Finding Home When Disaster Strikes: Dust Bowl Migration and Housing in Los Angeles

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UF WARRINGTON COLLEGE of BUSINESS

Motivation

- Natural disasters displace an increasing number of people every year
  - 1.3% of the U.S. adult population (2022 Census Bureau Household Pulse Survey)
  - Over 3 million were displaced by natural disasters in 2022 alone!
- The scientific community predicts an increase in natural disasters in future decades
- *Migration* is a crucial mechanism in lessening negative welfare effects
  Desmet & Rossi-Hansberg (2015); Cruz & Rossi-Hansberg (2021); Bilal & Rossi-Hansberg (2023)
- Many people will be displaced by disasters and will seek refuge somewhere else

> How does the migration of *"climate refugees"* impact housing market conditions in receiving cities?

Motivation

- The arrival of migrants usually increases house prices and rents in receiving regions
  [*Saiz (2003, 2007); Ottaviano & Peri (2006); Ang et al. (2023)*]
- Impacts on housing also depend on how the migrants are perceived by the locals
  - "*Distaste*" for migrants can cause incumbent "*flight*" and house prices may fall
  - Previous literature has explored:
    1. Ethnic and cultural differences:
       [*e.g., Saiz & Wachter (2011); Sá (2015); Moraga et al. (2019)*]
    2. Racial differences
       [*e.g., Boustan (2010); Akbar et al. (2022); Bayer et al. (2022)*]
- **This paper:** Natural disaster-induced migrants [*Boustan et al. (2012); Daepp et al. (2023)*]
  - Similar race and ethnicity
  - They were *"pushed"* to migrate: alleviate selection concerns
  - Refugees are economically vulnerable
  - How are they perceived by locals? Discrimination may arise

Contributions

1. The impacts of climate disaster-induced migration on housing: *Daepp et al. (2023)*
   - Dust Bowl as an exogenous shock pushing people to migrate
   - Allows us to isolate the effect from other factors affecting the decision to move

2. The economic consequences of the 1930s American Dust Bowl: *Hornbeck (2012, 2023)*
   - Effects on housing are still unknown
   - Housing as an important component of wealth

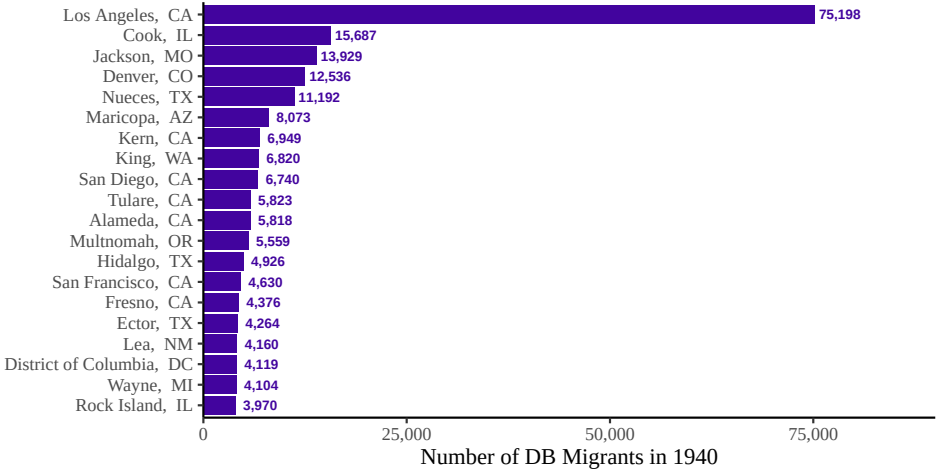
3. Los Angeles Address Sample: geocoded and linked across the 1930–1940 Censuses

Historical Background

- The 1930s Dust Bowl: One of the most severe natural disasters in U.S. History
- Result of combined weather conditions, prolonged drought, and farming techniques
- Dust storms, called “black blizzards” caused illness, damage, and death
- Historians estimate that close to 60% of the area’s population left their homes

Kansas (1935–1936). *Credit: (L) FDR Library Digital Archives; (R) Kansas Historical Society*

