Zoning and the American Suburb

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The archetypal “American Suburb” (Levittown, PA)

The Long Run Impact of Zoning on Suburban Form

- We construct the first spatial panel dataset of zoning regulations from the original ordinances for suburban municipalities around Chicago from 1921 to 1980: Cook County Longitudinal Zoning Database.
- We establish new facts about early zoning and what development looked like before zoning.
- We provide the first long-run estimates of impacts of zoning on suburban form:
  - How did zoning shape the overall distribution of land use?
  - How did zoning affect residential neighborhoods?
  - What can we learn from more accessible data?

Preview of Results

1. Zoning had a striking effect on the form of the suburbs, primarily by shifting land towards single-family homes and away from everything else.

2. Lot sizes within residential neighborhoods were also affected, and earlier than widely believed.

3. However, an extraordinary amount of information is needed to establish causality of zoning with respect to land use because zoning ordinances always reflected existing land use.

Cook County Longitudinal Zoning Database

- Available for download now (see my website).
- Includes maps + associated bylaws, updated each decade.
- Complements existing sources of zoning data from surveys like WRLURI (many), the National Zoning Atlas (Xu et al., 2023), and new ChatGPT approaches (Bartik et al., 2025).

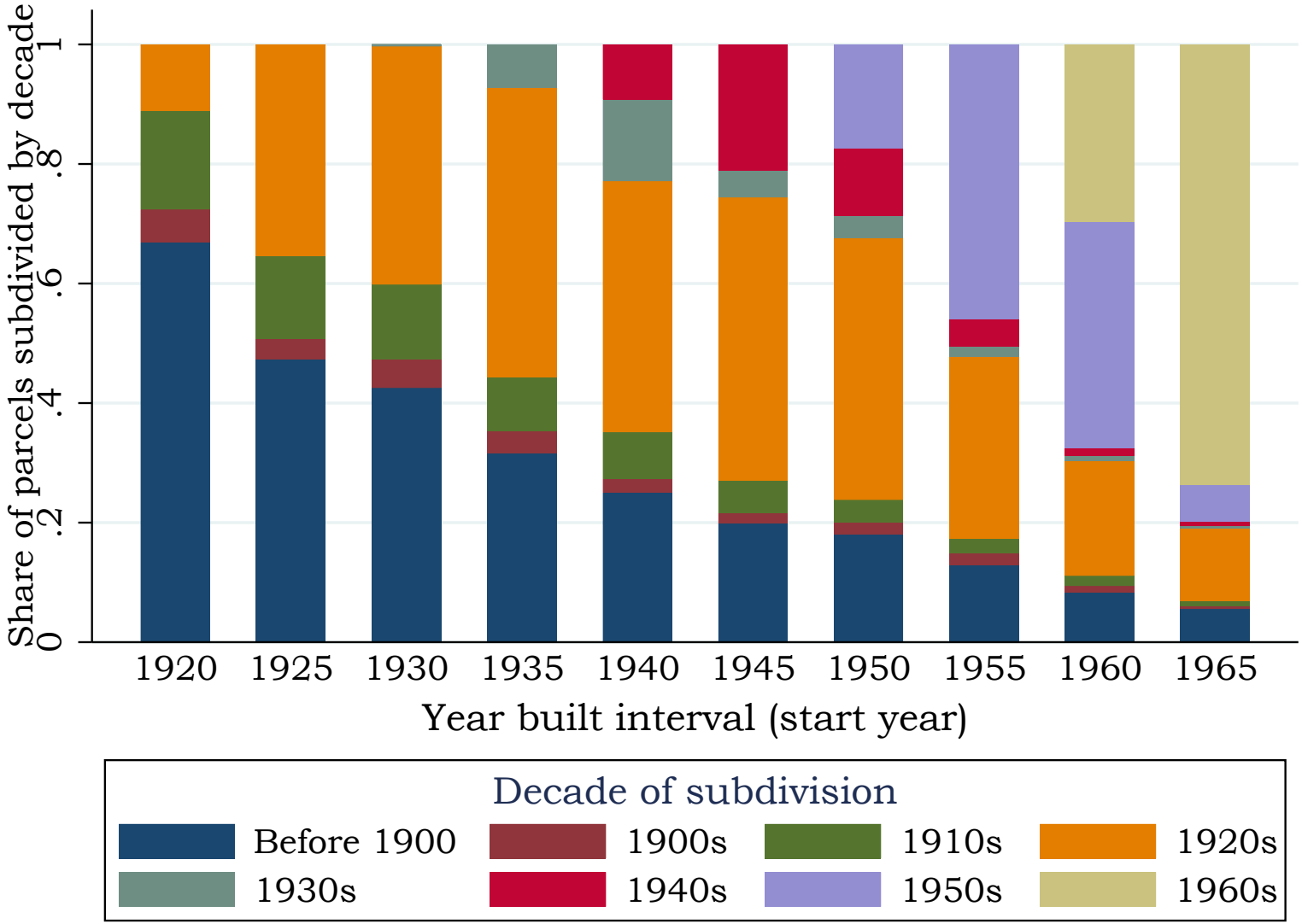
Zoning literature in economics

- Current zoning is reducing affordability, mobility, and economic growth (Ganong & Shoag, 2017; Glaeser & Gyourko, 2018; Gyourko & Krimmel, 2021; Schuetz, 2022).
- Short-run impacts of zoning on undeveloped areas (Turner et al., 2014) and on existing built areas (Anagol et al., 2021; Kulka et al., 2026; McMillen & McDonald, 2002).
- Zoning is clearly a constraint on current (re)development, especially in central cities (Rollet, 2025; Diamond, Huang, and McQuade, 2024), but also as form of growth control in the suburbs (Ellickson, 2022).
- Households place a huge premium on low density (Gyourko & McCulloch, 2023) and use zoning to maintain segregation (Trounstine, 2020).
- Identification in this literature very difficult, both because of measurement (Lewis & Marantz, 2019) and reverse causality (Molloy, 2020).
- Studies of the long-run impact of imputed minimum lot size (MLS) regulations (Cui, 2024; Macek, 2024; Song, 2025; Zabel & Dalton, 2011).

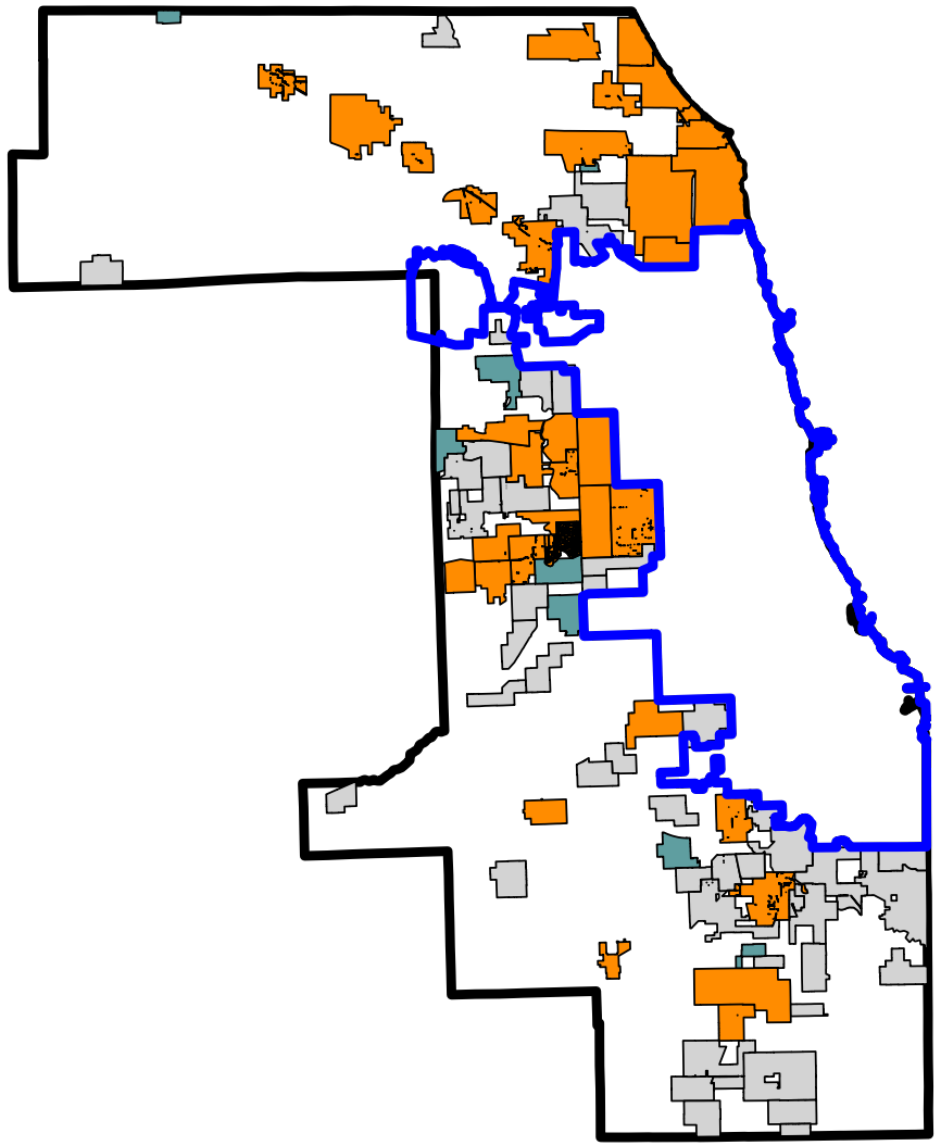
Another Critical Data Source - Subdivision Records

1. We obtained subdivision dates for parcels in Cook County (via public records request).
2. Parcels often platted years before a structure was built.
3. In Cook County, the median gap between year of plat and year current house built is 18 years. In the Hennepin County sample used by Sood and Ehrman-Solberg, the gap is 14 years.

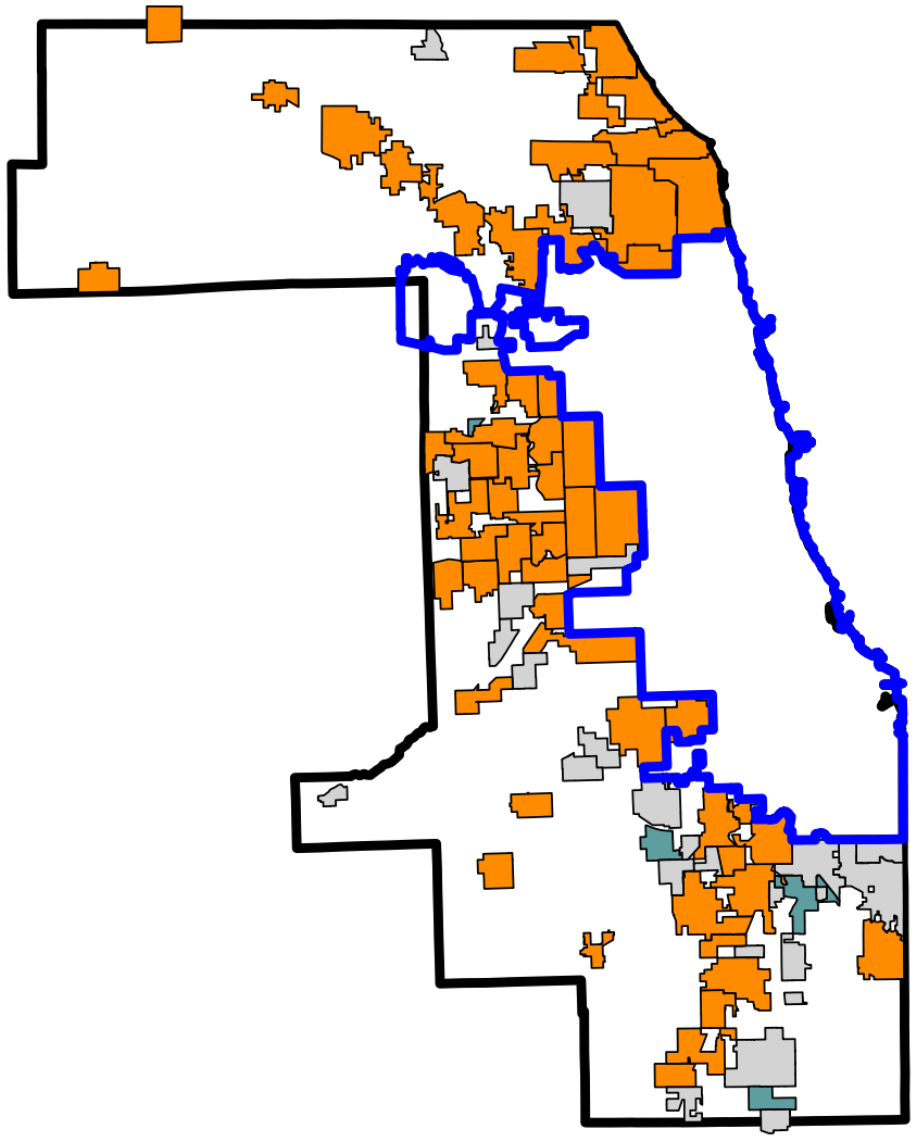
Year Built in Cotality ≠ Year Lot Subdivided



