	38.47
	E	23	45	13	29	3		45		22	18	5	42		42	4	32	2		2	13	9	45	44.29
	F	16	78	10	64	4		73	9	50	7	7	74		74	3	69	5	3	2	10	5	78	46.55
	G	18	54	12	41	1		52	1	35	16		53		53		35	2	2		12	7	54	47.00
	H	3	35		35			28	17	8	1	2	35		35	3	33	2		2			34	36.82
	I	16	20	4	14	2		20		6	6	8	18		18		19	2	1	1	4	4	19	45.25
	J	23	31	13	18			31		13	18		31		31		26				12	9	31	53.00
	K	22	36	17	19			35	4	18	10	3	36		35		30	4	3	2	15	11	35	49.46
203	B	5	15	1	13	1		15			2	13	14		14	1	14	1		1	1		14	29.71
204	E	11	23	7	14	2		21		15	6		21	3	21	2	22	2	2		5	4	22	40.23
	F	24	86	15	68	3		85	1	30	49	5	83	9	82	6	75	1		1	14	7	86	37.47
	G	10	195	4	148	8	1	152	82	70			146		146	4	137	1	1		3	2	154	41.76
	H	29	66	15	51			63	10	21	32		66		65	3	48	3		3	13	10	63	34.56
	I	13	25	10	15			25		6	15	4	25		25	2	19	1		1	8	7	25	36.00
	J	8	52	2	48	2		52	31	17	4		50		45		19				2	2	51	41.04
	K	31	70	27	39	4		69		10	27	32	66	4	66	6	61	5	4	1	25	18	70	41.89
	L	36	100	20	78	1	1	90	2	86	2		98	1	97	9	96				19	18	100	38.47
	M	35	131	13	117	1		119	26	69	13	11	130		130	12	119	3	1	2	13	12	130	36.76
	N	17	27	9	17	1		21		13	7	1	26		26	2	19	2	2		9	7	27	45.56
	O	25	123	14	109			119		75	35	9	123		123	7	115	5	2	5	14	12	123	37.01
205	A	9	15	3	12			15		14	1		15	2	15	1	9				3	3	13	75.92
	B	16	388	8	348	32		361	257	85	19		356		355	15	352	1	1		8	4	384	62.33
	C *	2	2																					
	D	3	210		202	8		204		204			202	14	202	3	199	6	5	1			208	51.62
	E	14	176	5	160	11		121	31	90			165		165	16	147				3	2	174	51.45
	F	8	285		273	12		285	62	223			273		273	13	276	5	4	1			285	42.66
	F F	1	73		73			73	73				73		73	3	73						73	52.05
	G	10	424		412	12		424	72	352			412		412	23	421						424	43.70
206.0	A	17	61	11	50			61		53	1	8	61	1	61	2	56	3		3	11	10	61	39.11
	B	27	48	19	28	1		29	1	7	19	2	47	1	47	2	26	1	1		17	8	48	40.08
	C	26	37	20	17			27		26	1		37		36		24				18	14	37	52.62
	C C	25	37	15	20	2		23		16	6	1	35		33	1	25				13	12	37	37.57
	D	8	17	7	10			9	1		7	1	17		17		8				7	5	17	32.76
	E	20	58	12	46			58	4	24	20	6	58	4	56						12	9	58	48.07
	F	3	3		3			3		3			3		2								3	43.33
	G	32	36	18	18			36	4	17	13	2	36		35	1	33				17	14	36	61.97
	H	30	39	11	17	2		30			26		28		28		27				11	10	39	46.33
	I	32	99	26	71	2		98	3	29	56	10	97		96	3	93	9	2	7	25	18	98	35.87
206.1	J	27	65	23	39	4		63	6	22	35		61		60	3	60	4		4	20	18	61	40.44
	K	10	21	6	15			9		4	4	1	21		21	1	7				6	5	21	40.62
	M	32	70	16	52	2		30	1	11	16	2	66		64	8	31				12	9	67	32.27
	O	8	18	6	10	2		18		10	8		16		16		17	1	1		6	5	18	45.39
	G	11	219	5	205	9		211		210	1		210		210	15	208	2	2		4	4	219	40.69
	I	19	47	16	31			47	8	7	32		47		47	4	45				12	10	47	39.83
	J	12	39	7	32			39		7	32		39		39	6	35	7	7	4	7	7	39	30.33
	K	9	24	4	19	1		24		10	14		23		23	1	21	7	6	1	4	2	24	34.04
207	A	34	59	26	32	1		59			35	24	58		58	3	58	26	26		22	16	58	32.84
	B	25	40	12	21	7		40		6	17	17	33		33		39	24	24		12	7	39	43.55
	C	12	76	3	67	6		76			72	4	70		68	11	74	47	47	3	3		74	29.51
	D	42	68	28	39	1		67	2	39	26		67		67	1	61	27	27	4	23	13	63	67.13
	E	40	220	24	183	13		214	73	115	22	4	207		207	5	209	19	18	3	21	11	217	54.04
	F	15	135	9	122	4		135	73	33	29		131		131	4	123	24	23		7	3	133	48.92



	Block	Total structures	ALL DWELLING UNITS BY OCCUPANCY AND TENURE: Total dwelling units	Owner occupied	Tenant occupied	Vacant, for sale or rent
0	B	2	3	1	2	
	C	6	14	2	11	
	D	3	10	1	9	
	F *	1	1			
	G	15	27	5	20	2
	H	17	39	12	27	
	H H	17	35	10	25	
	J	11	24	7	17	

Historical census data

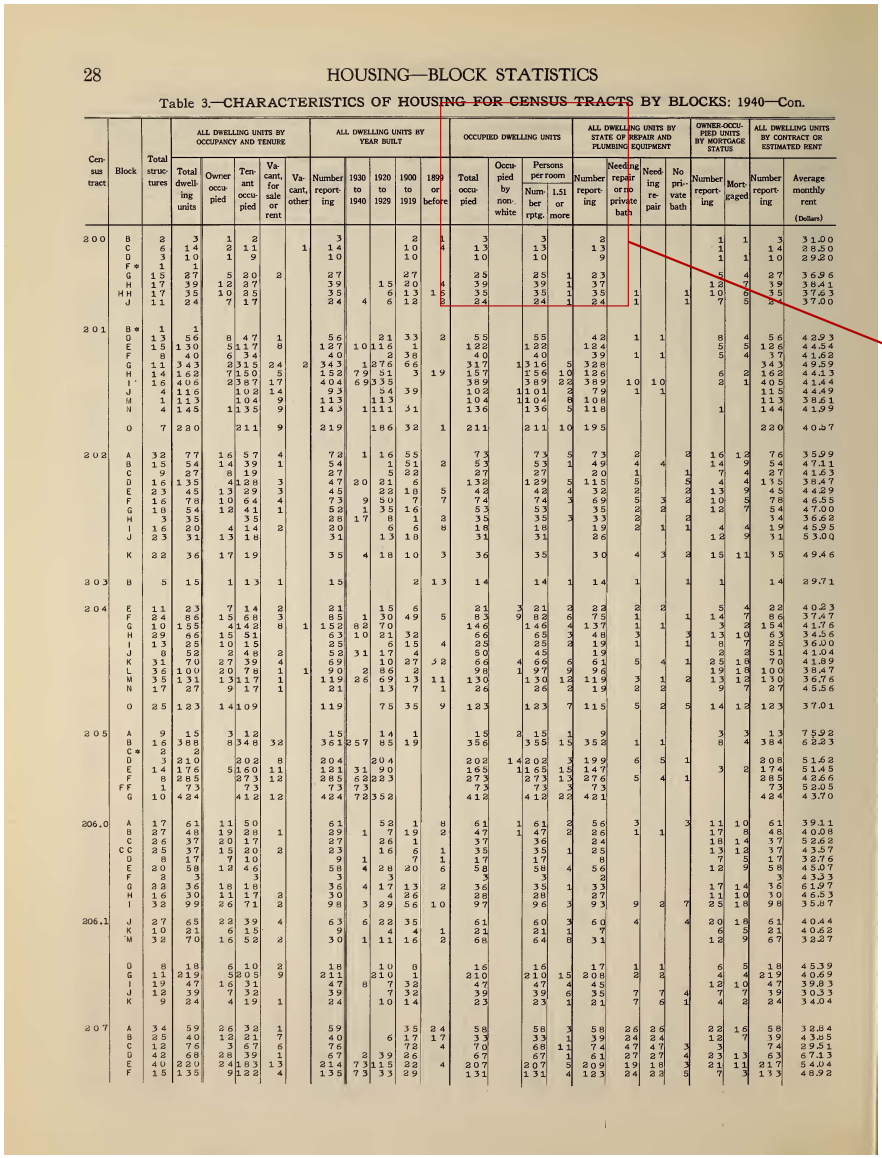


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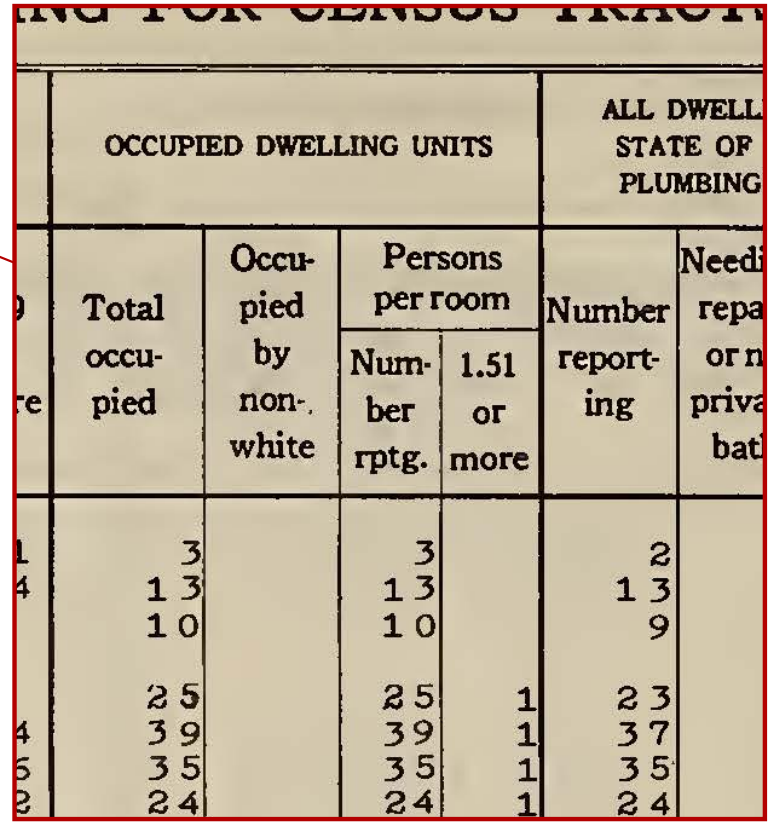
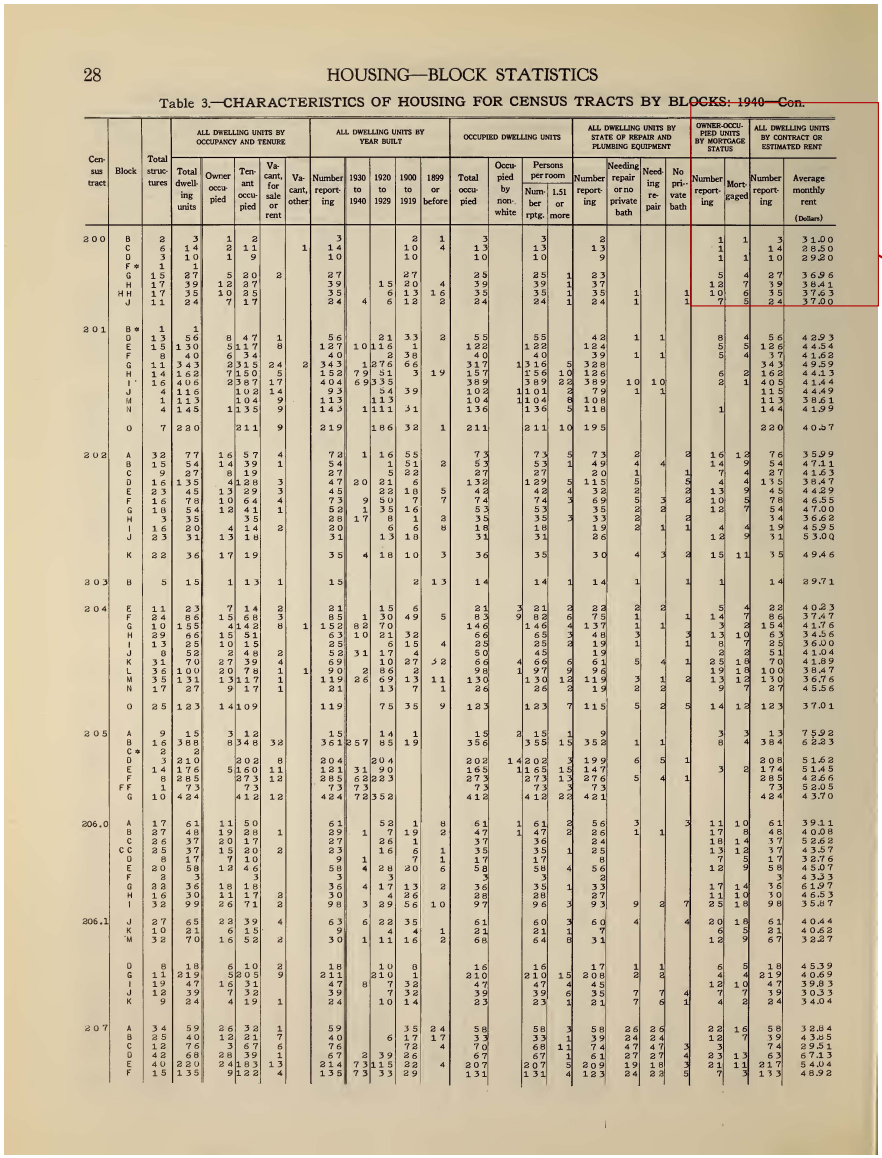
Table 3.—CHARACTERISTICS OF HOUSING FOR CENSUS TRACTS BY BLOCKS: 1940—Con.