Top 20 County Destinations



The Dust Bowl Migrants in California and Locals Attitudes

- Often called “Okies,” or “hillbillies”
- Stereotypes of poor, welfare-seeking, and unsuccessful Dust Bowl migrants were common
- Many historical accounts of discrimination

Dorothea Lange/Farm Security Adm. via Library of Congress

LA Times

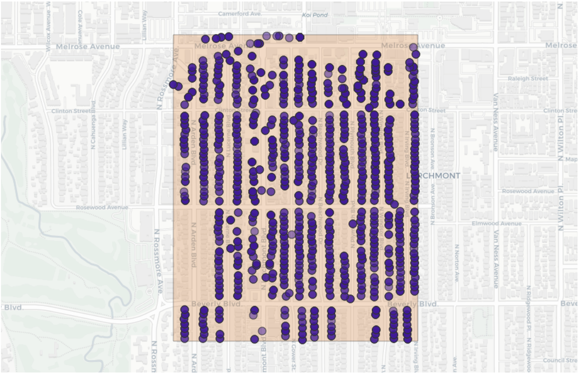
Data

Summary Statistics

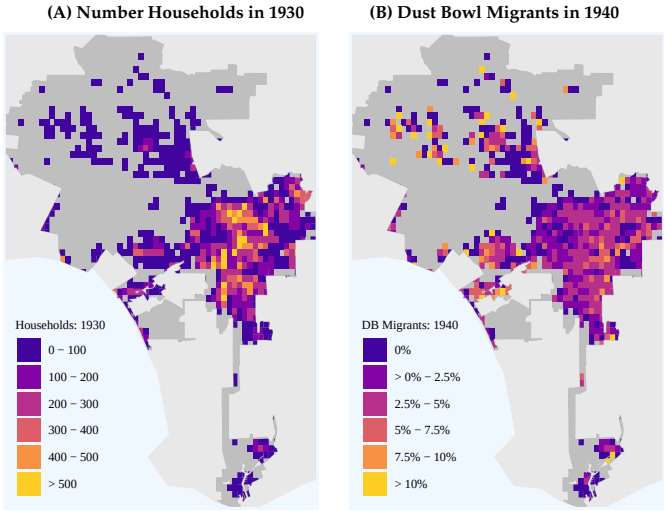
- Historical U.S. Census 1930–1940 (full-count, restricted access): IPUMS USA
  - Outcome Variables: House values, rents, and resident composition.
  - Household characteristics: age, education, race, etc.
- Urban Transition Historical GIS Project by *Logan et al. (2023)*:
  - LA addresses and enumeration districts
- Los Angeles Address Sample: geocoded and linked addresses
  - Linked addresses 1930–1940 from *Cortes & Sant'Anna (2024)* Basic Steps Balance
  - Geocoding of addresses from 1930 and 1940 **[NEW!]**
- Immigration from Dust Bowl areas from *Hornbeck (2012, AER)*
  - 1940 Census: County of residence in 1935
    Mostly counties in central states (e.g., OK, TX, NM, CO, NE, KS)
  - Three levels of erosion at the county level

Defining Neighborhoods: 1km Grids ($\approx$ .62 miles)

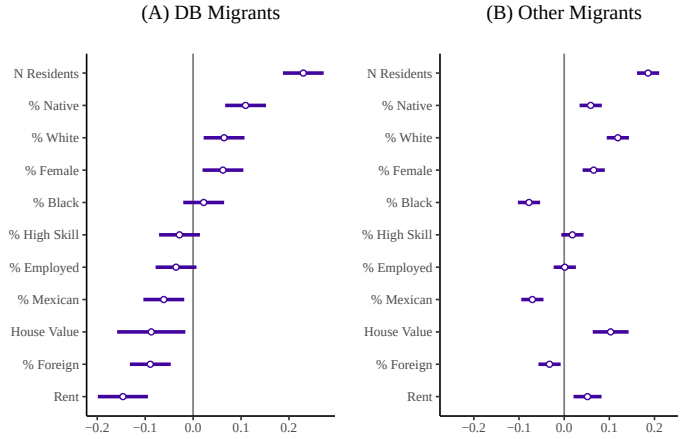
- Grid-level neighborhoods
- 30 arc seconds $\approx$ 1 km near Equator
- Match commonly used rasters data
- Consistent across Censuses (unlike enumeration districts that rely on decade-by-decade crosswalks)