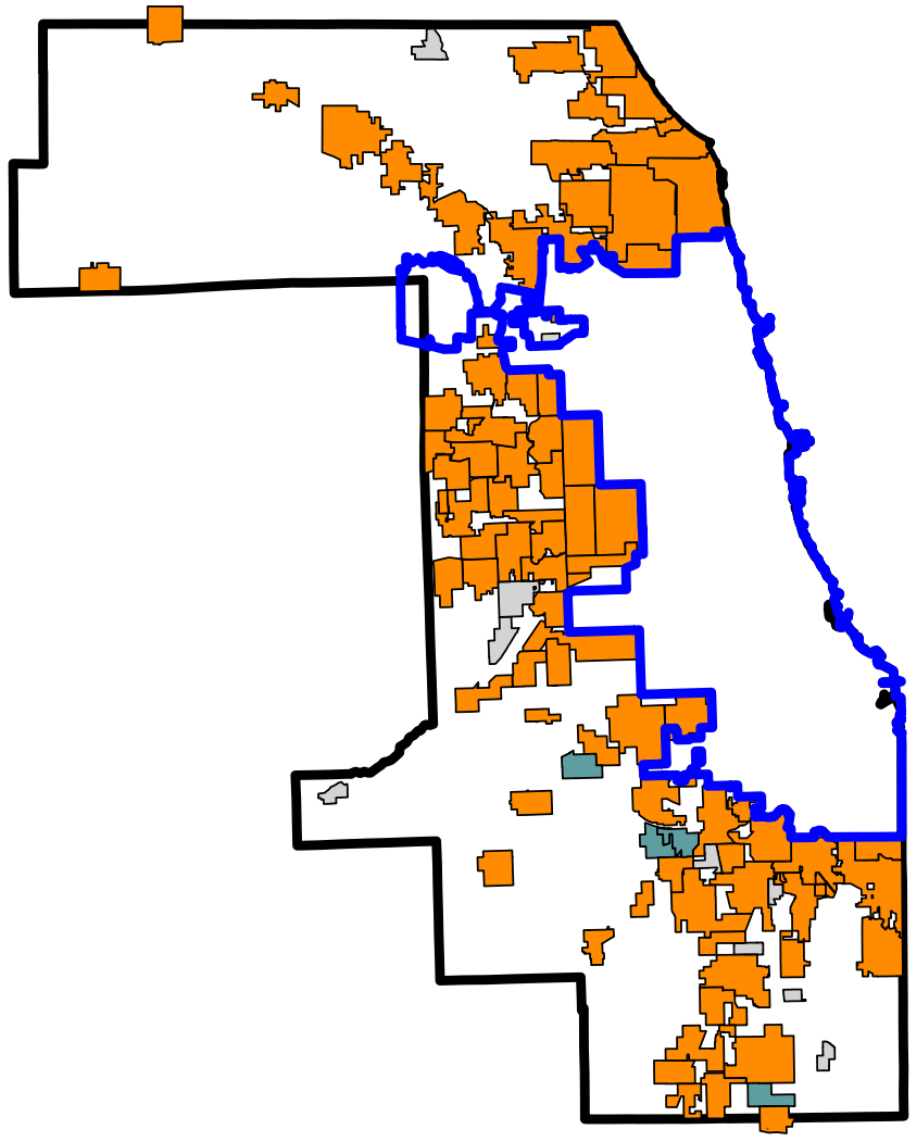
Cook County suburban zoning - 1920s



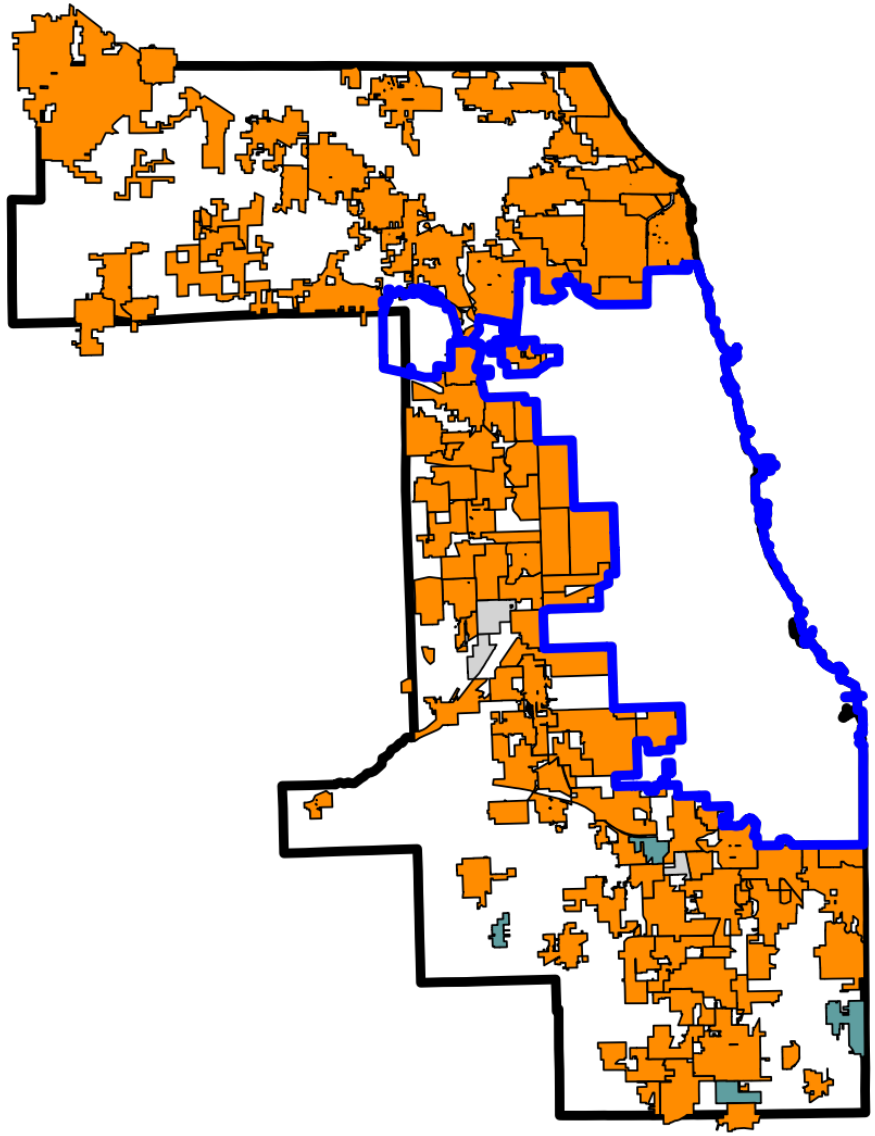
Cook County suburban zoning - 1940



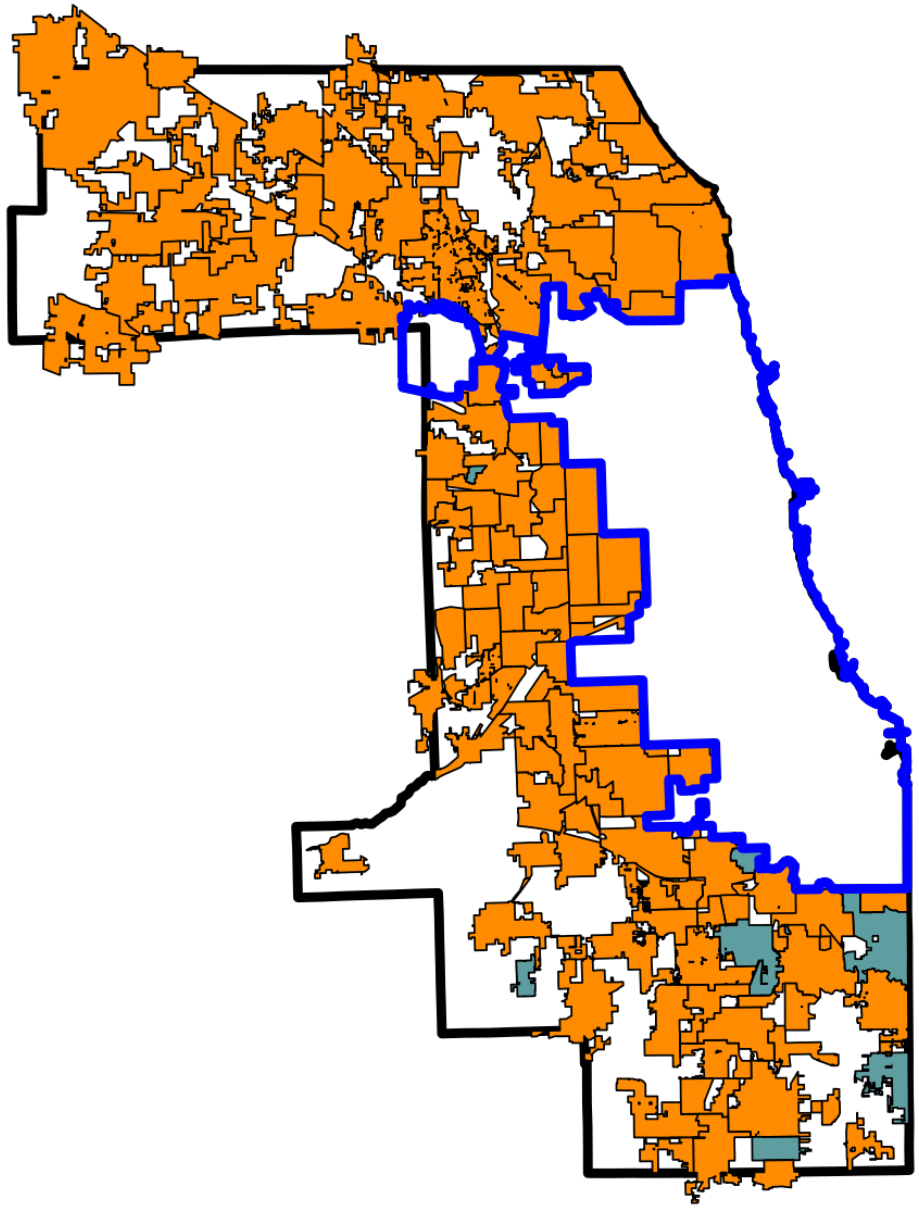
Cook County suburban zoning - 1950



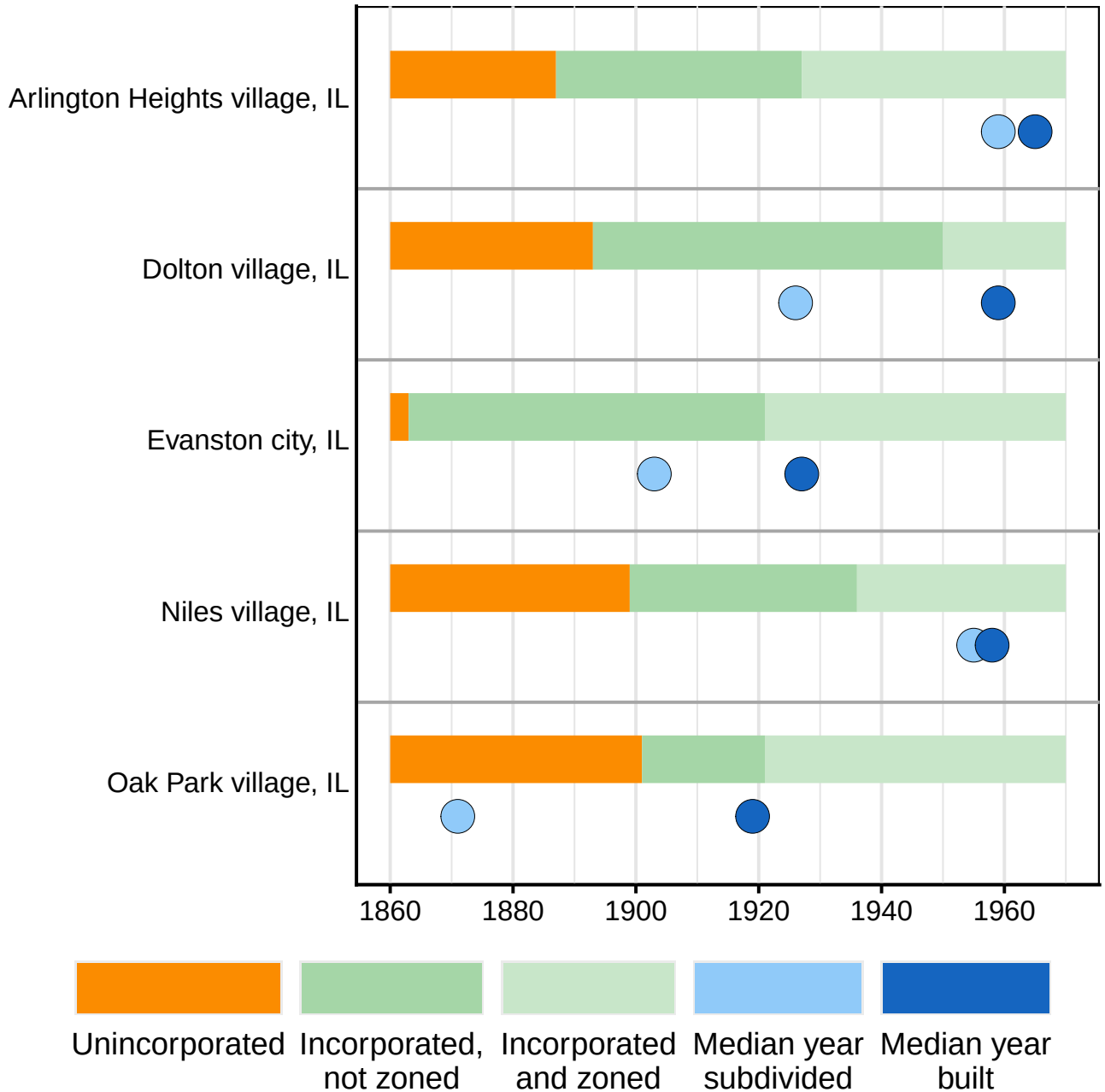