Census tract	Block	Total structures	ALL DWELLING UNITS BY OCCUPANCY AND TENURE: Total dwelling units	Owner occupied	Tenant occupied	Vacant, for sale or rent	Vacant, other	ALL DWELLING UNITS BY YEAR BUILT: Number reporting	1930 to 1940	1920 to 1929	1900 to 1919	1899 or before	OCCUPIED DWELLING UNITS: Total occupied	Occupied by nonwhite	Persons per room: Number rptg.	Persons per room: 1.51 or more	ALL DWELLING UNITS BY STATE OF REPAIR AND PLUMBING EQUIPMENT: Number reporting	Needing repair or no private bath	Needing repair	No private bath	OWNER-OCCUPIED UNITS BY MORTGAGE STATUS: Number reporting	Mortgaged	ALL DWELLING UNITS BY CONTRACT OR ESTIMATED RENT: Number reporting	Average monthly rent (Dollars)
200	B	2	3	1	2			3			2	1	3		3		2				1	1	3	31.00
	C	6	14	2	11		1	14			10	4	13		13		13				1		14	26.50
	D	3	10	1	9			10			10		10		10		9				1	1	10	29.20
	F*	1	1																					
	G	15	27	5	20	2		27			27		25		25	1	23				5	4	27	36.96
	H	17	39	12	27			39		15	20	4	39		39	1	37				12	7	39	38.41
	HH	17	35	10	25			35		6	13	16	35		35	1	35	1		1	10	5	35	37.63
	J	11	24	7	17			24	4	6	12	2	24		24	1	24	1		1	7	5	24	37.00
201	B*	1	1																					
	D	13	56	8	47	1		56		21	33	2	55		55		42	1	1		8	4	56	42.93
	E	15	130	5	117	8		127	10	116	1		120		120		124				5	5	126	44.54
	F	8	40	6	34			40		2	38		40		40		39	1	1		5	4	37	41.62
	G	11	343	2	315	24	2	343	1	276	66		317		316	5	328						343	49.59
	H	14	162	7	150	5		152	79	51	3	19	157		156	10	126				6	2	168	44.13
	I	16	406	2	387	17		404	69	335			389		389	22	389	10	10		2	1	405	41.44
	J	4	116		102	14		93		34	59		102		101	2	79	1	1				115	44.49
	M	4	113		104	9		113		113			104		104	8	108						113	38.61
	N	4	145	1	135	9		143	1	111	31		136		136	5	118				1		144	41.99
	O	7	230		211	9		219		186	32	1	211		211	10	195						220	40.27
202	A	32	77	16	57	4		72	1	16	55		73		73	5	73	2		2	16	13	76	35.99
	B	15	54	14	39	1		54		1	51	2	53		53	1	49	4	4		14	9	54	47.11
	C	9	27	8	19			27		5	22		27		27		20	1		1	7	4	27	41.63
	D	16	135	4	128	3		47	20	21	6		132		129	5	115	5			4	4	135	38.47
	E	23	45	13	29	3		45		22	18	5	42		42	4	32	2		2	13	9	45	44.29
	F	16	78	10	64	4		73	9	50	7	7	74		74	3	69	5	3	2	10	5	78	46.55
	G	18	54	12	41	1		52	1	35	16		53		53		35	2	2		12	7	54	47.00
	H	3	35		35			28	17	8	1	2	35		35	3	33	2		2			34	36.82
	I	16	20	4	14	2		20		6	6	8	18		18		19	2	1	1	4	4	19	45.95
	J	23	31	13	18			31		13	18		31		31		26				12	9	31	53.00
	K	22	36	17	19			35	4	18	10	3	36		35		30	4	3	2	15	11	35	49.46
203	B	5	15	1	13	1		15			2	13	14		14	1	14	1		1	1		14	29.71
204	E	11	23	7	14	2		21		15	6		21	3	21	2	22	2	2		5	4	22	40.23
	F	24	86	15	68	3		85	1	30	49	5	83	9	82	6	75	1	1	1	14	7	86	37.47
	G	10	195	4	148	8	1	152	82	70			146		145	4	177	1	1		3	2	154	41.76
	H	29	66	15	51			63	10	21	32		66		65	3	48	3		3	13	10	63	34.56
	I	13	25	10	15			25		6	15	4	25		25	2	19	1		1	8	7	25	36.00
	J	2	52	2	48	2		52	31	17	4		50		45		19				2	2	51	41.04
	K	31	70	27	39	4		69		10	27	32	66	4	66	6	61	5	4	1	25	18	70	41.89
	L	36	100	20	78	1	1	90	2	86	2		98	1	97	9	96				19	18	100	38.47
	M	35	131	13	117	1		119	26	69	13	11	130		130	12	119	3	1	2	13	12	130	36.76
	N	17	27	9	17	1		21		13	7	1	26		26	2	19	2	2		9	7	27	45.56
	O	25	123	14	109			119		75	35	9	123		123	7	115	5	2	5	14	12	123	37.01
205	A	9	15	3	12			15		14	1		15	2	15	1	9				3	3	13	75.92
	B	16	388	8	348	32		361	257	85	19		356		355	15	352	1	1		8	4	384	62.33
	C*	2	2																					
	D	3	210		202	8		204		204			202	14	202	3	199	6	5	1			208	51.62
	E	14	176		150	11		121	31	90			165		165	15	147				3	2	174	51.45
	F	8	285		273	12		285	62	223			273		273	13	276	5	4	1			285	42.66
	FF	1	73		73			73	73				73		73	3	73						73	52.05
	G	10	424		412	12		424	72	352			412		412	23	421						424	43.70
206.0	A	17	61	11	50			61		52	1	8	61	1	61	2	56	3		3	11	10	61	39.11
	B	27	48	19	28	1		29	1	7	19	2	47	1	47	2	26	1	1		17	8	48	40.08
	C	26	37	20	17			27		26	1		37		36		24				18	14	37	52.62
	CC	25	37	15	20	2		23		16	6	1	36	1	35	1	25				13	12	37	33.57
	D	8	17	7	10			9	1		7	1	17		17		8				7	5	17	32.76
	E	20	58	12	46			58	4	28	20	6	58		58	4	56				12	9	58	48.07
	F	2	3		3			3		3			3		2		2						3	43.33
	G	32	36	18	18			36	4	17	13	2	36		35	1	33				17	14	36	61.97
	H	16	30	11	17	2		30		4	26		28		28		27				11	10	30	46.33
	I	32	99	26	71	2		98	3	29	56	10	97		96	3	93	9	2	7	25	18	98	35.87
206.1	J	27	65	23	39	4		63	6	22	35		61		60	3	60	4		4	20	18	61	40.44
	K	10	21	6	15			9		4	4	1	21		21	1	7				6	5	21	40.52
	M	32	70	16	52	2		30	1	11	16	2	66		64	8	31				12	9	67	32.27
	Q	8	18	6	10	2		18		10	8		16		16		17	1	1		6	5	18	45.39
	G	11	219	5	205	9		211		210	1		210		210	15	208	2	2		4	4	219	40.69
	I	19	47	16	31			47	8	7	32		47		47	4	45				12	10	47	39.83
	J	12	39	7	32			39		7	32		39		39	6	35	7	7	4	7	7	39	30.33
	K	9	24	4	19	1		24		10	14		23		23	1	21	7	6	1	4	2	24	34.04
207	A	34	59	26	32	1	7	59			35	24	58		58	3	58	26	26		22	16	58	32.84
	B	25	40	12	21	7		40		6	17	17	33		33		39	24	24		12	7	39	43.55
	C	12	76	3	67	6		76			72	4	70		68	11	74	47	47	3	3		74	29.51
	D	42	68	28	39	1		67	2	39	26		67		67	1	61	27	27	4	23	13	63	67.13
	E	40	220	24	183	13		214	73	115	22	4	207		207	5	209	19	18	3	21	11	217	54.04
	F	15	135	9	122	4		135	73	33	29		131		131	4	123	24	23		7	3	133	48.92



	OCCUPIED DWELLING UNITS				ALL DWELL STATE OF PLUMBING	
	Total occupied	Occupied by nonwhite	Persons per room: Number rptg.	Persons per room: 1.51 or more	Number reporting	Needi repa or n priva bat
1	3		3		2	
4	13		13		13	
	10		10		9	
	25		25	1	23	
4	39		39	1	37	
5	35		35	1	35	
2	24		24	1	24	

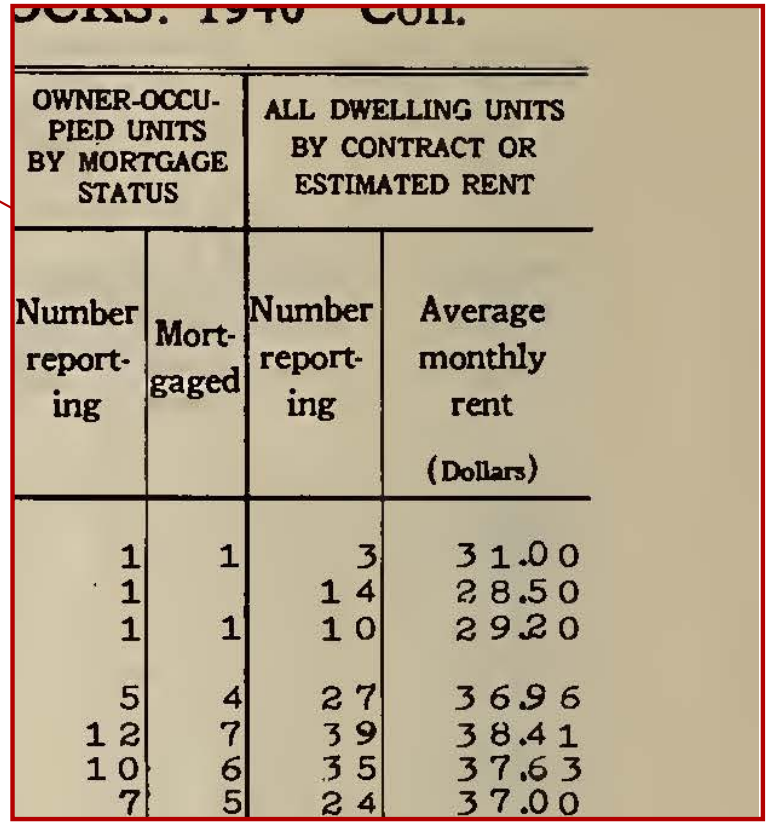
Historical census data



28 HOUSING—BLOCK STATISTICS

Table 3.—CHARACTERISTICS OF HOUSING FOR CENSUS TRACTS BY BLOCKS: 1940—Con.