Dust Bowl Migrants in Los Angeles: Widespread

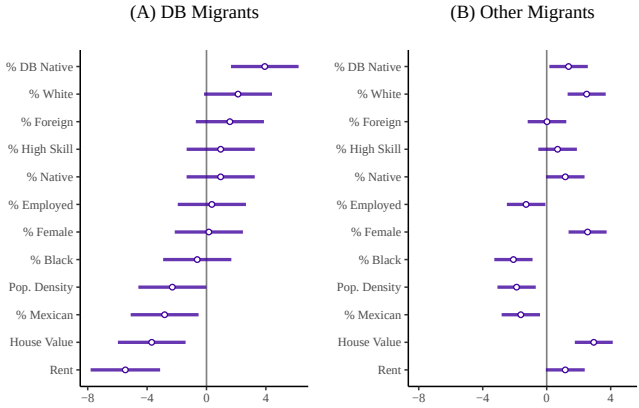


Address Characteristics in 1930 and Migrant Presence:



- DBs went to addresses with disproportionately lower rents and house values (*vis-à-vis* other U.S.-born migrants)

Neighborhood Characteristics in 1930 and Migrant Presence



- But this may be solely driven by the neighborhoods of their houses
- The house-level granularity will allow us to disentangle how much each factor contributes to this disparity *within neighborhood*!

Empirical Strategy: Address Level

- How did the presence of Dust Bowl migrants affect the evolution of housing prices?

$$\Delta y_{i,n} = \alpha_n + \beta \cdot D_{i,n} + \gamma' X_{i,n,1930} + \epsilon_{i,n}.$$

- $\Delta y_{i,n}$: log-difference of house value or rent in address i in neighborhood n
- $D_{i,n}$: 1 if the head of household is a migrant from Dust Bowl areas
- $X_{i,n,1930}$: controls include resident characteristics [race, gender, U.S./foreign-born, high-skilled, employed] and house characteristics [#residents, value/rent in 1930])
- α_n : neighborhood fixed effects

Results: Effects of Dust Bowl Migration in House Values and Rents

	Full Sample			
	(1)	(2)	(3)	(4)
Panel A - Dependent Variable: Δ log(House Values)				
Dust Bowl Migrant	–0.043	–0.099**	–0.082*	–0.078*
	(0.065)	(0.050)	(0.047)	(0.047)
Observations	24,498	24,498	24,498	24,498
Dep. Var. mean	–0.74	–0.74	–0.74	–0.74
Cluster Groups	837	837	837	837
Panel B - Dependent Variable: Δ log(Rents)				
Dust Bowl Migrant	0.032	–0.044***	–0.029**	–0.025*
	(0.020)	(0.015)	(0.014)	(0.014)
Observations	25,364	25,364	25,364	25,364
Dep. Var. Mean	–0.42	–0.42	–0.42	–0.42
Cluster Groups	703	703	703	703
Controls		✓	✓	✓
Grid-Neighborhood FE			✓	
Enum. District FE				✓

- Houses inhabited by DB migrants had a lower growth rate in home value and rents over the decade
- House Value's Econ. Signif.: $|\frac{0.082}{0.74}| = -11\%$ relative to the mean growth. DB house values fell even more than the average of that decade!
- Rents: $|\frac{0.029}{0.42}| = -7\%$ relative to the mean growth. DB rents fell even more than the average of that decade!