Cook County suburban zoning - 1960



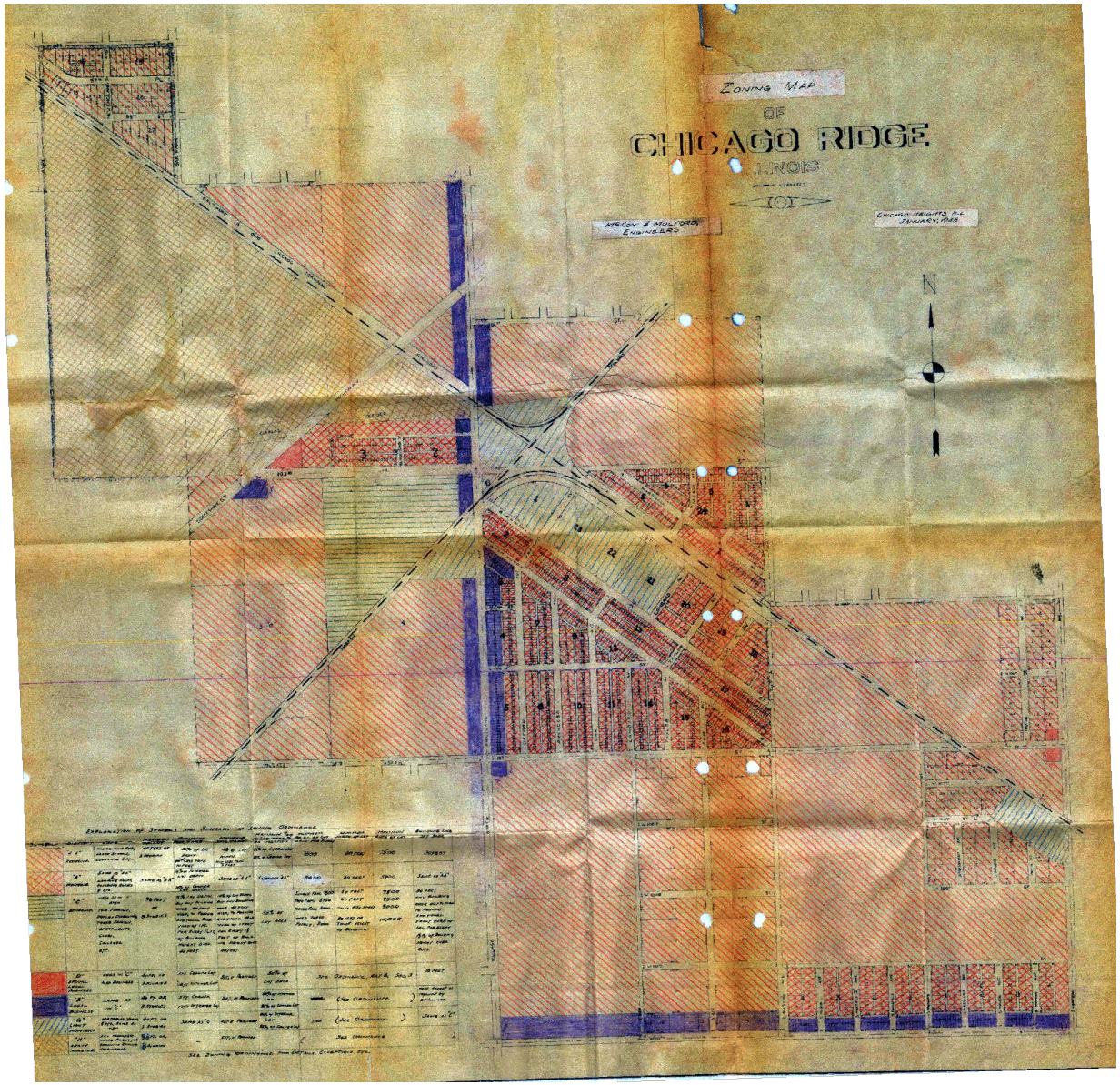
Cook County suburban zoning - 1970



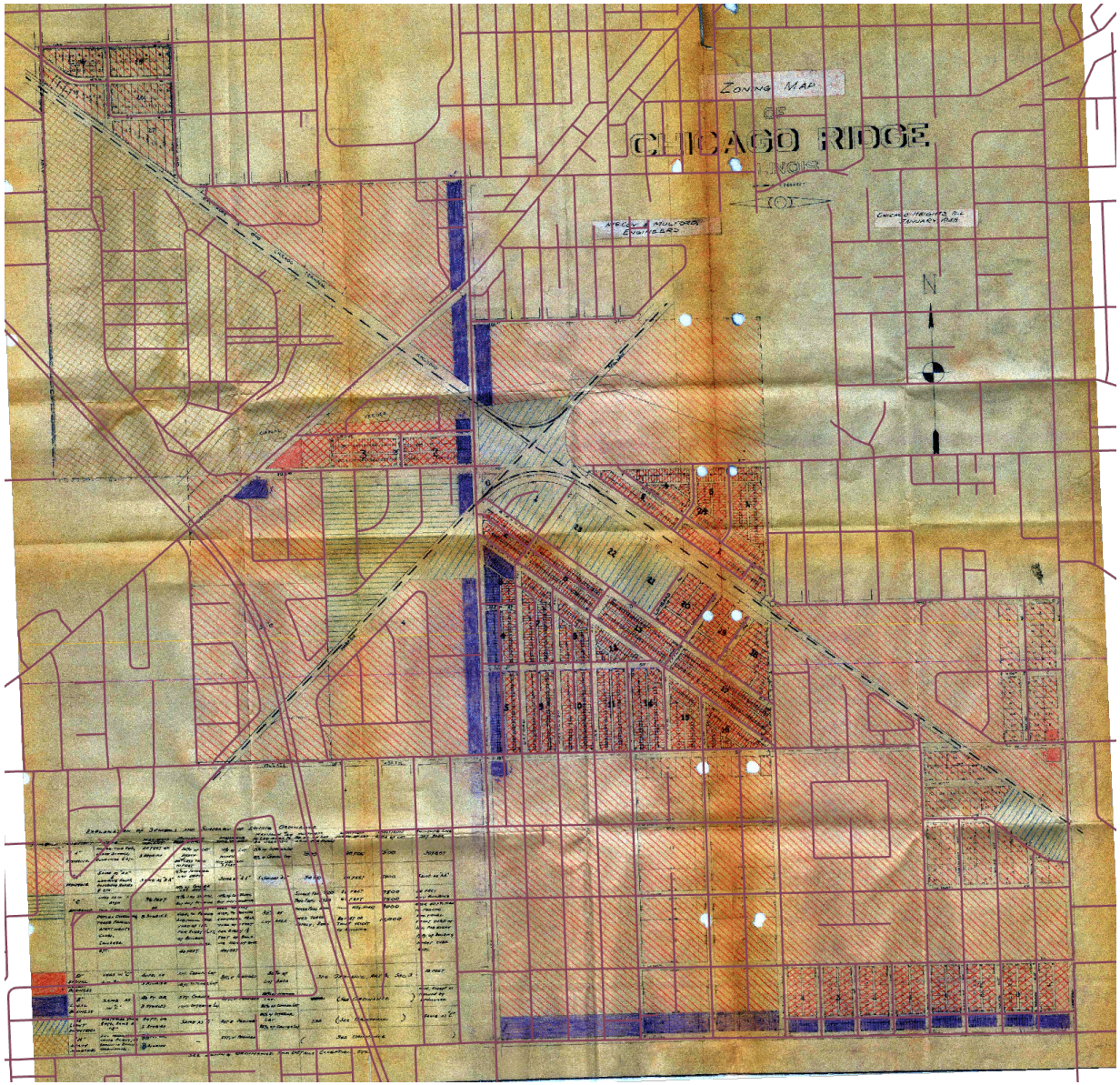
Timeline of zoning adoption



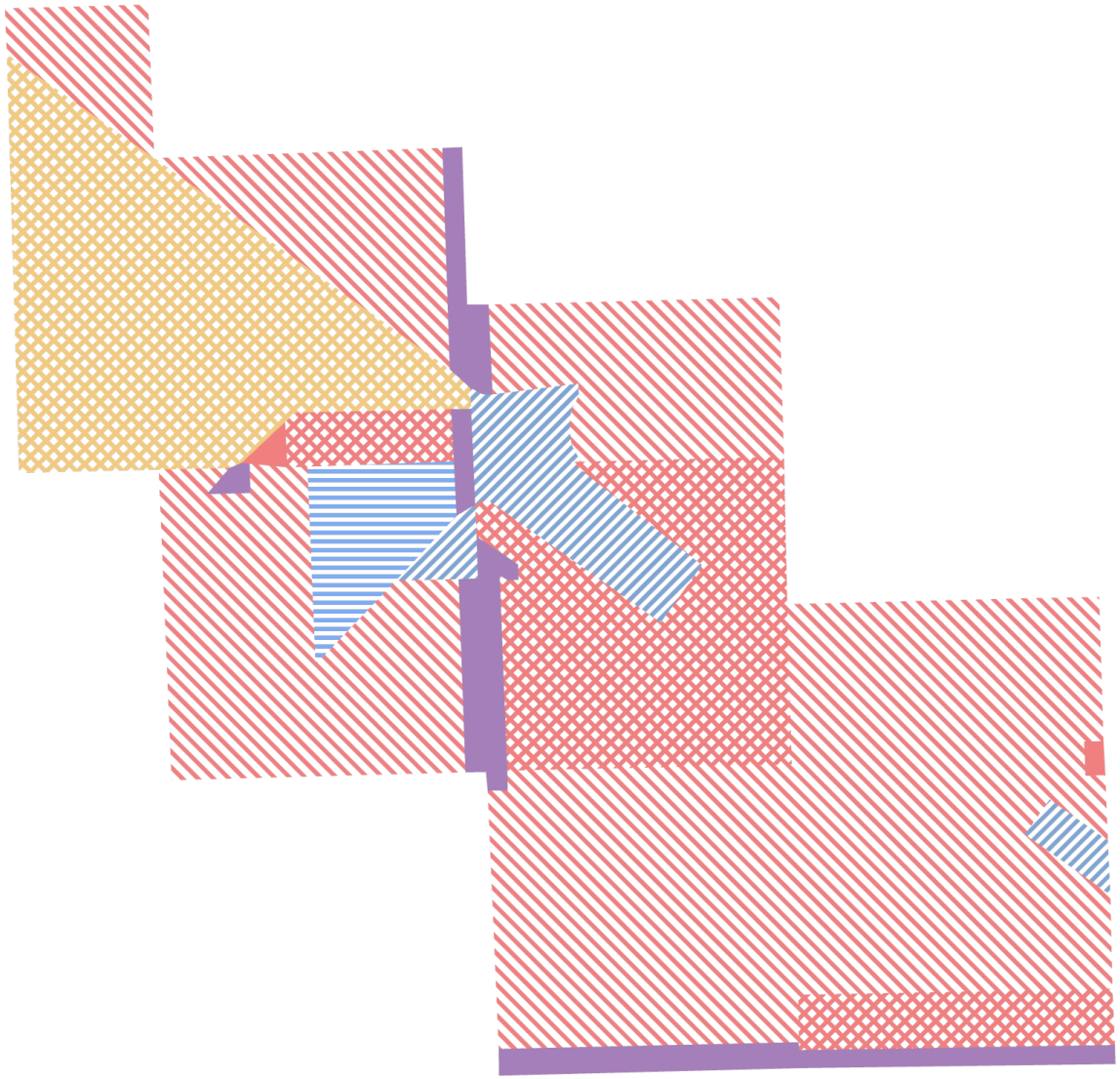
Spatial data - Chicago Ridge zoning map from 1945