Census tract	Block	Total structures	ALL DWELLING UNITS BY OCCUPANCY AND TENURE: Total dwelling units	Owner occupied	Tenant occupied	Vacant, for sale or rent	Vacant, other	ALL DWELLING UNITS BY YEAR BUILT: Number reporting	1930 to 1940	1920 to 1929	1900 to 1919	1899 or before	OCCUPIED DWELLING UNITS: Total occupied	Occupied by nonwhite	Persons per room: Number rptg.	Persons per room: 1.51 or more	ALL DWELLING UNITS BY STATE OF REPAIR AND PLUMBING EQUIPMENT: Number reporting	Needing repair or no private bath	Needing repair	No private bath	OWNER-OCCUPIED UNITS BY MORTGAGE STATUS: Number reporting	Mortgaged	ALL DWELLING UNITS BY CONTRACT OR ESTIMATED RENT: Number reporting	Average monthly rent (Dollars)
200	B	2	3	1	2			3			2	1	3		3		2				1	1	3	31.00
	C	6	14	2	11		1	14			10	4	13		13		13				1		14	28.50
	D	3	10	1	9			10			10		10		10		9				1	1	10	29.20
	F*	1	1																					
	G	15	27	5	20	2		27				27	25		25	1	23				5	4	27	36.96
	H	17	39	12	27			39		15	20	4	39		39	1	37				12	7	39	38.41
	HH	17	35	10	25			35		6	13	16	35		35	1	35	1		1	10	6	35	37.63
	J	11	24	7	17			24	4	6	12	2	24		24	1	24	1		1	7	5	24	37.00
201	B*	1	1																					
	D	13	56		8	47	1	56		21	33	2	55		55		42	1	1		8	4	56	42.93
	E	15	130		5	117	8	127	10	116	1		128		128		124				5	5	126	44.54
	F	8	40		6	34		40		2	38		40		40		39	1	1		5	4	37	41.62
	G	11	343		2	315	24	343		276	66		316	5	328		328						343	49.59
	H	14	162		7	150	5	152	79	51	3	19	156	10	126		126				6	2	168	44.13
	I	16	406		2	387	17	404	69	335			389	22	389		389	10	10		2	1	405	41.44
	J	4	116			102	14	93		54	39		101	2	79		79	1	1				115	44.49
	M	9	113			104	9	113		113			104	8	108		108						113	38.61
	N	4	145		1	135	9	143	1	111	31		136	5	118		118				1		144	41.99
	O	7	230			211	9	219		186	32	1	211	10	195		195						220	40.27
202	A	32	77	16	57	4		72	1	16	55		73	5	73		73	2		2	16	13	76	35.99
	B	15	54	14	39	1		54		1	51	2	53	1	53		49	4	4		14	9	54	47.11
	C	9	27	8	19			27		5	22		27		27		20	1		1	7	4	27	41.63
	D	16	135		4	128	3	47	20	21	6		132		129	5	115	5		5	4	4	135	38.47
	E	23	45		13	29	3	45		22	18	5	42		42	4	32	2		2	13	9	45	44.29
	F	16	78		10	64	4	73	9	50	7	7	74		74	3	69	5	3	2	10	5	78	46.55
	G	18	54		12	41	1	52	1	35	16	2	53		53		35	2	2		12	7	54	47.00
	H	3	35			35		28	17	8	1	2	35		35	3	33	2		2			34	36.82
	I	16	20		4	14	2	20		6	6	8	18		18		19	2	1	1	4	4	19	45.25
	J	23	31		13	18		31		13	18		31		31		26				12	9	31	53.00
	K	22	36	17	19			35	4	18	10	3	36		35		30	4	3	2	15	11	35	49.46
203	B	5	15	1	13	1		15			2	13	14		14	1	14	1		1	1		14	29.71
204	E	11	23	7	14	2		21		15	6		21	3	21	2	22	2	2		5	4	22	40.23
	F	24	86	15	68	3		85	1	30	49	5	83	9	82	6	75	1		1	14	7	86	37.47
	G	10	195	4	143	8	1	152	82	70			146		146	4	137	1	1		3	2	154	41.76
	H	29	66	15	51			63	10	21	32		66		65	3	48	3		3	13	10	63	34.56
	I	13	25	10	15			25		6	15	4	25		25	2	19	1		1	8	7	25	36.00
	J	3	52	2	48	2		52	31	17	4		50		45		19				2	2	51	41.04
	K	31	70	27	39	4		69		10	27	32	66	4	66	6	61	5	4	1	25	18	70	41.89
	L	36	100	20	78	1	1	90	2	86	2		98	1	97	9	96				19	18	100	38.47
	M	35	131	13	117	1		119	26	69	13	11	130		130	12	119	3	1	2	13	12	130	36.76
	N	17	27	9	17	1		21		13	7	1	26		26	2	19	2	2		9	7	27	45.56
	O	25	123	14	109			119		75	35	9	123		123	7	115	5	2	5	14	12	123	37.01
205	A	9	15	3	12			15		14	1		15	2	15	1	9				3	3	13	75.92
	B	16	388	8	348	32		361	257	85	19		356		355	15	352	1	1		8	4	384	62.33
	C*	2	2																					
	D	3	210		202	8		204		204			202	14	202	3	199	6	5	1			208	51.62
	E	14	176		156	11		121	31	90			165		165	16	147				3	2	174	51.45
	F	8	285		273	12		285	62	223			273		273	13	276	5	4	1			285	42.66
	FF	1	73		73			73	73				73		73	3	73						73	52.05
	G	10	424		412	12		424	72	352			412		412	22	421						424	43.70
206.0	A	17	61	11	50			61		52	1	8	61	1	61	2	56	3		3	11	10	61	39.11
	B	27	48	19	28	1		29	1	7	19	2	47	1	47	2	26	1	1		17	8	48	40.08
	C	26	37	20	17			27		26	1		37		36		24				18	14	37	52.62
	CC	25	37	15	20	2		23		16	6	1	35		35	1	25				13	12	37	43.57
	D	8	17	7	10			9	1		7	1	17		17		8				7	5	17	38.76
	E	20	58	12	46			58	4	28	20	6	58	4	56						12	9	58	48.07
	F	3	3		3			3		3			3		2								3	43.33
	G	32	36	18	18			36	4	17	13	2	36		35	1	33				17	14	36	61.97
	H	30	30	11	17	2		30		4	26		28		28		27				11	10	30	46.83
	I	32	99	26	71	2		98	3	29	56	10	97		96	3	93	9	2	7	35	18	98	35.87
206.1	J	27	65	23	39	4		63	6	22	35		61		60	3	60	4		4	30	18	61	40.44
	K	10	21	6	15			9		4	4	1	21		21	1	7				6	5	21	40.62
	M	32	70	16	52	2		30	1	11	16	2	68		64	8	31				12	9	67	32.27
	O	8	18	6	10	2		18		10	8		16		16		17	1	1		6	5	18	45.39
	G	11	219	5	205	9		211		210	1		210	15	208		208	2	2		4	4	219	40.69
	I	19	47	16	31			47	8	7	32		47	4	45		45				12	10	47	39.83
	J	12	39	7	32			39		7	32		39	6	35	7	35	7	7	4	7	7	39	30.33
	K	9	24	4	19	1		24		10	14		23	1	23	1	21	7	6	1	4	2	24	34.04
207	A	34	59	26	32	1		59			35	24	58		58	3	58	26	26		22	16	58	32.84
	B	25	40	12	21	7		40		6	17	17	33		33	1	39	24	24		12	7	39	43.55
	C	12	76	3	67	6		76			72	4	70		68	11	74	47	47	3	3		74	29.51
	D	42	68	28	39	1		67	2	39	26		67		67	1	61	27	27	4	23	13	63	67.13
	E	40	220	24	183	13		214	73	115	22	4	207		207	5	209	19	18	3	21	11	217	54.04
	F	15	135	9	122	4		135	73	33	29		131		131	4	123	24	23		7	3	133	48.92



OWNER-OCCUPIED UNITS BY MORTGAGE STATUS		ALL DWELLING UNITS BY CONTRACT OR ESTIMATED RENT	
Number reporting	Mortgaged	Number reporting	Average monthly rent (Dollars)
1	1	3	31.00
1		14	28.50
1	1	10	29.20
5	4	27	36.96
12	7	39	38.41
10	6	35	37.63
7	5	24	37.00

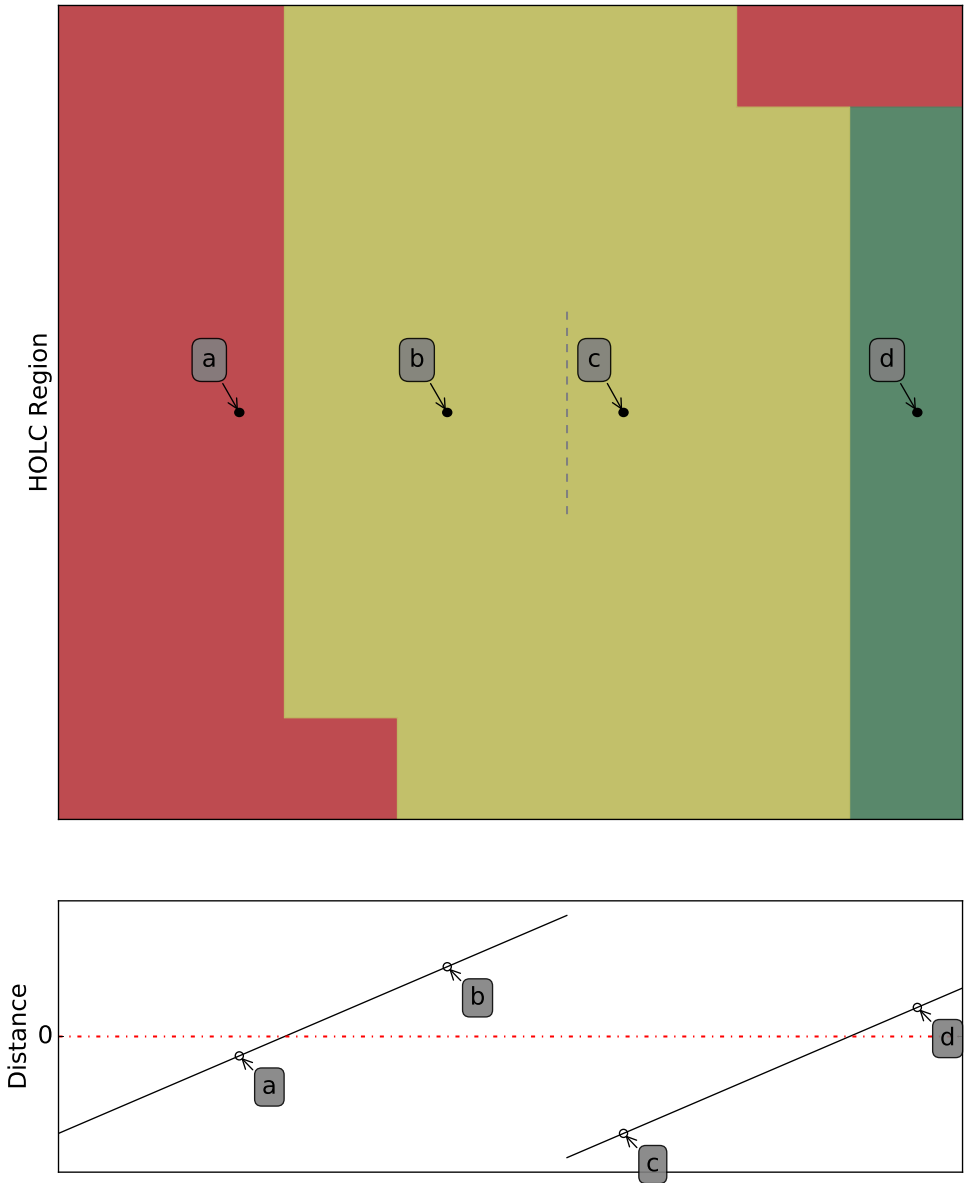
Summary stats by HOLC grade

	HOLC Security Grade			
	A	B	C	D
1940 Characteristics:				
Est. Rent ($)	66.44	44.87	33.37	24.31
Non-White (%)	0.40	0.46	1.24	17.65
Vacant (%)	0.50	0.26	0.21	0.16
Overcrowded (%)	0.38	1.21	2.61	6.31
Disrepair (%)	1.87	3.48	6.15	11.95

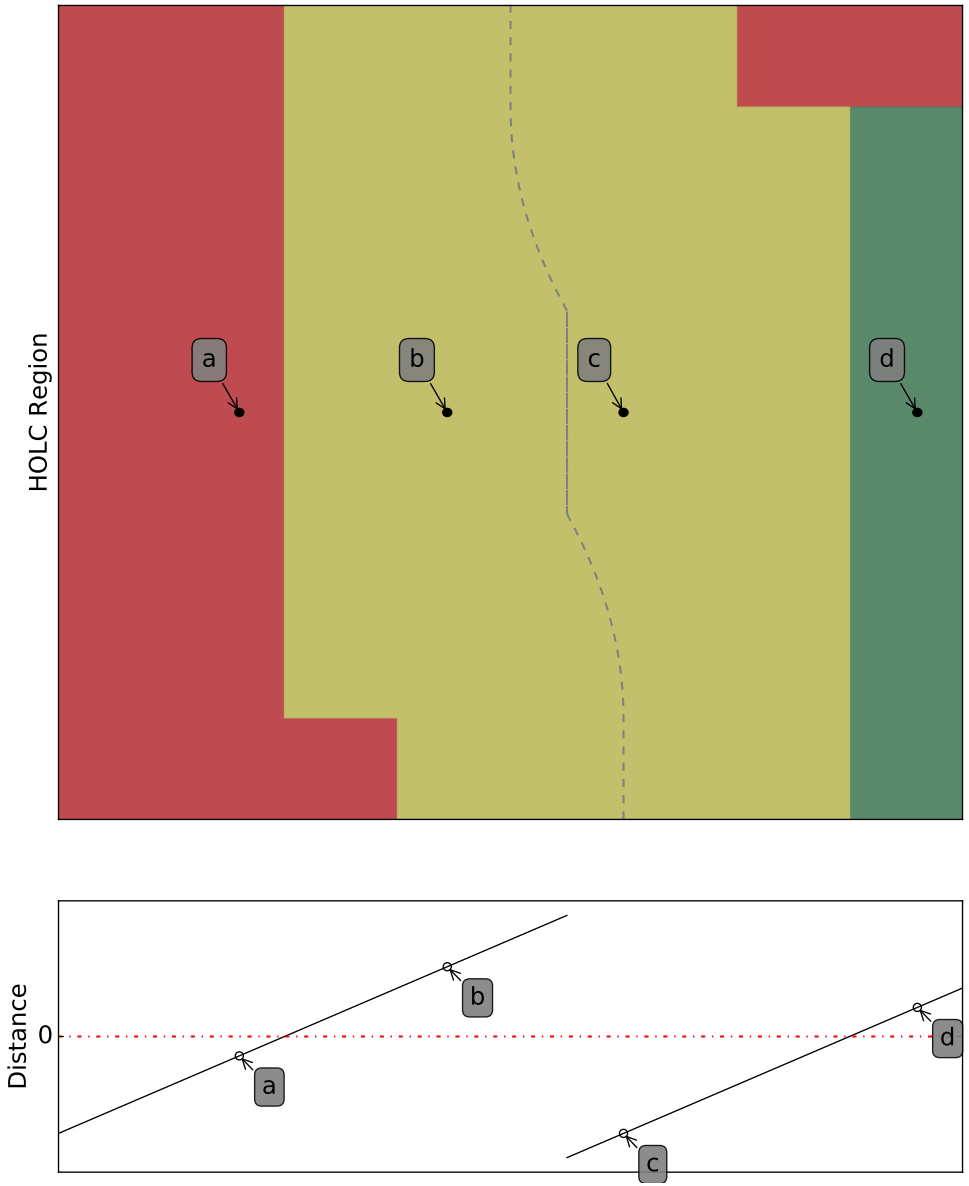
Summary stats by HOLC grade

	HOLC Security Grade			
	A	B	C	D
1940 Characteristics:				
Est. Rent ($)	66.44	44.87	33.37	24.31
Non-White (%)	0.40	0.46	1.24	17.65
Vacant (%)	0.50	0.26	0.21	0.16
Overcrowded (%)	0.38	1.21	2.61	6.31
Disrepair (%)	1.87	3.48	6.15	11.95
1990 Characteristics:				
Est. Value ($1,000)	227.38	138.81	106.83	85.58
Non-White (%)	18.48	28.52	40.41	58.80
Vacant (%)	3.34	4.75	6.75	10.46
Overcrowded (%)	0.35	1.56	3.75	5.06

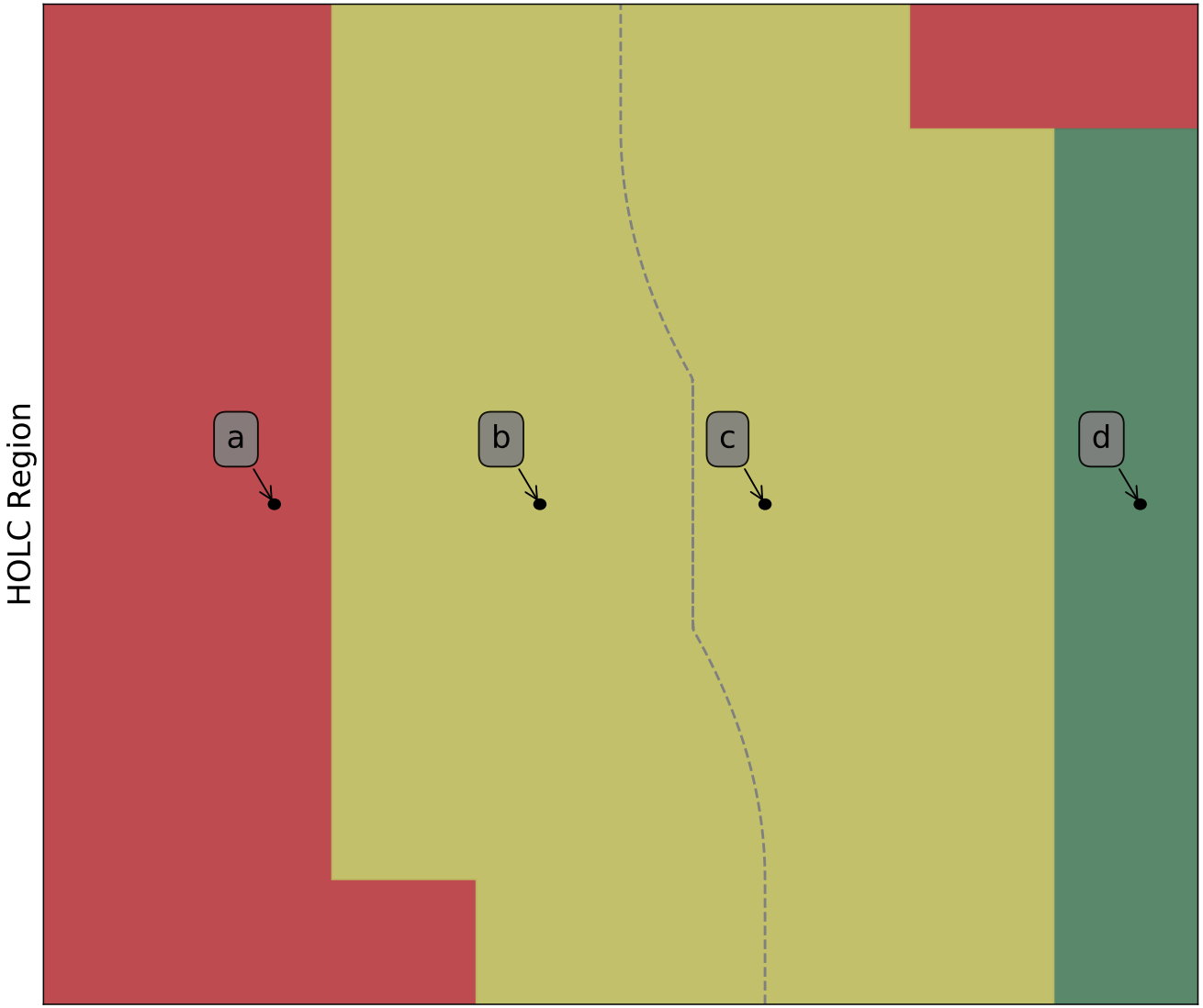
Computing distance to a boundary



Computing distance to a boundary



Assigning fixed effects - Region-Pair FEs



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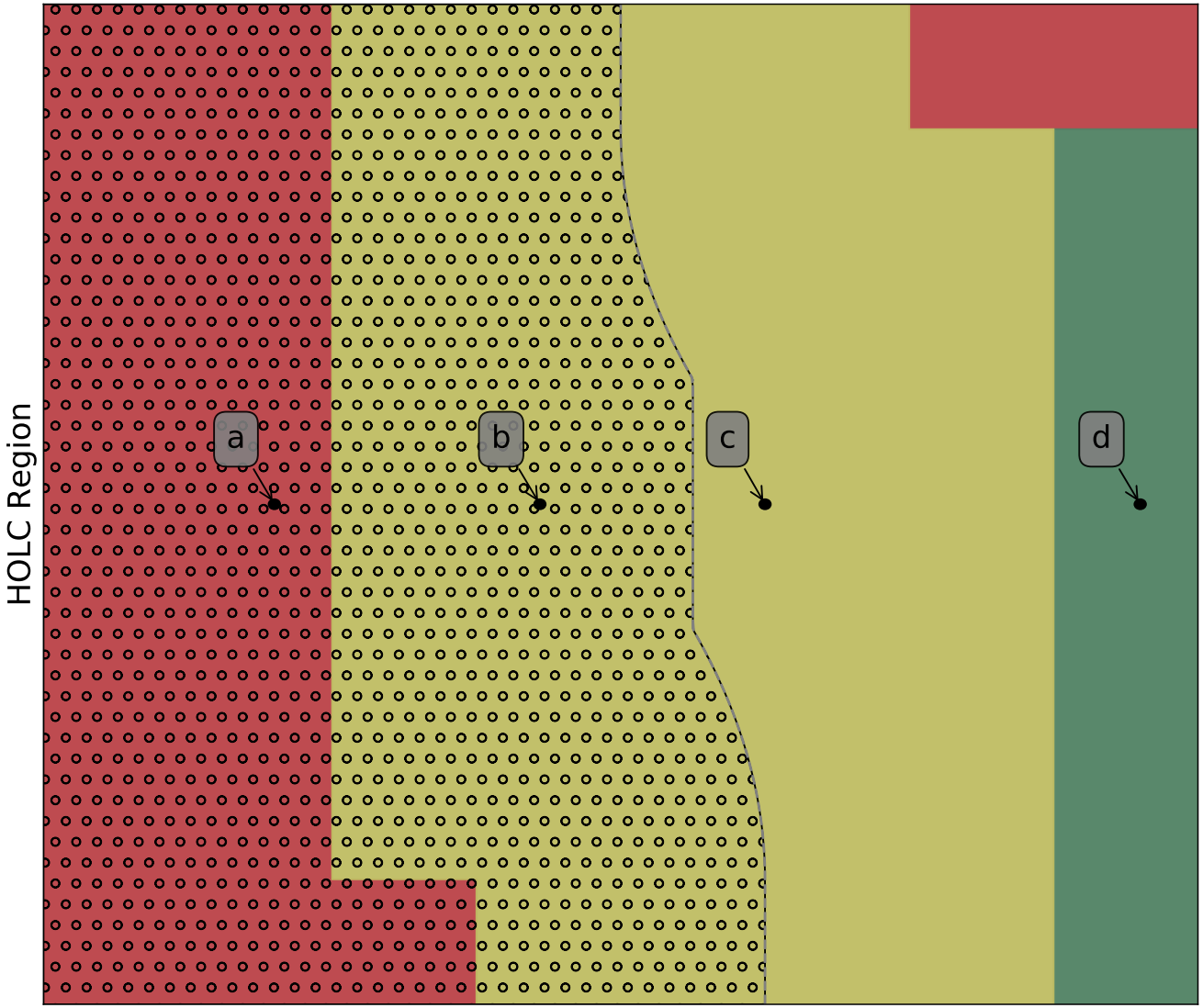
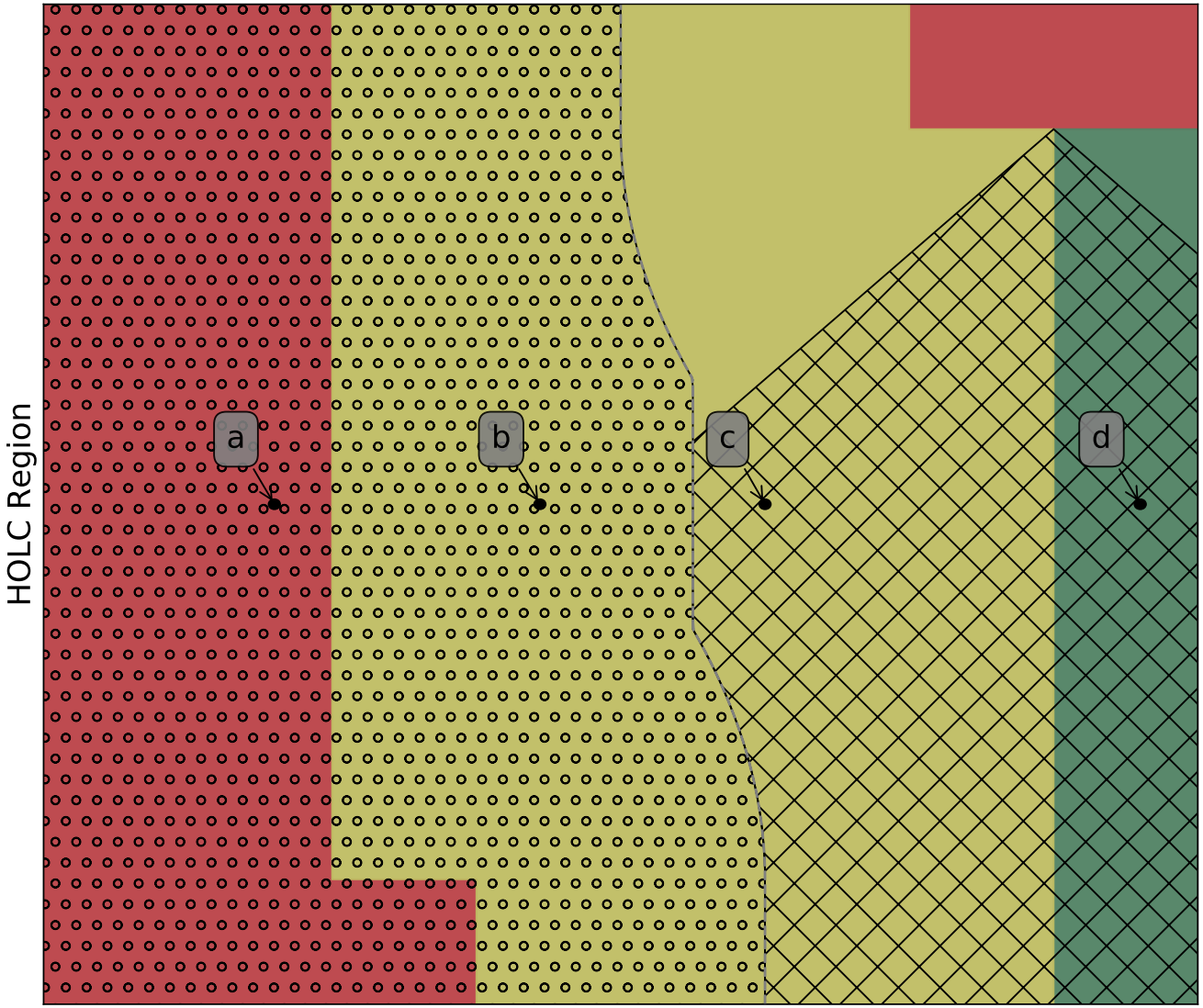
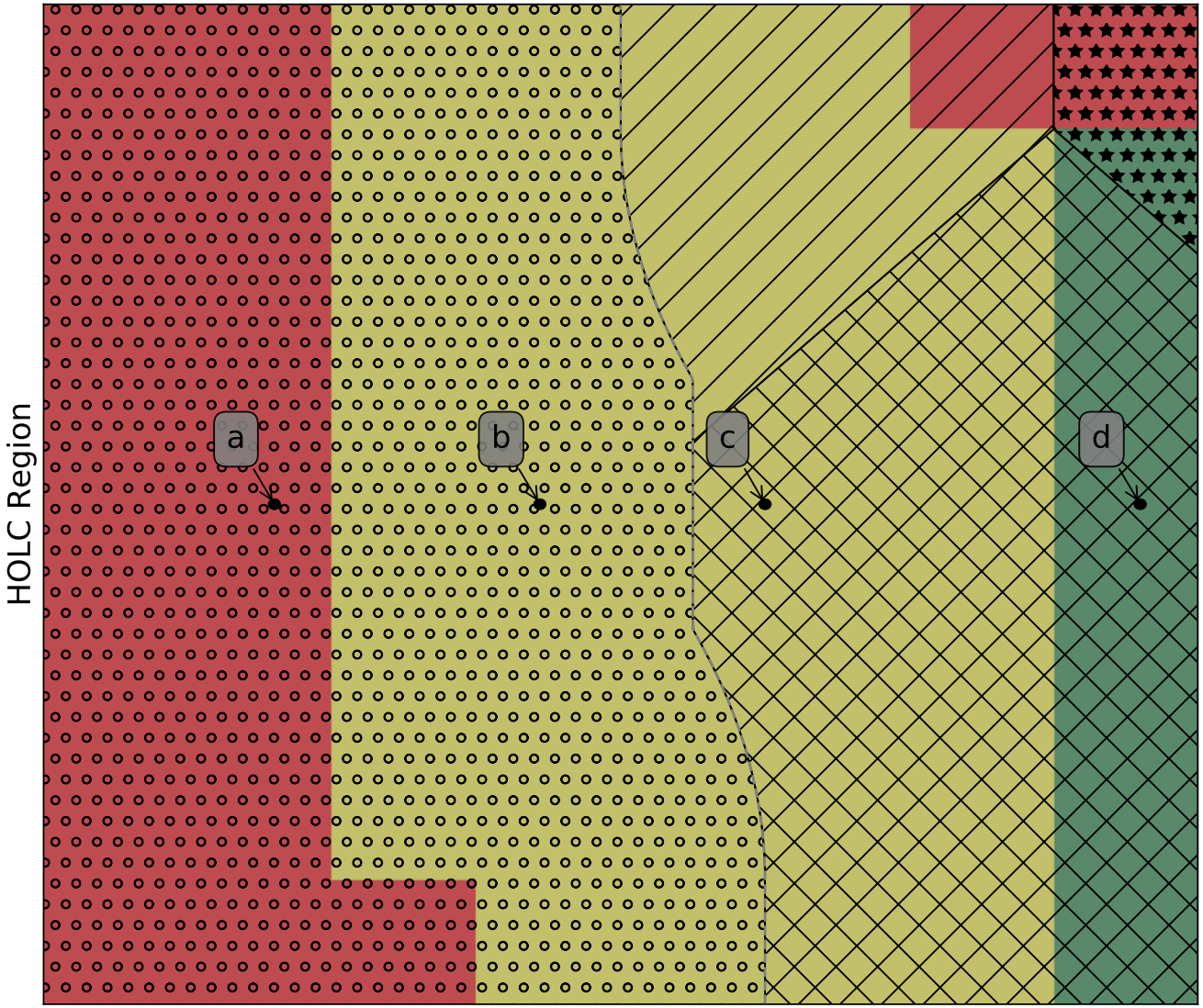