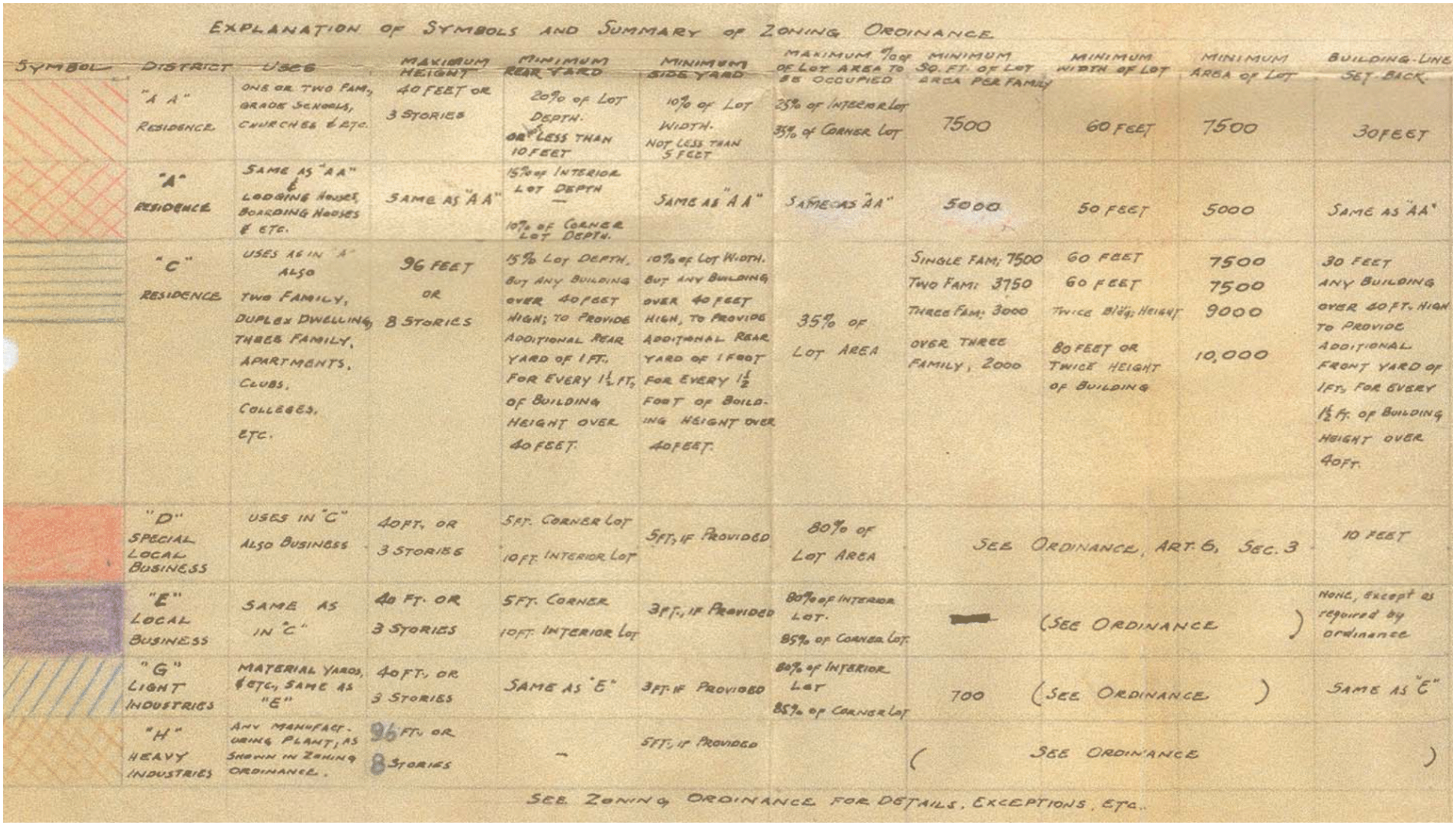
With street file



Zoning area shape file



Associated bylaws



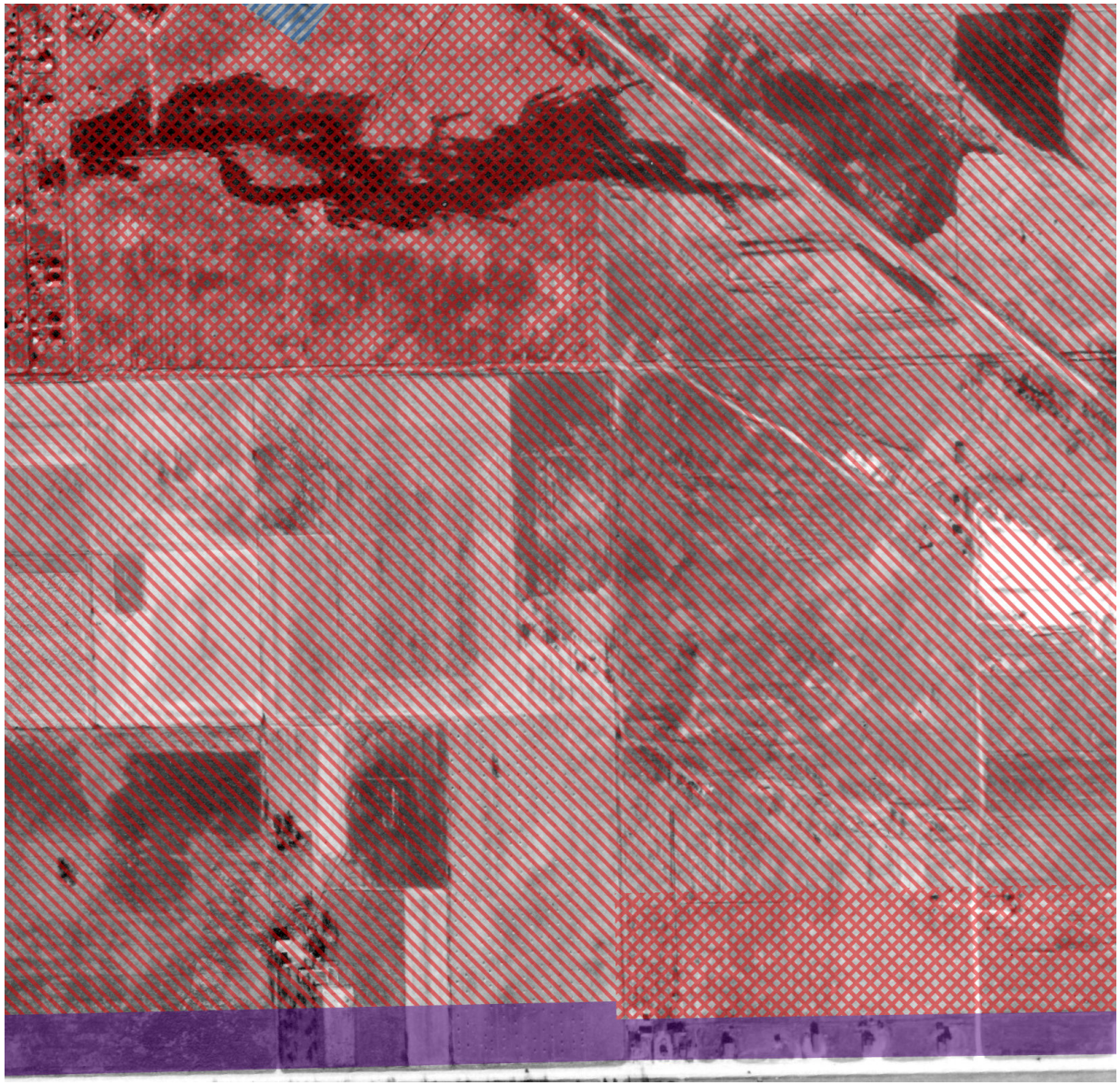
EXPLANATION OF SYMBOLS AND SUMMARY OF ZONING ORDINANCE

SYMBOL	DISTRICT	USES	MAXIMUM HEIGHT	MINIMUM REAR YARD	MINIMUM SIDE YARD	MAXIMUM % OF LOT AREA TO BE OCCUPIED	MINIMUM SQ. FT. OF LOT AREA PER FAMILY	MINIMUM WIDTH OF LOT	MINIMUM AREA OF LOT	BUILDING-LINE SET BACK
	"A A" RESIDENCE	ONE OR TWO FAM., GRADE SCHOOLS, CHURCHES & ETC.	40 FEET OR 3 STORIES	20% of LOT DEPTH. OR LESS THAN 10 FEET	10% of LOT WIDTH. NOT LESS THAN 5 FEET	25% of INTERIOR LOT 35% of CORNER LOT	7500	60 FEET	7500	30 FEET
	"A" RESIDENCE	SAME AS "AA" & LODGING HOUSES, BOARDING HOUSES & ETC.	SAME AS "AA"	15% of INTERIOR LOT DEPTH — 10% of CORNER LOT DEPTH.	SAME AS "AA"	SAME AS "AA"	5000	50 FEET	5000	SAME AS "AA"
	"C" RESIDENCE	USES AS IN "A" ALSO TWO FAMILY, DUPLEX DWELLING, THREE FAMILY, APARTMENTS, CLUBS, COLLEGES, ETC.	96 FEET OR 8 STORIES	15% LOT DEPTH, BUT ANY BUILDING OVER 40 FEET HIGH; TO PROVIDE ADDITIONAL REAR YARD OF 1 FT. FOR EVERY 1½ FT. OF BUILDING HEIGHT OVER 40 FEET.	10% of LOT WIDTH. BUT ANY BUILDING OVER 40 FEET HIGH, TO PROVIDE ADDITIONAL REAR YARD OF 1 FOOT FOR EVERY 1½ FOOT OF BUILDING HEIGHT OVER 40 FEET.	35% OF LOT AREA	SINGLE FAM: 7500 TWO FAM: 3750 THREE FAM: 3000 OVER THREE FAMILY, 2000	60 FEET 60 FEET TWICE Bldg. HEIGHT 80 FEET OR TWICE HEIGHT OF BUILDING	7500 7500 9000 10,000	30 FEET ANY BUILDING OVER 40 FT. HIGH TO PROVIDE ADDITIONAL FRONT YARD OF 1 FT. FOR EVERY 1½ FT. OF BUILDING HEIGHT OVER 40 FT.