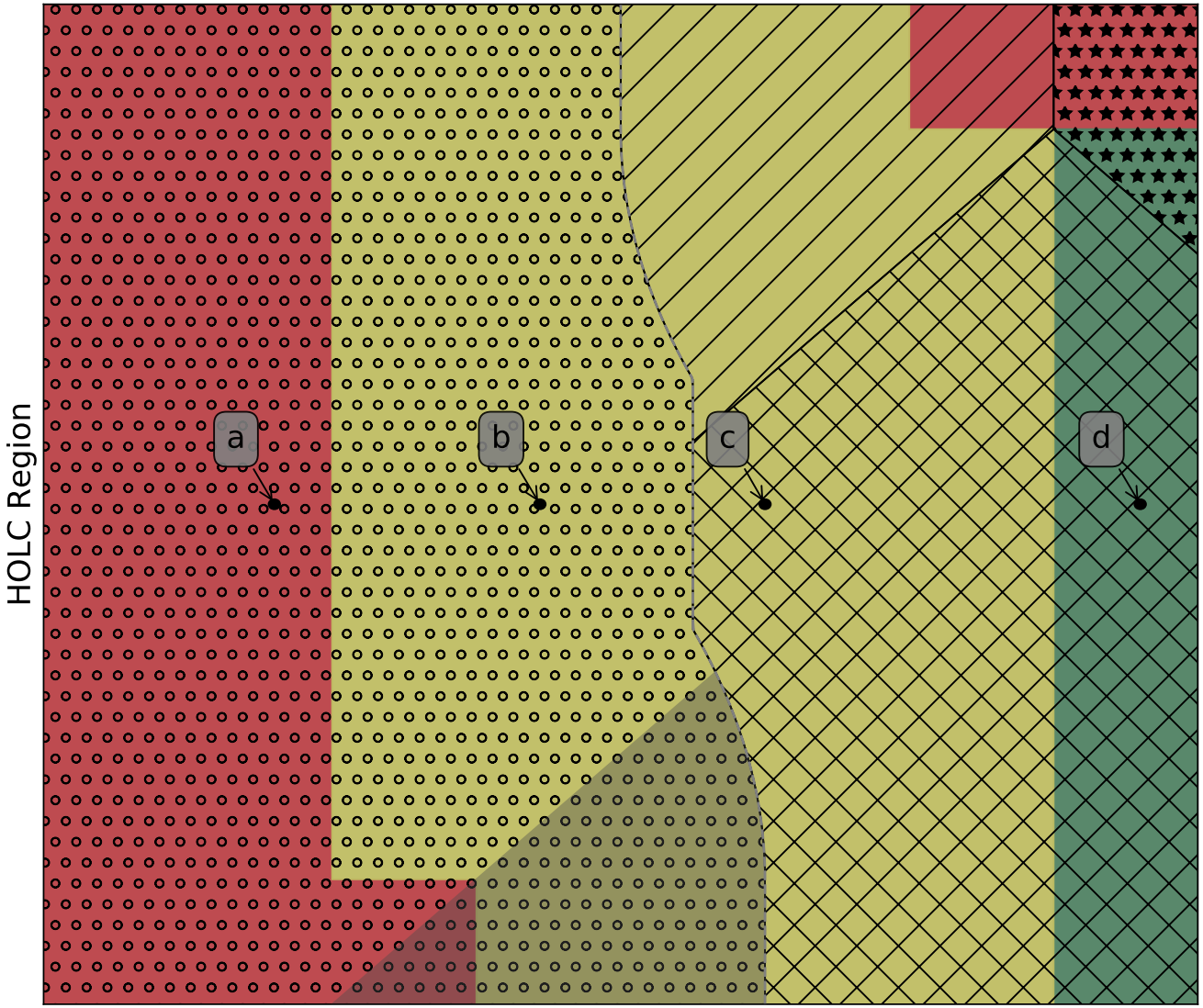
Assigning fixed effects - Region-Pair FEs



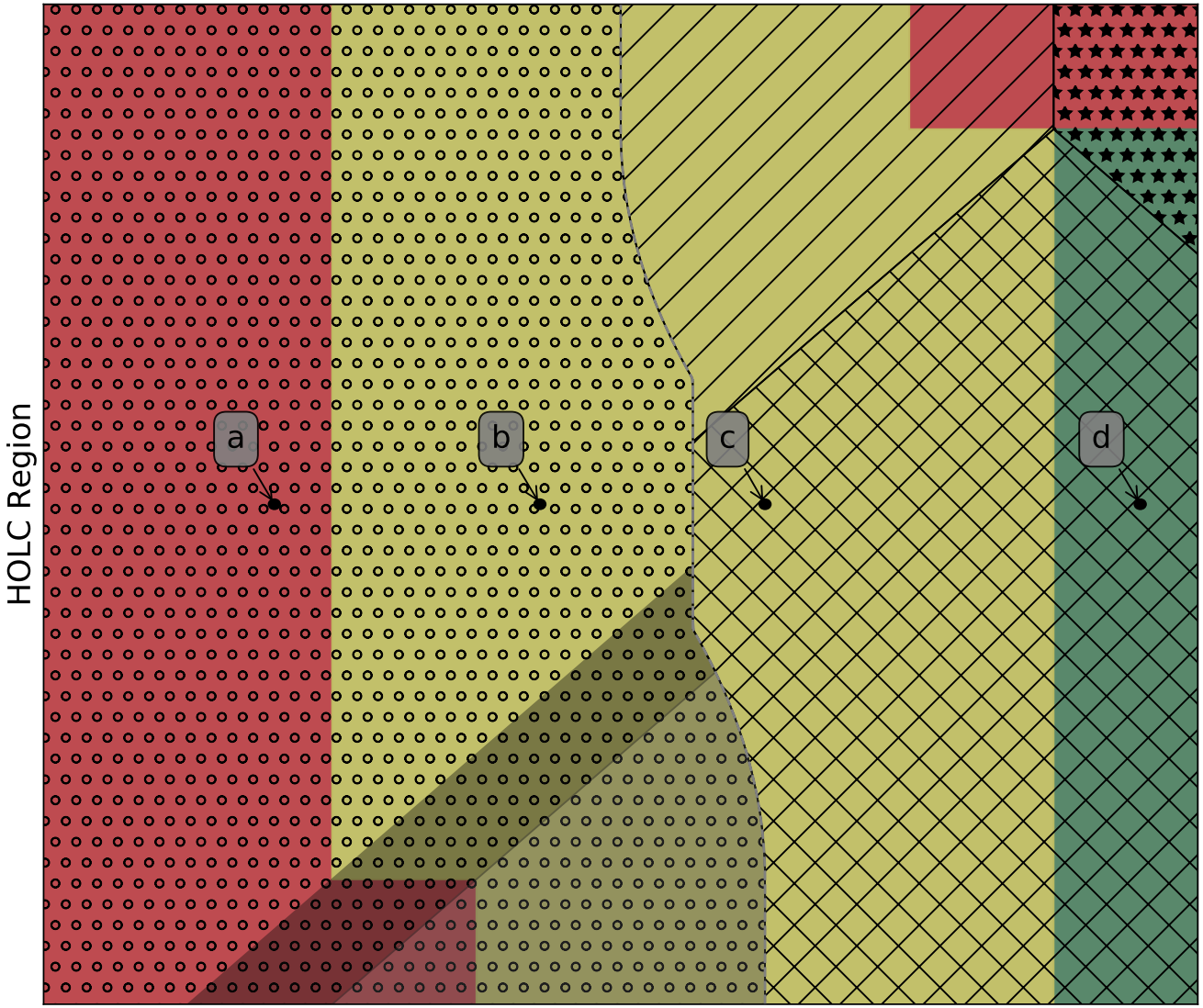
Assigning fixed effects - Region-Pair FEs



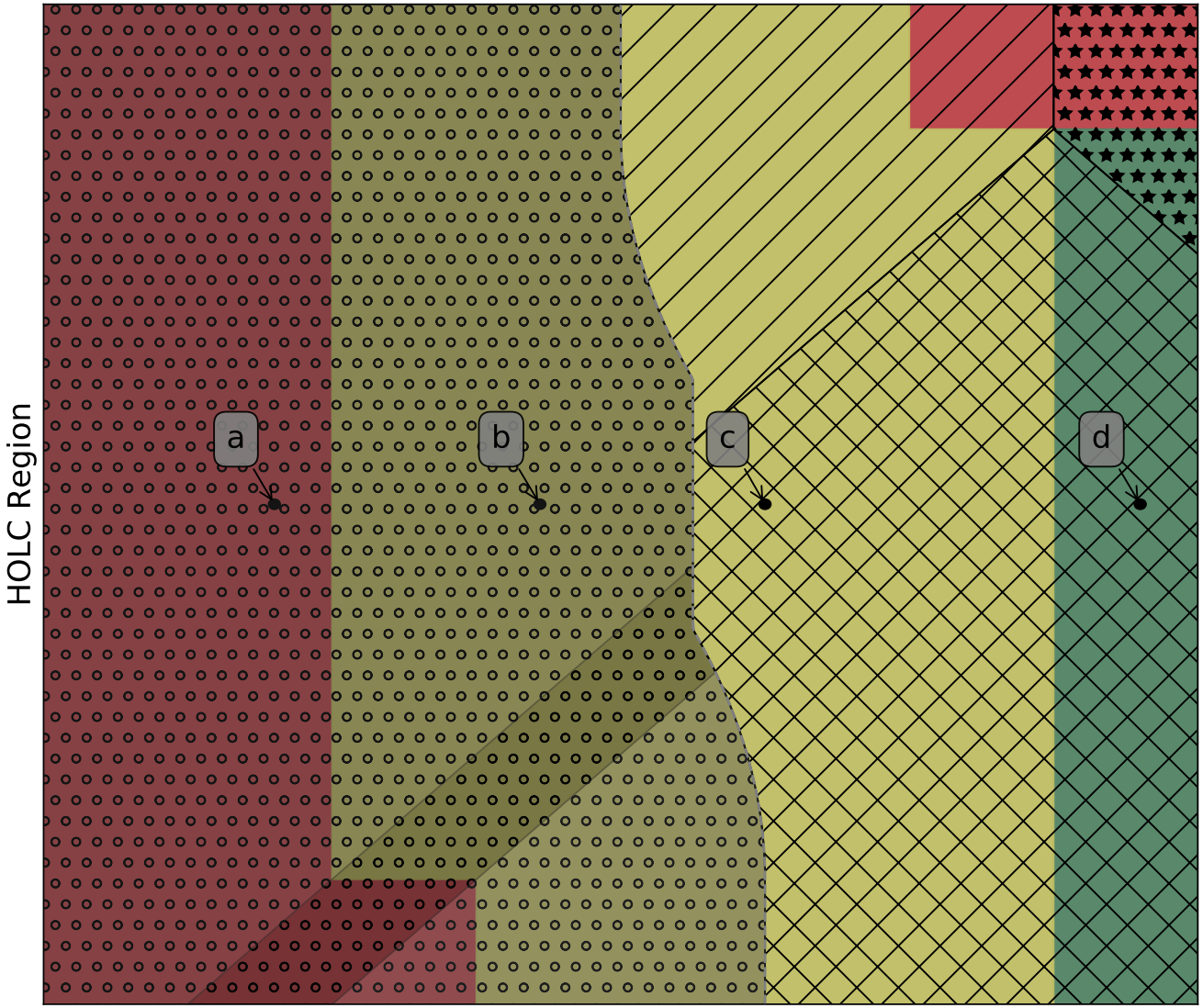
Assigning fixed effects - Border FEs



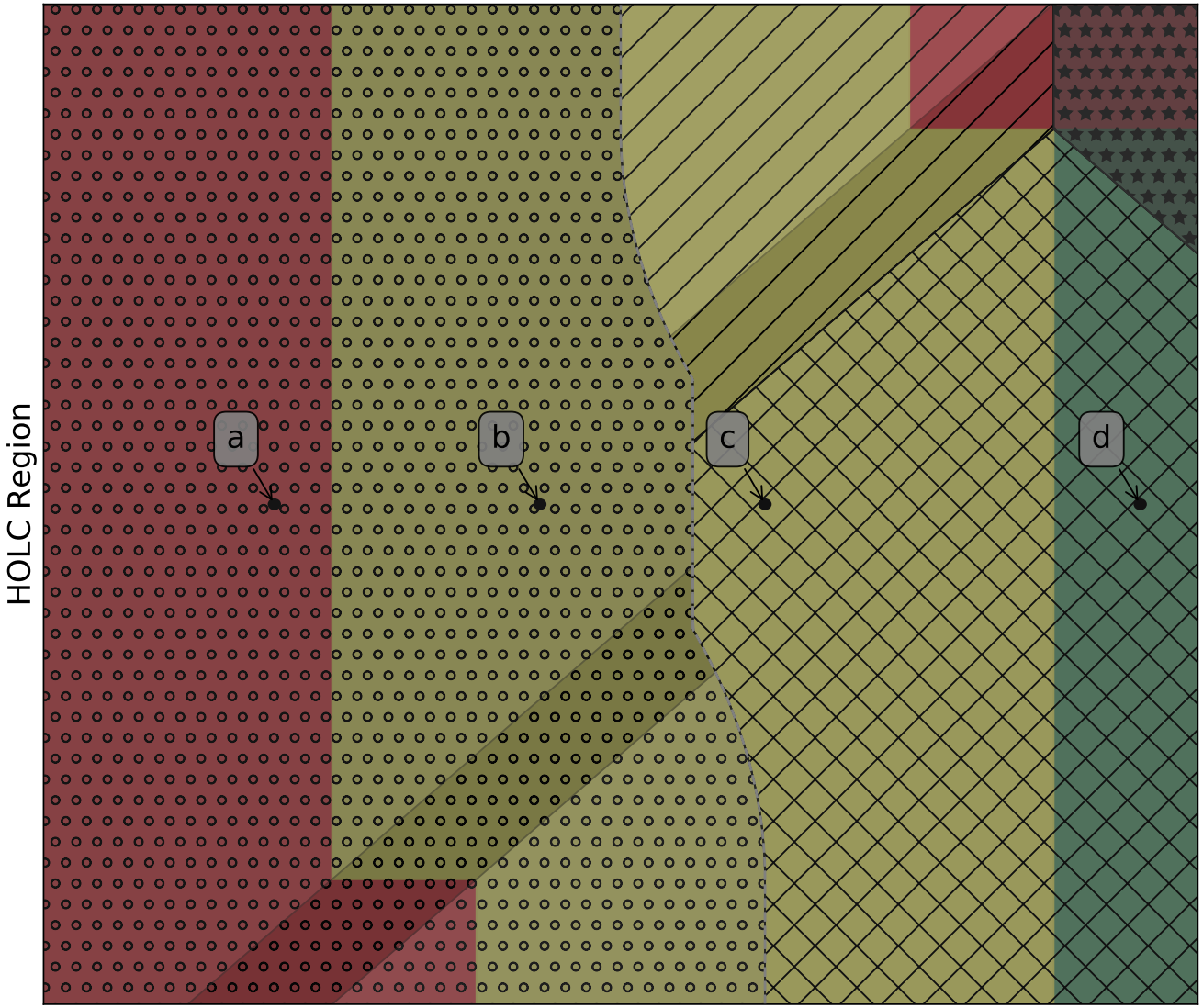
Assigning fixed effects - Border FEs



Assigning fixed effects - Border FEs



Assigning fixed effects - Border FEs



Empirical specification

$$Y_i = \alpha + \beta \mathbb{1}(dist_i < 0) + \sum_{n=1}^{N} \theta_n dist_i^n + \mathbb{1}(dist_i < 0) \times \sum_{n=1}^{N} \gamma_n dist_i^n + \phi_j + \varepsilon_i$$

- Y_i is the outcome of interest
- ϕ_j is a *Grade-pair/Region-pair/Border* fixed effect

- Consider a bandwidth of 500m (effect robust to alternative distances)
- Polynomial for each empirical specification chosen to maximize the AIC

Identification assumption *[1/2]*

- **Identification assumption:** Unobservable characteristics varied smoothly at boundaries when maps were created
- Start by excluding boundaries that coincide with geographic features

Identification assumption *[1/2]*

- **Identification assumption:** Unobservable characteristics varied smoothly at boundaries when maps were created
- Start by excluding boundaries that coincide with geographic features

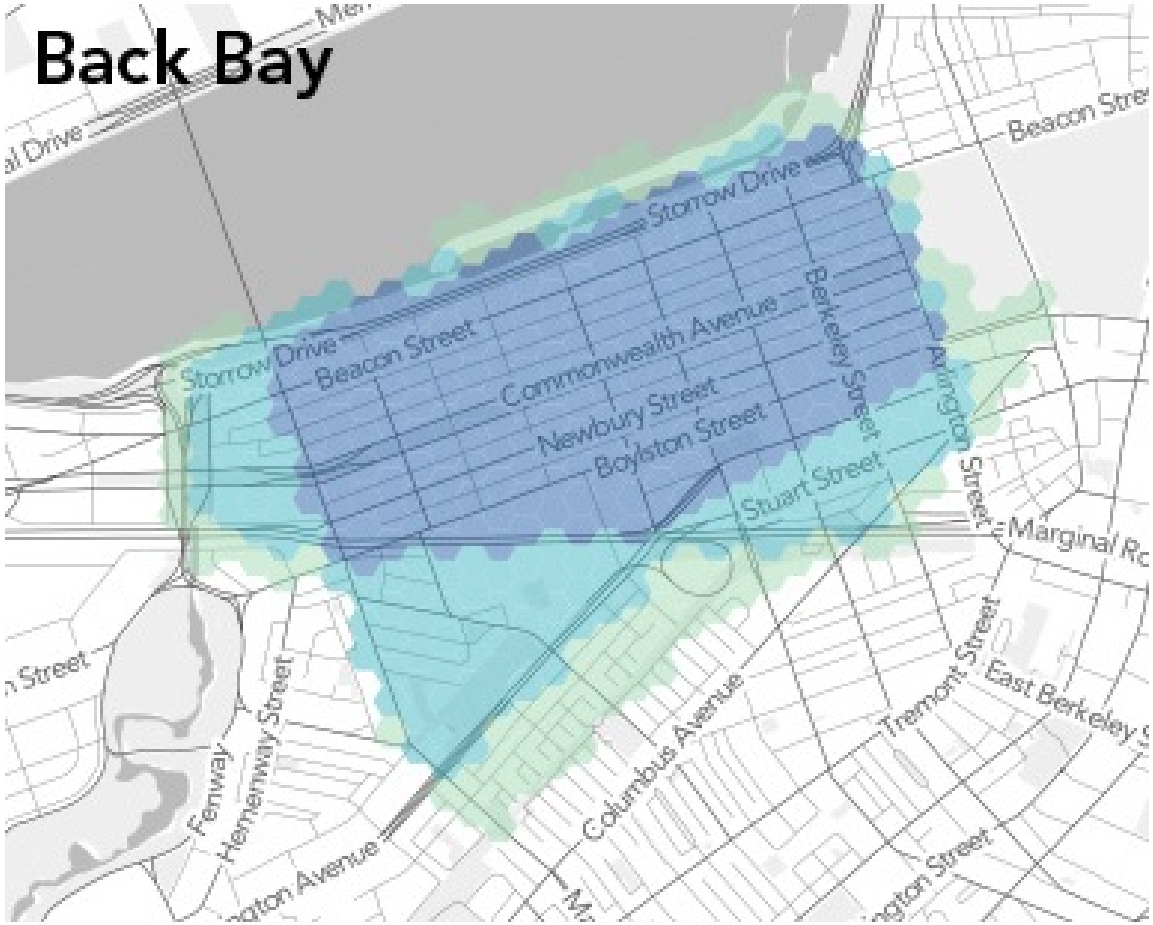
- Anecdotal evidence suggests this is reasonable...
  - Boundaries didn't coincide with administrative borders (e.g., wards, census tracts) *[Hiller, 2005]*
  - Maps often underwent multiple revisions *[Hiller, 2005]*
  - In general, identifying neighborhood boundaries is tricky...

Identification assumption *[2/2]*

Neighborhood Boundary Disagreement

Identification assumption *[2/2]*

Neighborhood Boundary Disagreement

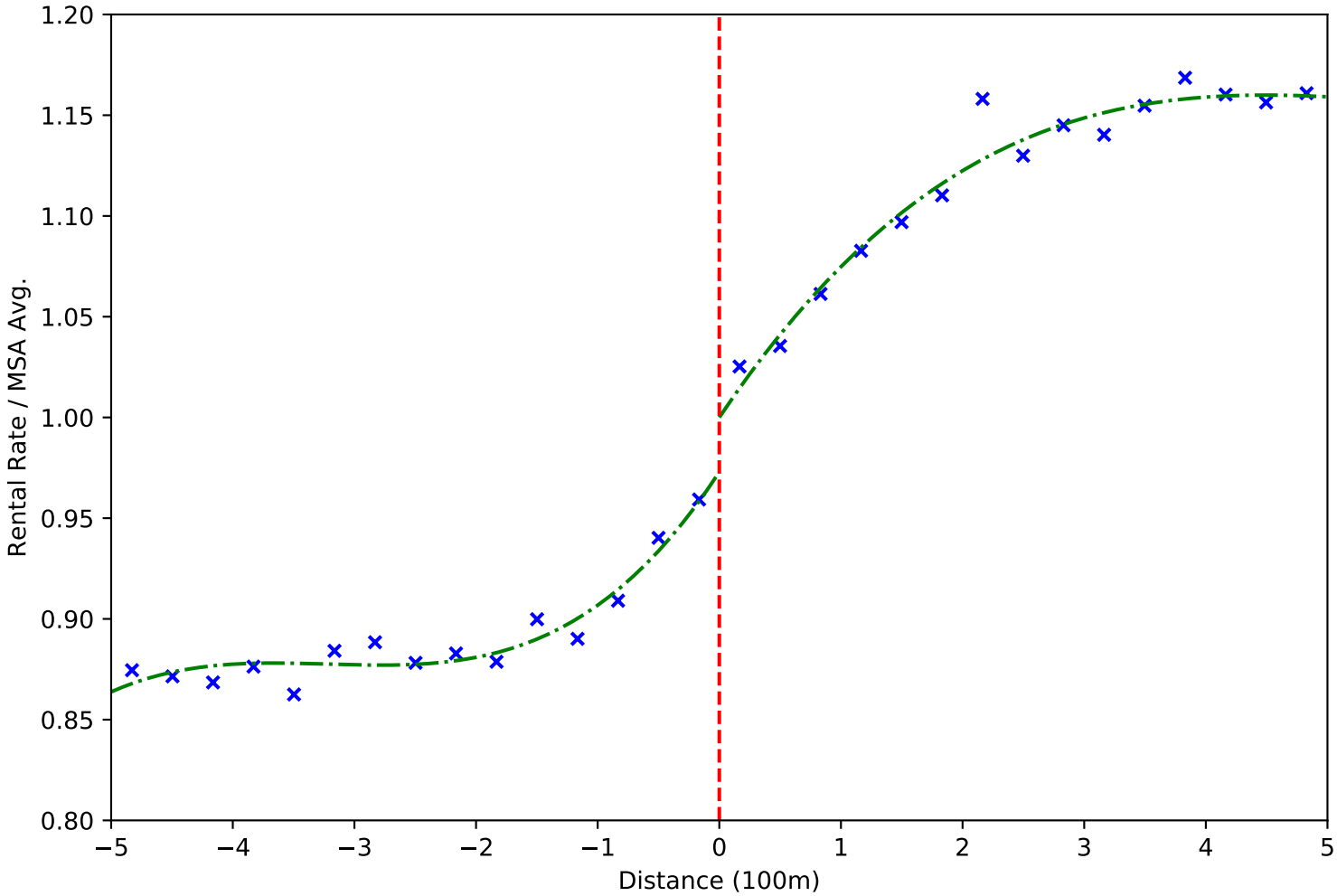


Outline

1. Institutional background
2. Data and summary statistics
3. Empirical strategy
4. **Results**
5. Conclusion

Does redlining have a persistent effect on house prices?