	"D" SPECIAL LOCAL BUSINESS	USES IN "C" ALSO BUSINESS	40 FT. OR 3 STORIES	5 FT. CORNER LOT 10 FT. INTERIOR LOT	5 FT. IF PROVIDED	80% of LOT AREA	SEE ORDINANCE, ART. 6, SEC. 3			10 FEET
	"E" LOCAL BUSINESS	SAME AS IN "C"	40 FT. OR 3 STORIES	5 FT. CORNER 10 FT. INTERIOR LOT	3 FT., IF PROVIDED	80% of INTERIOR LOT. 85% of CORNER LOT.	—	(SEE ORDINANCE)		NONE, except as required by ordinance
	"G" LIGHT INDUSTRIES	MATERIAL YARDS, & ETC., SAME AS "E"	40 FT. OR 3 STORIES	SAME AS "E"	3 FT. IF PROVIDED	80% of INTERIOR LOT 85% of CORNER LOT	700	(SEE ORDINANCE)		SAME AS "E"
	"H" HEAVY INDUSTRIES	ANY MANUFACTURING PLANT, AS SHOWN IN ZONING ORDINANCE.	96 FT. OR 8 STORIES	—	5 FT. IF PROVIDED	(SEE ORDINANCE)				

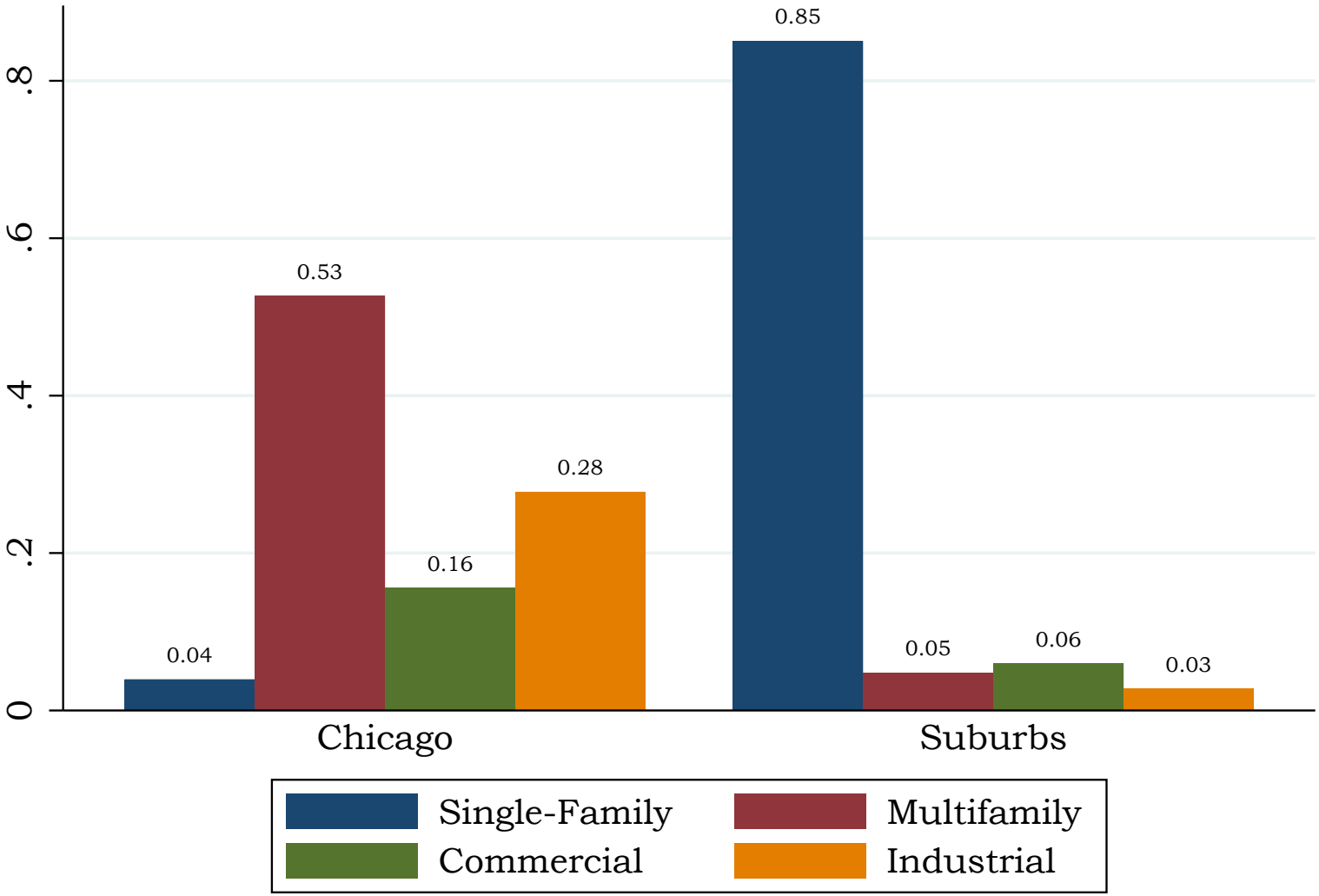
SEE ZONING ORDINANCE FOR DETAILS, EXCEPTIONS, ETC.

Before there was google maps

Undeveloped land with different zoning classifications



Municipalities zoned in the 1920s



Chicago and 35 suburbs

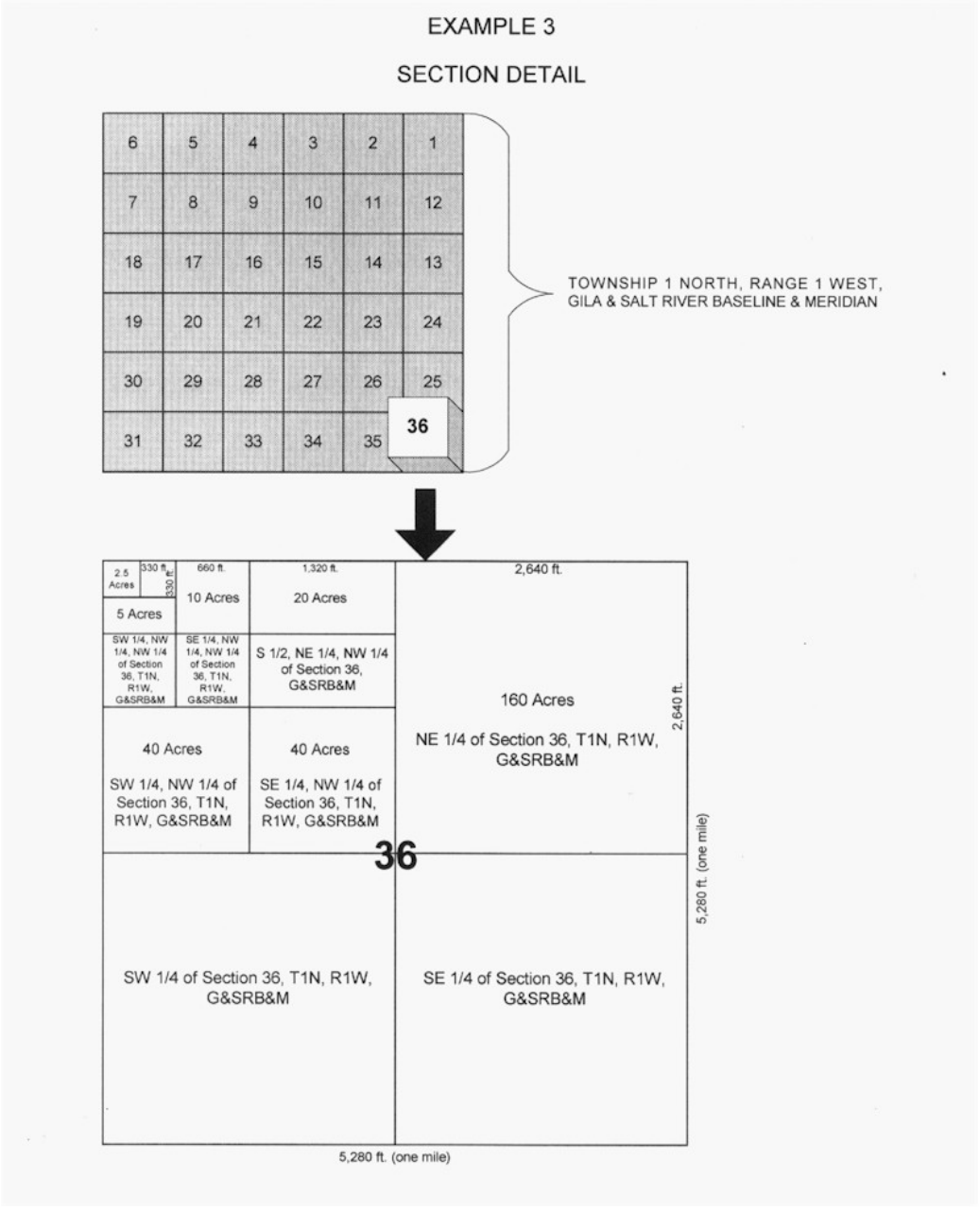
Empirical results

1. **Impacts of zoning on overall distribution of land in suburbs**
2. Impacts of zoning on residential neighborhoods
3. What can we learn from more accessible data?

Zoning and the overall distribution of land use

- We focus on the restrictiveness of zoning on undeveloped land.
- Observations based on quarter-mile sections of the Public Land Survey System.

PLSS divisions



Measuring the diversity of zoning and land use

- For each neighborhood, calculate shares zoned for different uses in each decade and create an entropy index.
- Also calculated share devoted to actual uses today using the same categories (plus townhomes).
- Diversity is given by

$$\sum_{i=1}^{N} s_i \ln(\frac{1}{s_i})$$

where N is the number of categories and s_i is the share of land devoted to land use/zone i.

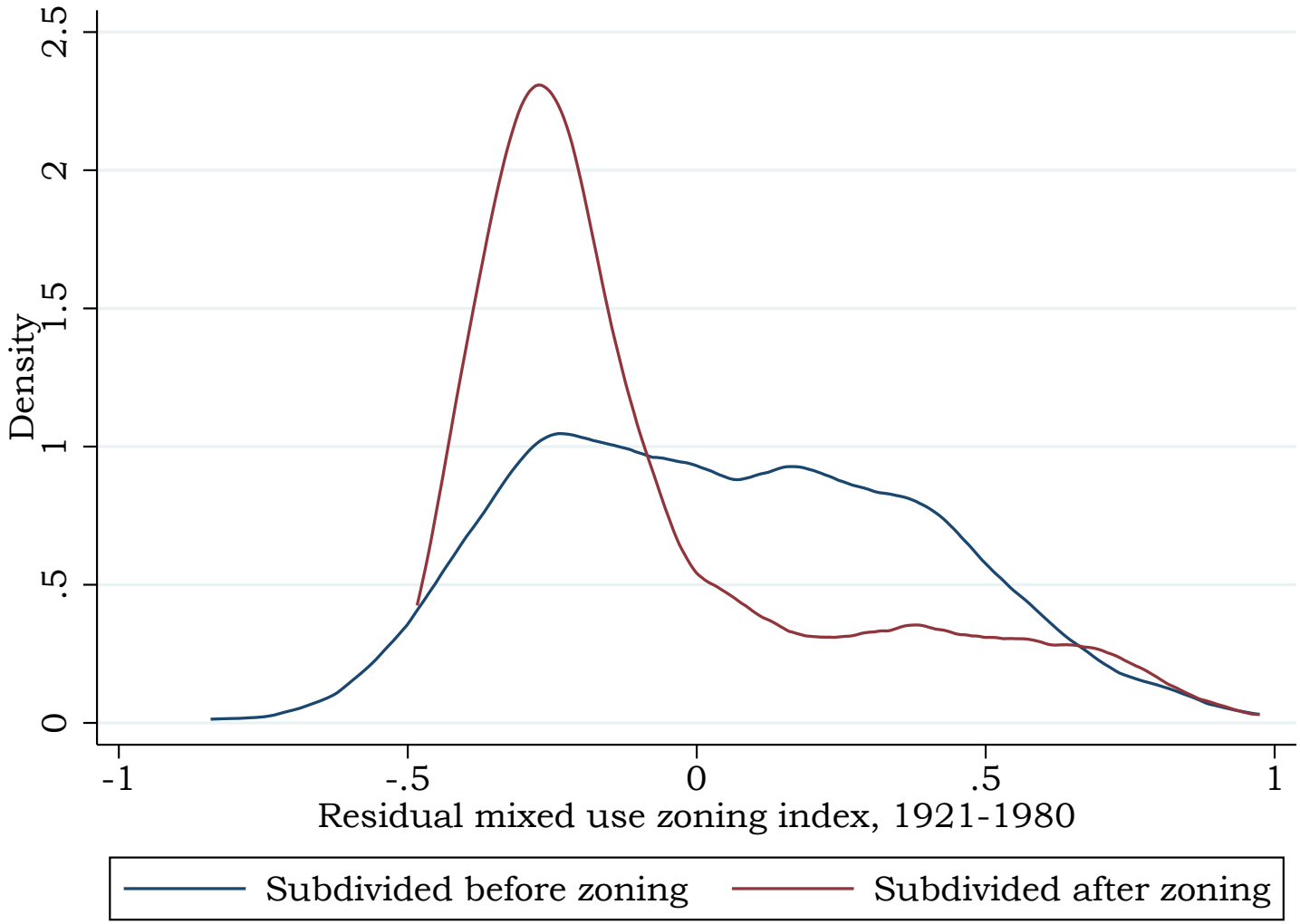
Entropy of post-zoning land use: low diversity

Entropy of post-zoning land use: high diversity

How did zoning change overall distribution of land use?

- First comparison: Quarter-sections subdivided before zoning vs. those subdivided after zoning.
- Residualize out factors that may have influenced development, such as:
  - decade of development,
  - distance to the nearest river and Lake Michigan,
  - distance to the CBD, city boundary, and various land use areas of Chicago,
  - distance to nearest railroad, commuter railroad, and rail station,
  - 1940 population and Black share,
  - 1943 land values.

Zoning diversity (residualized)



Empirical specification for impact of zoning

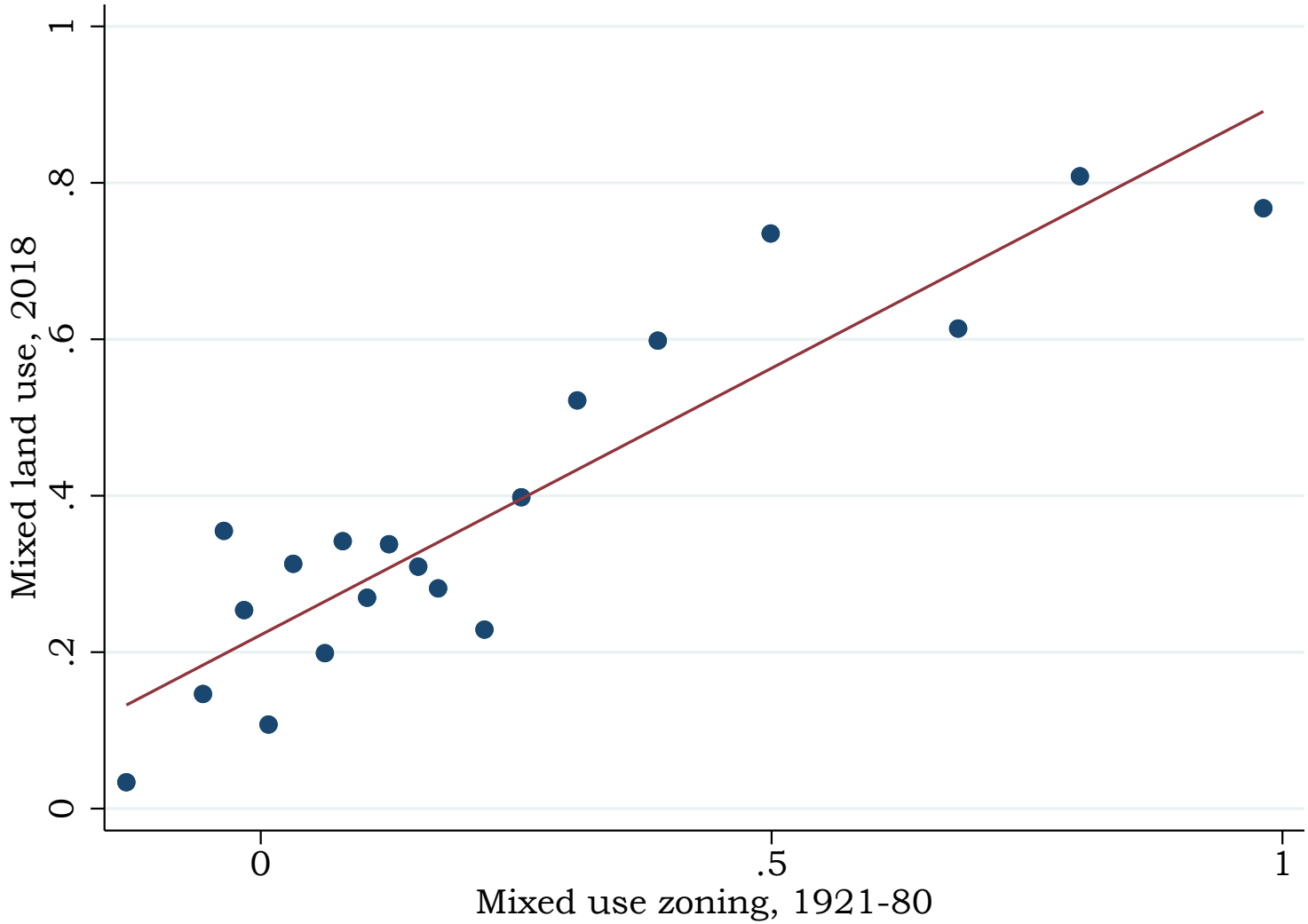
Our regressions take the form of:

$$y_i = \alpha + \beta z_i + \gamma' X + \epsilon,$$

where y_i is our outcome of interest.