Lower 1990 house values for redlined areas

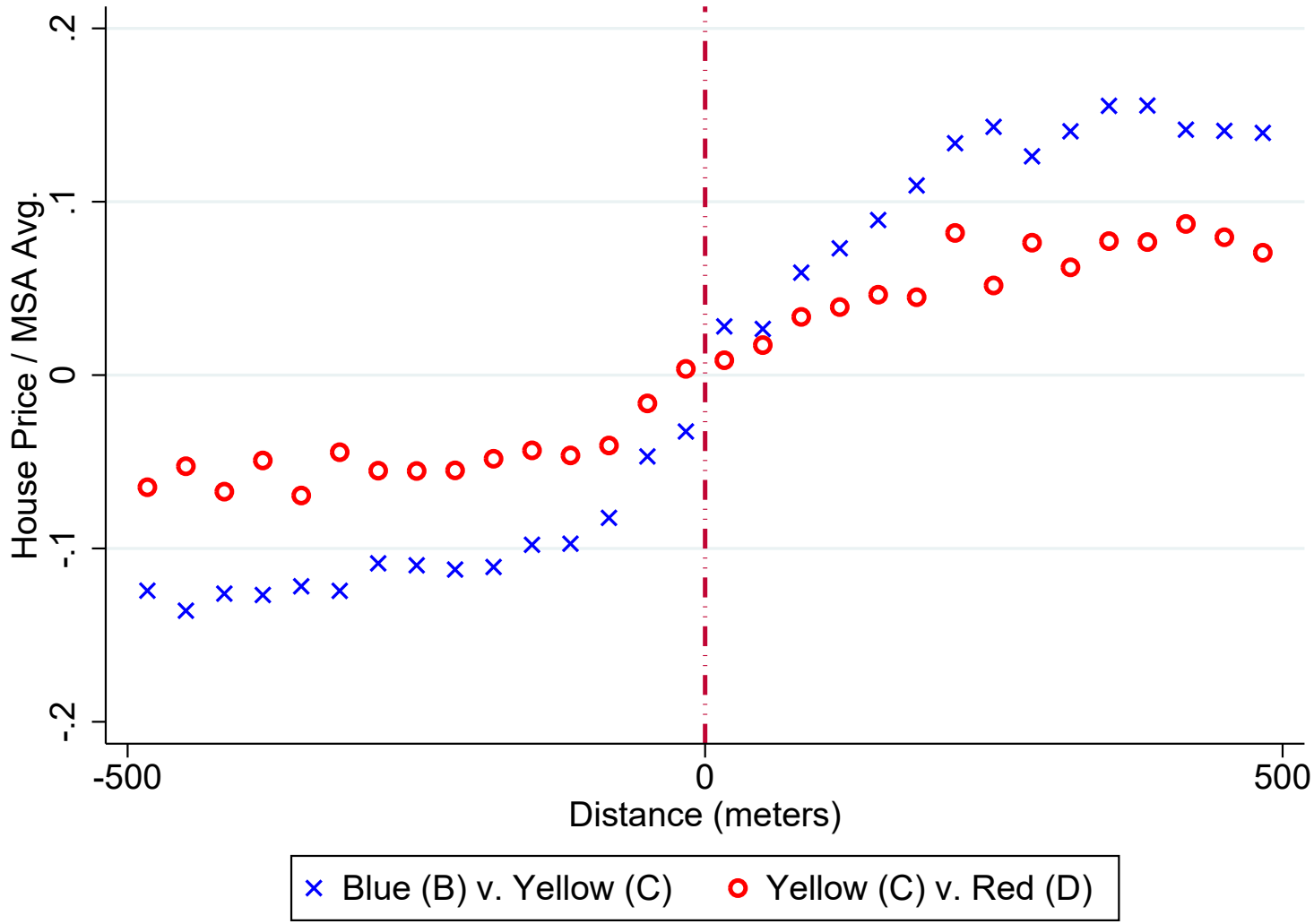


Lower 1990 house values for redlined areas

Dep. var. = 1990 house prices / MSA Avg.	(1)	(2)	(3)
$\mathbb{1}(dist < 0)$	-0.030	-0.027***	-0.027***
	(-1.57)	(-2.82)	(-3.29)
N	107,439	107,429	105,514
R^2	0.223	0.725	0.778
FEs	Grade-Pair	Region-Pair	Border
Order Polynomial	3	3	3

Varying house price dynamics across comparisons

Varying house price dynamics across comparisons



No change in the effect

Dep. var. = 1990 house prices / MSA Avg.			
Panel A: Common Polynomial across Grade-Pair			
$\mathbb{1}(dist < 0)$	-0.030	-0.027***	-0.027***
	(-1.57)	(-2.82)	(-3.29)
N	107,439	107,429	105,514
R^2	0.223	0.725	0.778
Panel B: Polynomials varying by Grade-Pair			
$\mathbb{1}(dist < 0)$	-0.032*	-0.026***	-0.025***
	(-1.75)	(-2.63)	(-3.02)
N	107,439	107,429	105,514
R^2	0.243	0.737	0.788
FEs	Grade-Pair	Region-Pair	Border

Redlining (or Greenlining)?

Focus has generally been on red (*Grade D*) regions

No economic prediction for which grade (if any) should have a stronger impact:

- Grade D regions could have been adversely affected from a credit restriction or...
- Grade A regions could have disproportionately benefited from an excessive credit supply

Redlining (or Greenlining)?

Dep. var. = 1990 house prices / MSA Avg.				
	Ex. Red		Ex. Green	
	(1)	(2)	(3)	(4)
$\mathbb{1}(dist < 0)$	-0.044***	-0.045***	-0.008	-0.007
	(-3.09)	(-3.38)	(-0.77)	(-0.64)
N	62,924	61,659	89,773	88,310
R^2	0.723	0.780	0.667	0.730
FEs	Reg.-Pair	Border	Reg.-Pair	Border
Order Polynomial	3	3	3	3

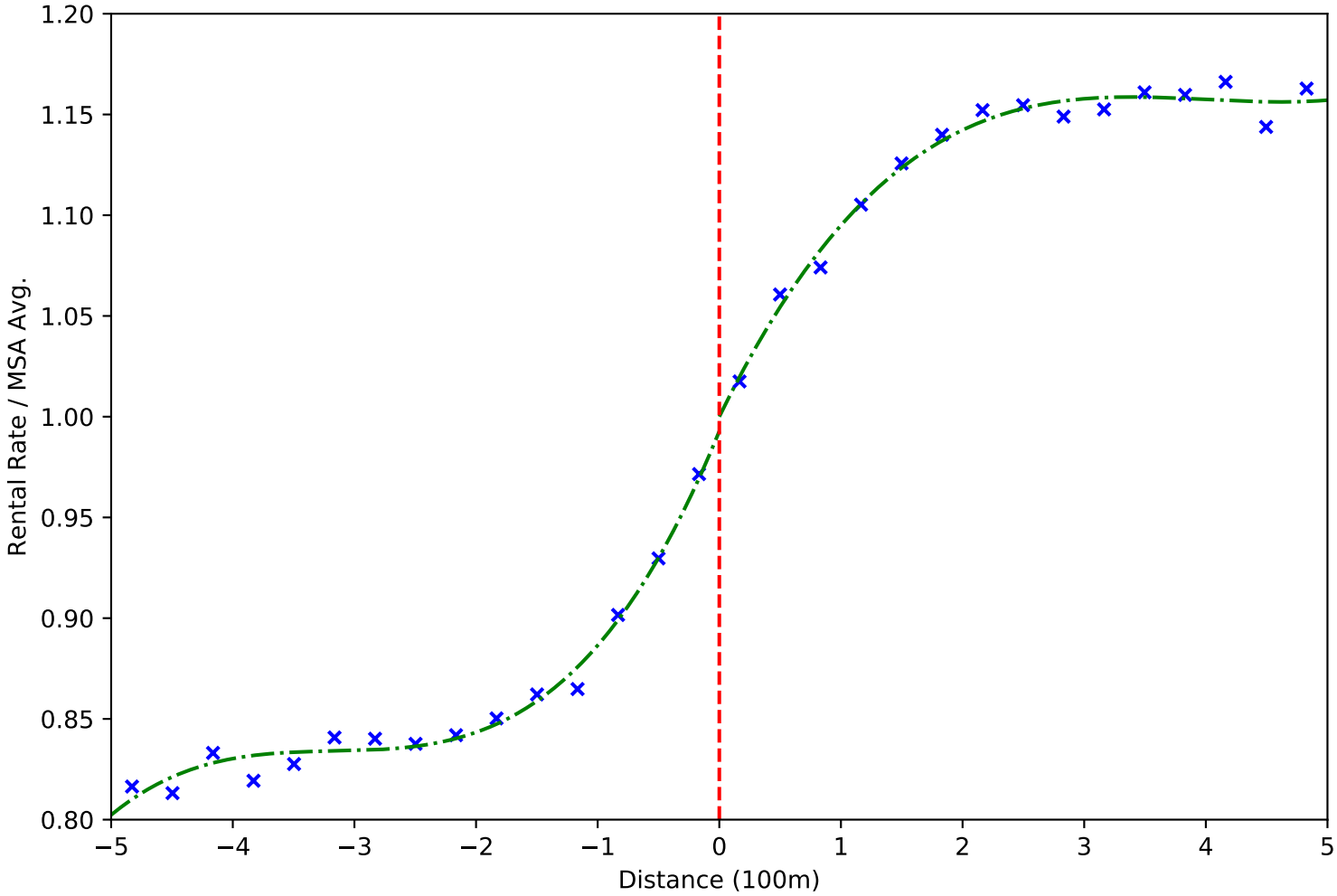
Testing the identification assumption

Are results driven by endogenous boundaries?

We address this concern in 2 ways:

1. Exclude boundaries that coincide with geographic features
2. Test for pre-existing (1940) differences in neighborhood characteristics

No effect on 1940 rental values



No effect on 1940 rental values

Dep. var. = 1940 rental rates	(1)	(2)	(3)
$\mathbb{1}(dist < 0)$	0.009	-0.007	-0.010
	(0.45)	(-0.59)	(-0.77)
N	56,505	56,498	55,565
R^2	0.365	0.608	0.680
FEs	Grade-Pair	Region-Pair	Border
Order Polynomial	3	3	3

...or other 1940 characteristics

Other Characteristics

	(1) Non-white	(2) Vacant	(3) Overcrowded	(4) Disrepair
$\mathbb{1}(dist < 0)$	0.447	0.001	0.025	-0.186
	(0.83)	(0.02)	(0.14)	(-0.52)
N	57,073	59,477	56,990	56,740
R^2	0.545	0.144	0.358	0.320
FEs	Border	Border	Border	Border
Order Polynomial	2	2	3	2

The channel

We consider two potential channels to explain the drop in HPs:

1. **Financing/Credit rationing**
2. **"Steering" of homeowners**

Financing/Credit rationing [1/2]

Test #1:

- Banks may have relied on HOLC maps as a substitute for monitoring
- Would expect this reliance to be weakened when "soft information" is available *[Petersen and Rajan, 2002]*
- Test this by examining historical bank branch proximity

For each census block: distance to the nearest bank branch operating in January, 1935 (FFIEC)

Local banks attenuate the effect

Dep. var. = 1990 house prices / MSA Avg.	(1)	(2)
$\mathbb{1}(dist < 0)$	-0.029***	-0.029***
	(-2.84)	(-3.43)
$\times$ *BankDistance*	-0.022**	-0.021***
	(-2.45)	(-3.06)
N	107,429	105,514
R^2	0.725	0.778
FEs	Region-Pair	Border
Order Polynomial	3	3

Financing/Credit rationing [2/2]

Test #2:

- Divestment may lead to deterioration of housing stock
  $\rightarrow$ lower HP through "disamenity effect" *[Gerardi et al., 2015]*
- May also expect to see more renters, which can also have negative externalities *[DiPasquale and Glaesar, 1999]*
- Test this by examining characteristics of the structure

Increase in vacancies, renters, overcrowding (1990)

Panel A: Percent Vacant			
$\mathbb{1}(dist < 0)$	0.628**	0.692***	0.700***
	(2.36)	(3.12)	(2.89)
N	115,786	115,778	113,886
R^2	0.049	0.230	0.291

Increase in vacancies, renters, overcrowding (1990)

Panel A: Percent Vacant			
$\mathbb{1}(dist < 0)$	0.628**	0.692***	0.700***
	(2.36)	(3.12)	(2.89)
N	115,786	115,778	113,886
R^2	0.049	0.230	0.291
Panel B: Percent Renter-Occupied			
$\mathbb{1}(dist < 0)$	1.633*	1.890***	1.619*
	(2.03)	(2.76)	(1.90)
N	115,523	115,516	113,622
R^2	0.127	0.486	0.562

Increase in vacancies, renters, overcrowding (1990)

Panel A: Percent Vacant			
$\mathbb{1}(dist < 0)$	0.628**	0.692***	0.700***
	(2.36)	(3.12)	(2.89)
N	115,786	115,778	113,886
R^2	0.049	0.230	0.291
Panel B: Percent Renter-Occupied			
$\mathbb{1}(dist < 0)$	1.633*	1.890***	1.619*
	(2.03)	(2.76)	(1.90)
N	115,523	115,516	113,622
R^2	0.127	0.486	0.562
Panel C: Percent Overcrowded			
$\mathbb{1}(dist < 0)$	0.019	0.327**	0.309***
	(0.09)	(2.66)	(2.94)
N	115,523	115,516	113,622
R^2	0.032	0.609	0.642
FEs	Grade-Pair	Region-Pair	Border

No evidence of a change in racial makeup (1990)

Dep. var. = Percent Non-white Household-head			
	(1)	(2)	(3)
$\mathbb{1}(dist < 0)$	0.645	-0.042	0.180
	(0.51)	(-0.10)	(0.48)
N	115,785	115,778	113,882
R^2	0.106	0.837	0.877
FEs	Grade-Pair	Region-Pair	Border
Order Polynomial	3	3	3