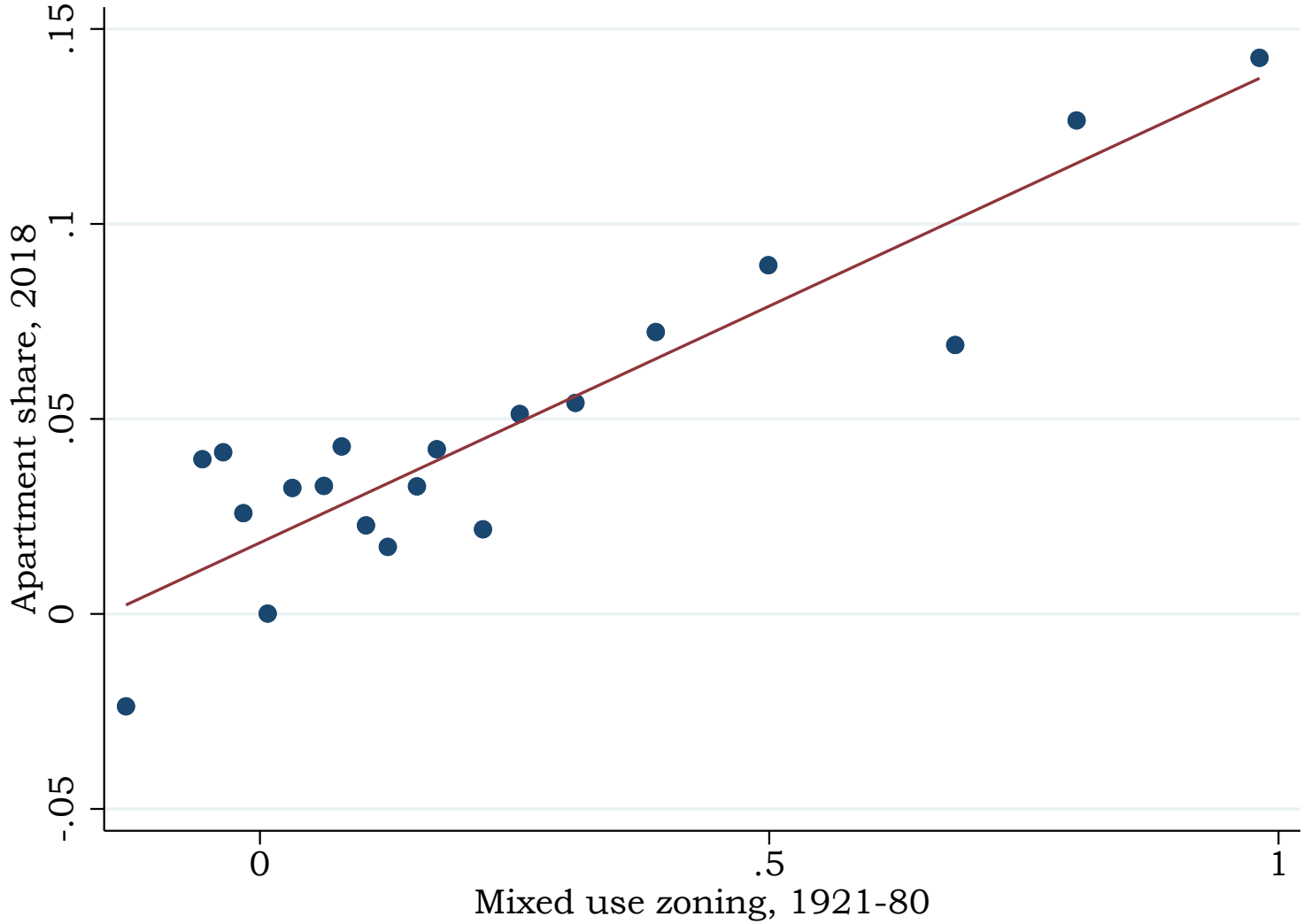
- Outcomes: 2018 land use diversity, commercial share, apartment share, and Walkscore of the neighborhood.
- z_i is the diversity index of zoning for PLSS quarter-section i.
- X includes aforementioned controls.
- Limit sample to only places where $\geq$90% of subdivision occurs after zoning.
- Isolate causal effect by focusing on "arbitrary" zoning of undeveloped land.

Impact of zoning on land use diversity



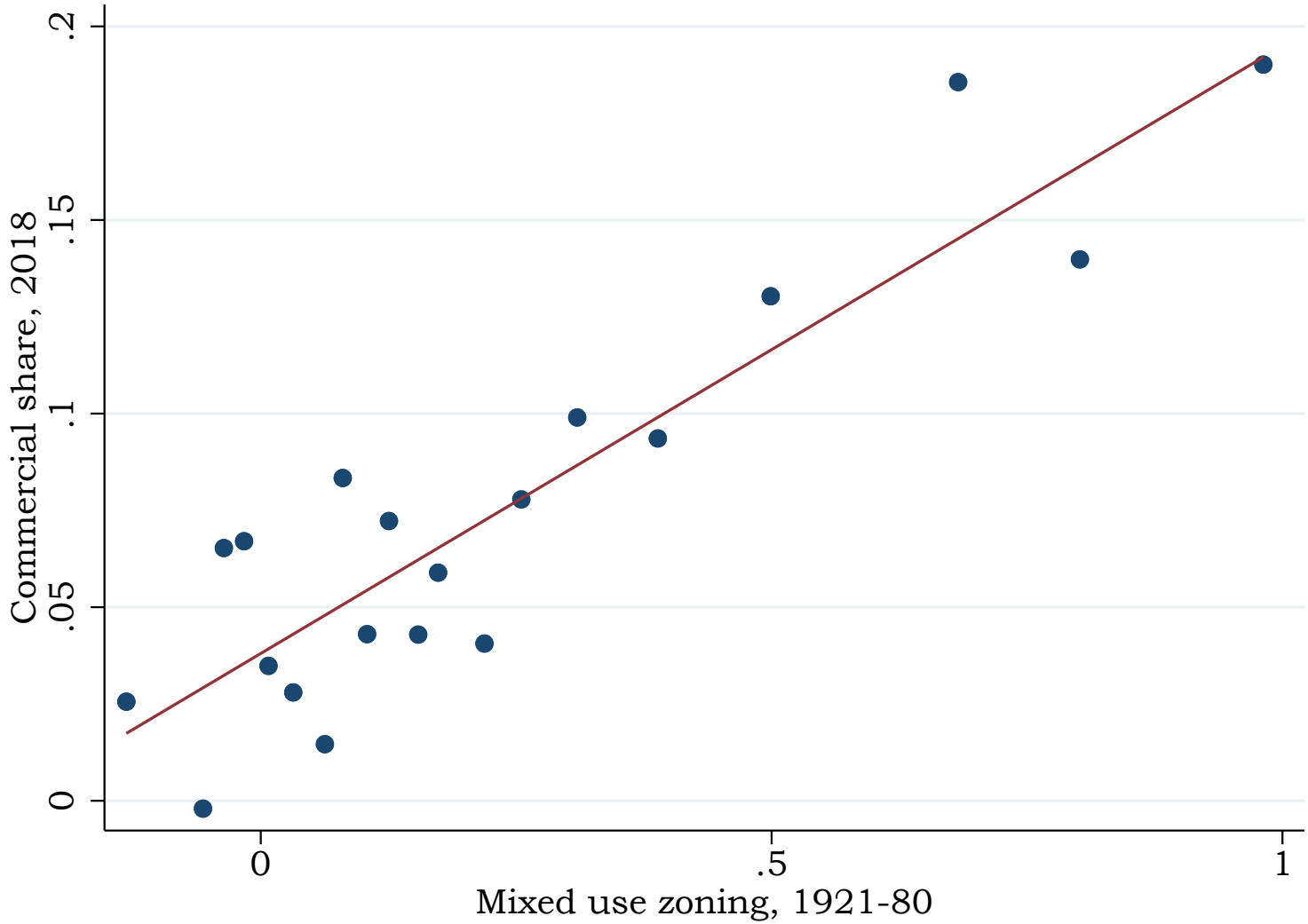
Outcome/predictor orthogonalized to controls for distances/time of development/1943 land values. 90% of subdivision after zoning.

Impact of zoning on apartment share



Outcome/predictor orthogonalized to controls for distances/time of development/1943 land values. 90% of subdivision after zoning.

Impact of zoning on commercial share



Outcome/predictor orthogonalized to controls for distances/time of development/1943 land values. 90% of subdivision after zoning.

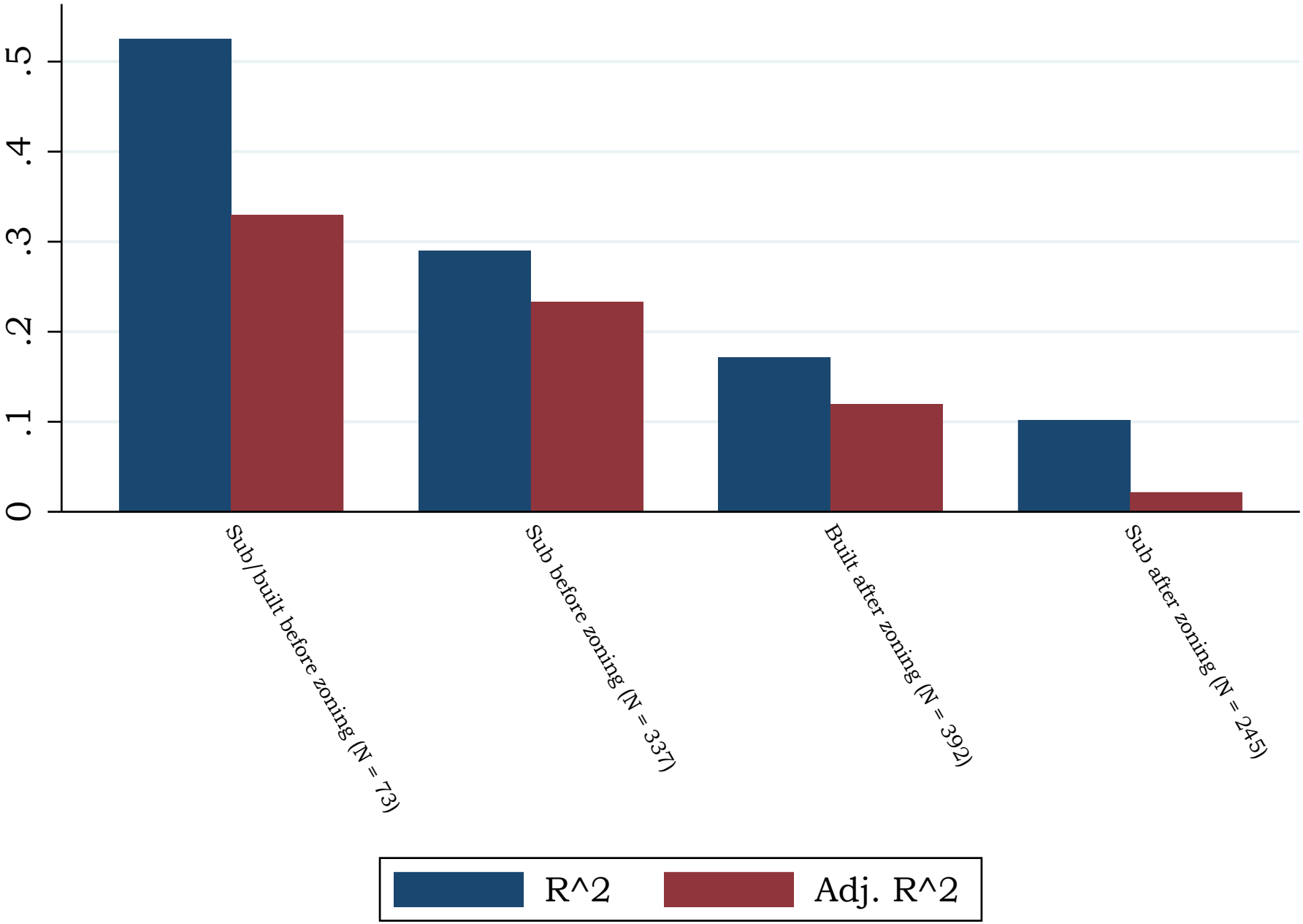
Causal impacts of zoning

	Land use diversity, 2018		Single family, 2018		Apartment, 2018		Commercial, 2018	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mixed use zoning, 1921-80	.68***	.69***	-.44***	-.45***	.12***	.12***	.16***	.15***
	(.074)	(.065)	(.059)	(.054)	(.035)	(.035)	(.032)	(.03)
Observations	245	245	245	245	245	245	245	245
R^2	0.37	0.31	0.41	0.25	0.27	0.11	0.22	0.15
Median of outcome	0.25	0.25	0.93	0.93	0.00	0.00	0.02	0.02
Controls	Yes	No	Yes	No	Yes	No	Yes	No

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The least restrictively zoned squares have 12% more land for apartments and 16% more land for stores today relative to the most restrictively zoned. Single-family share cut in half.

Can you predict zoning diversity?



Causal and "causal" impacts of zoning

	Land use diversity, 2018			
	(1)	(2)	(3)	(4)
Mixed use zoning, 1921-80	.68***	.61***	.5***	.65***
	(.074)	(.057)	(.053)	(.097)
Observations	245	392	337	73
R^2	0.37	0.34	0.39	0.84
Med. 1940 population	0	6	422	2,099
Controls	Yes	Yes	Yes	Yes
Subdivided after zoning	Yes	No	No	No
Built after zoning	No	Yes	No	No
Subdivided before zoning	No	No	Yes	Yes
Built before zoning	No	No	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Empirical results

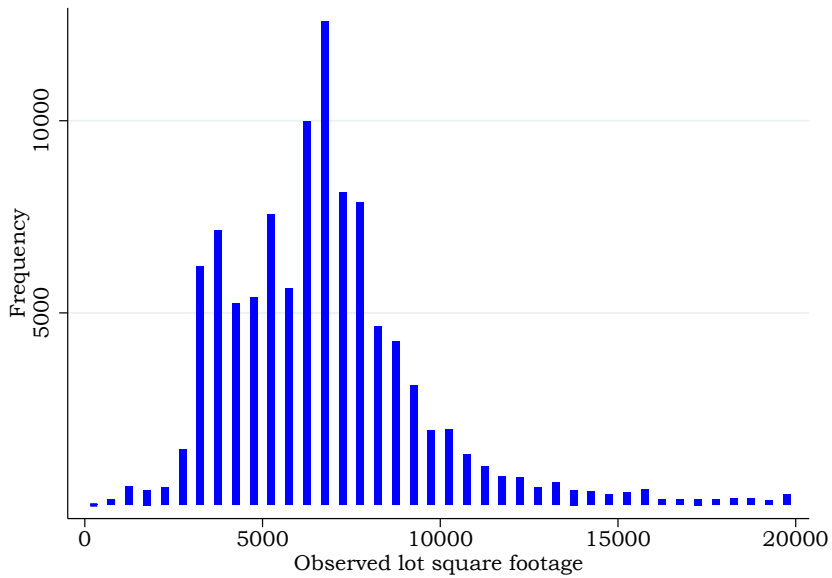
1. Impacts of zoning on overall distribution of land in suburbs
2. **Impacts of zoning on residential neighborhoods**
3. What can we learn from more accessible data?

- Did zoning affect prewar residential neighborhoods?
  - Zoned subdivisions had lot sizes $\approx 20\%$ larger than non-zoned.
  - Density regulations were binding as early as the 1920s.
- Postwar MLS - see paper.

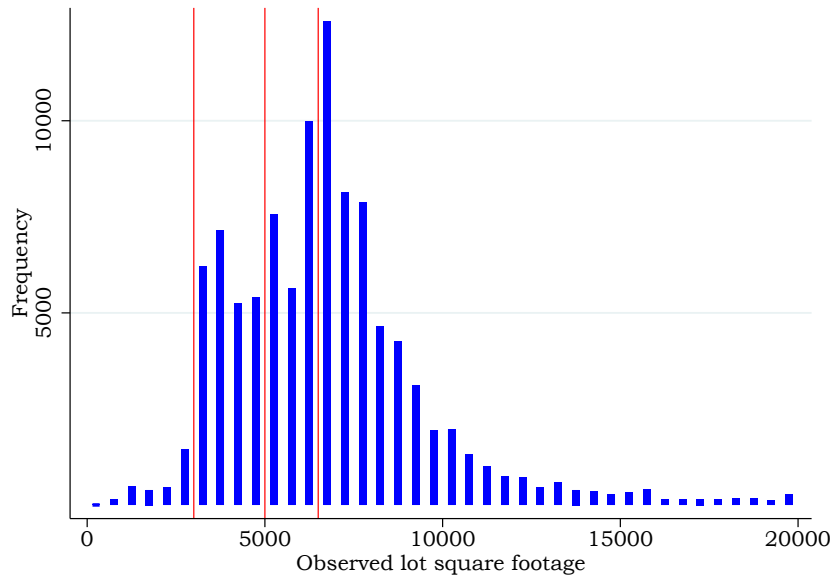
Empirical results

1. Impacts of zoning on overall distribution of land in suburbs
2. Impacts of zoning on residential neighborhoods
3. **What can we learn from more accessible data?**

Distribution of lot sizes for all houses built in the 1950s

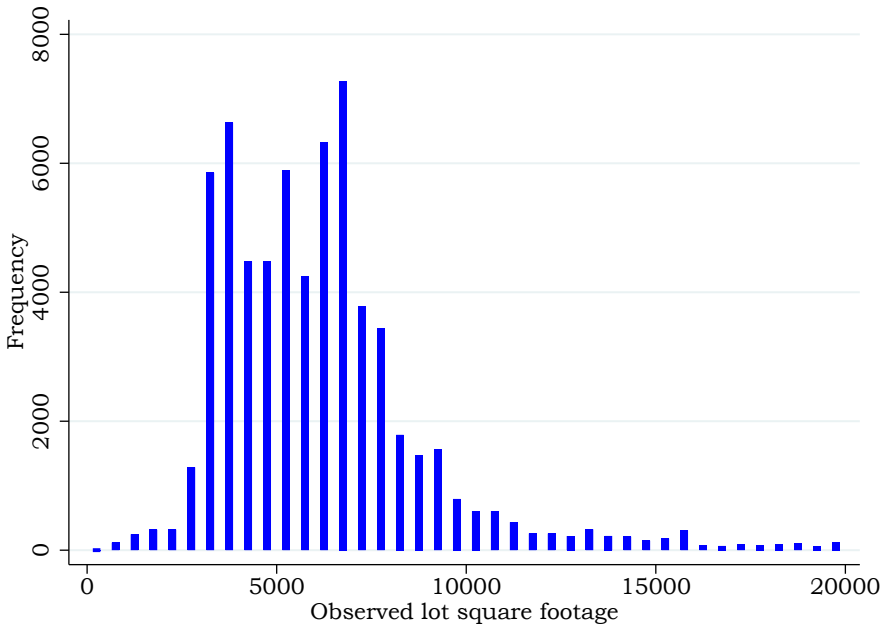


All houses built 1950s

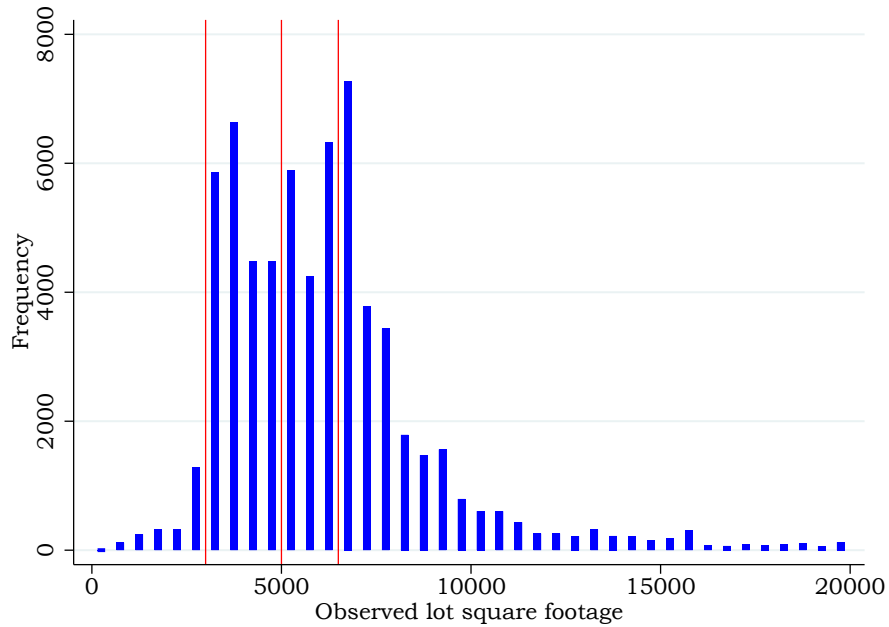


With common MLSs

Distribution of lot sizes if subdivided *before zoning*

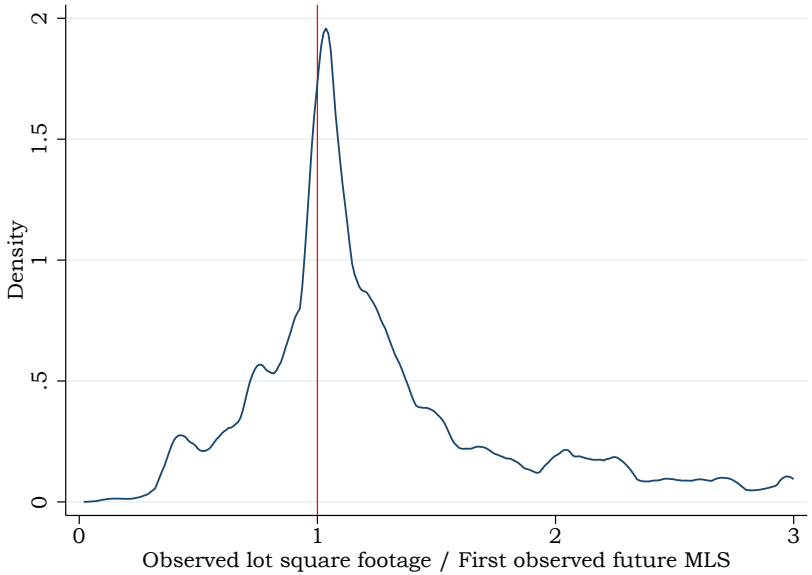


Subdivided prior to zoning

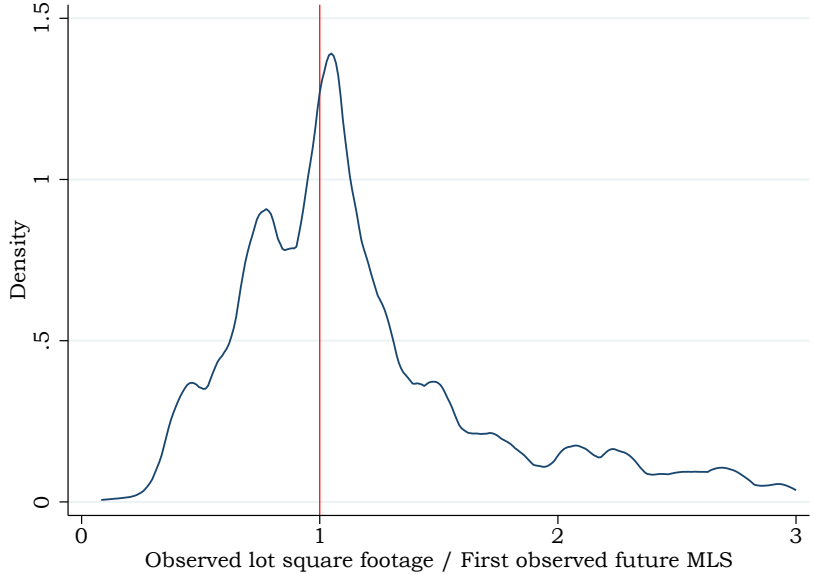


With common (future) MLSs

Zoning followed earlier subdivision



Built in 1950s, first observed MLS



Subdivided before zoning, future MLS

Regulation shapes lot sizes and lot sizes shape regulation.

Conclusion

- Cook County Longitudinal Zoning Database contains digitized bylaws and maps at a decadal frequency for nearly all suburban municipalities in Cook county, 1921-1980.
- Zoning exerted a substantial effect on places that were zoned prior to development, shifting the distribution of land towards single-family housing beyond what the market would have delivered.
- Although zoning is important, significant challenges to study it:
  1. To study lot sizes, need parcel plat date and this is not generally observable.
  2. True effects of zoning very similar to "effects" of zoning where there was no scope for impacting land use.
  3. Similar issues for MLS - unregulated lot distribution is both bunch-y and crystallized into future regulations.