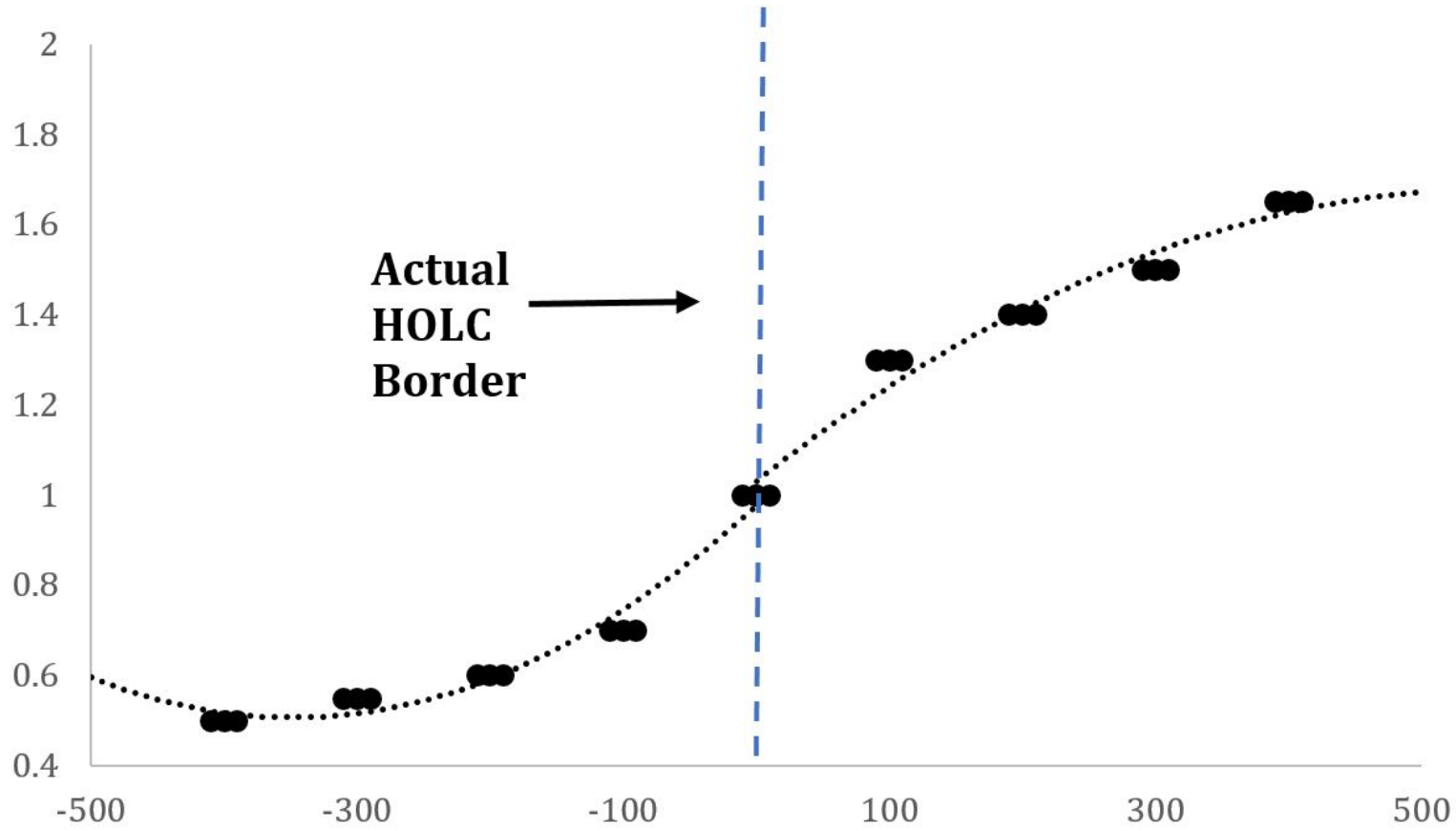
Conclusion

- We examine persistent effects of redlining in mortgage markets
- We find policy is associated with about a 3% decrease in 1990 house prices
  - Effect is more pronounced in areas farther from (historical) bank branches
  - Effect is not being driven by "*red*" regions
- Evidence points to negative externalities associated with renters and vacant homes, consistent with a credit rationing channel

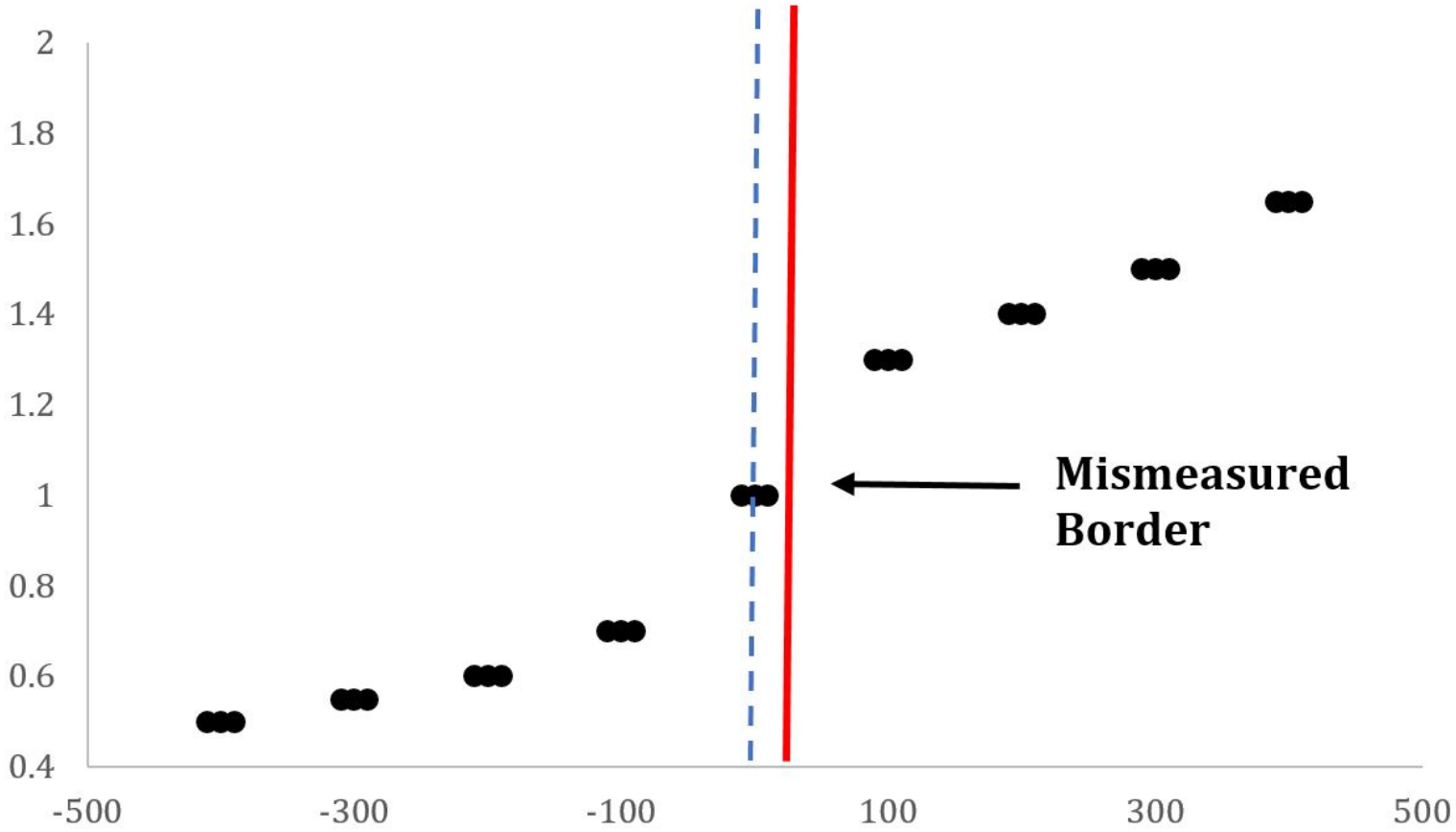
Conclusion

Thank You!

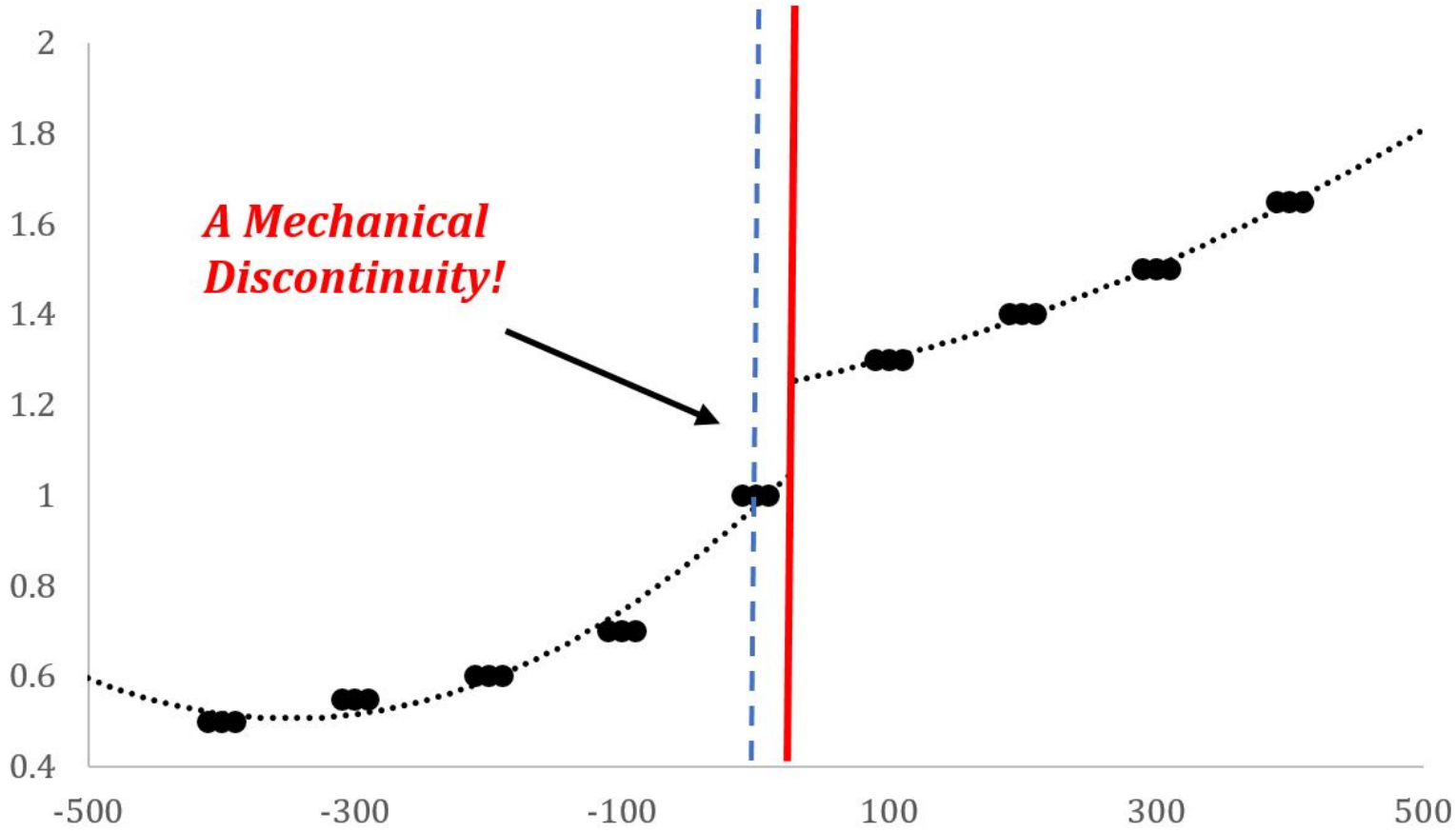
Mis-Measured Boundaries



Mis-Measured Boundaries



Mis-Measured Boundaries



Characteristics Across the Street

	(1)	(2)	(3)
	Panel A: House Price		
$\mathbb{1}$(Better Grade Side)	0.006	0.004	0.013
	(0.65)	(0.43)	(1.20)
N	230,790	183,844	119,842
R^2	0.796	0.821	0.870
	Panel B: House Price (nominal)		
$\mathbb{1}$(Better Grade Side)	-4.383	-28.282	11.316
	(-0.05)	(-0.25)	(0.09)
N	230,790	183,844	119,842
R^2	0.976	0.980	0.948
FEs	Street-Block	Street-Block	Street-Block
Bandwidth	200	150	100

Characteristics Across the Street

Panel E: 𝟙(Renter)			
𝟙(Better Grade Side)	-0.005*	-0.004	-0.005
	(-1.78)	(-1.21)	(-1.16)
N	675,148	539,123	360,101
R^2	0.285	0.284	0.284
Panel F: 𝟙(Radio)			
𝟙(Better Grade Side)	-0.002	-0.001	0.002
	(-0.62)	(-0.45)	(0.53)
N	675,148	539,123	360,101
R^2	0.200	0.201	0.194
Panel G: 𝟙(White)			
𝟙(Better Grade Side)	-0.001	-0.000	-0.001
	(-0.65)	(-0.69)	(-1.00)
N	675,148	539,123	360,101
R^2	0.636	0.625	0.628
FEs	Street-Block	Street-Block	Street-Block
Bandwidth	200	150	100