Comparing DBs with other Migrants *within Neighborhood*: Rent Results Remain

	Full Sample				Only Migrants			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Dependent Variable: Δ log(House Values)								
Dust Bowl Migrant	–0.043	–0.099**	–0.082*	–0.078*	0.048	–0.040	–0.029	0.033
	(0.065)	(0.050)	(0.047)	(0.047)	(0.071)	(0.054)	(0.073)	(0.063)
Observations	24,498	24,498	24,498	24,498	1,167	1,167	1,167	1,167
Dep. Var. mean	–0.74	–0.74	–0.74	–0.74	–0.82	–0.82	–0.82	–0.82
Cluster Groups	837	837	837	837	445	445	445	445
Panel B. Dependent Variable: Δ log(Rents)								
Dust Bowl Migrant	0.032	–0.044***	–0.029**	–0.025*	0.013	–0.072***	–0.048***	–0.035**
	(0.020)	(0.015)	(0.014)	(0.014)	(0.022)	(0.016)	(0.017)	(0.017)
Observations	25,364	25,364	25,364	25,364	5,318	5,318	5,318	5,318
Dep. Var. Mean	–0.42	–0.42	–0.42	–0.42	–0.4	–0.4	–0.4	–0.4
Cluster Groups	703	703	703	703	545	545	545	545
Controls		✓	✓	✓		✓	✓	✓
Grid-Neighborhood FE			✓				✓	
Enum. District FE				✓				✓

- Comparing DBs *within neighborhoods* with migrants reduces sample to only 25% in rents and 5% for house values
- House value results lose power, but rent results remain significant

Is proximity to Dust Bowlers priced as a real estate "disamenity?"

- Due to discrimination, real estate markets could have priced houses near DB families as undesirable
- To test this, we restrict the sample to *incumbent households* (non-migrants, i.e., excluding also DBs) within the same neighborhood

$$\Delta y_{i,n} = \alpha_n + \beta \cdot \log(Proximity_{i,n}) + \gamma' X_{i,n,1930} + \epsilon_{i,n}$$

- $\Delta y_{i,n}$ is the log difference of house value or rent in address i in neighborhood n
- $Proximity = \frac{1}{Distance_{i,n}}$, where *Distance* is the log avg distance to DB families of house i
- $X_{i,n,1930}$: control variables
- α_n : neighborhood fixed effects

Proximity to Dust Bowlers is priced as a real estate disamenity!

	Δ log(House Values)			Δ log(Rents)		
	(1)	(2)	(3)	(4)	(5)	(6)
log(Avg. Proximity to Dust Bowl migrants)	-1.320*	-1.380***	-1.330**	-0.305	0.104	0.138
	(0.709)	(0.525)	(0.519)	(0.817)	(0.561)	(0.556)
Observations	23,331	23,331	23,331	20,046	20,046	20,046
Dep. Var. Mean	-0.73	-0.73	-0.73	-0.43	-0.43	-0.43
Cluster Groups	830	830	830	668	668	668
Controls:						
Pre-Conditions			✓			✓
Grid-Neighborhood FE	✓	✓	✓	✓	✓	✓

- Houses located closer to DB migrants had a lower growth rate in their home value over the decade
- Rents do not display a pricing effect: renters have greater mobility, being less tied to properties

Were these effects large enough to impact entire neighborhoods? Neighborhood-Level Analysis

- We now relax the identification to study neighborhood-level outcomes
- This allows us to obtain estimates at aggregation levels comparable to most studies
- It allows longer-term insights using ACS Census Tract-level data to measure housing values and rents in 2019
- To improve upon the endogenous DB neighborhood choice, we use *"subdivisions"* — finer grids of 0.3 km [10 arc seconds $\approx$ 0.18 miles]

$$\Delta y_n = \alpha + \beta \cdot D_n + \gamma' X_{n,1930} + \epsilon_n.$$

- Δy_n is the log difference in the mean house value or rent in the neighborhood n
- D_n share of Dust Bowl migrants in n
- $X_{n,1930}$ are control variables
- Standard errors are clustered using *Conley (1999)* ($\approx$ 4 km radius spatial correlation)

Neighborhoods that received more DB migrants had lower growth rates in home values and rents

	Sub-Division			Grid-Neighborhood		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Dependent Variable: House Values						
Share of Dust Bowl Migrants	–1.67***	–1.63***	–1.45***	–2.78***	–2.81***	–1.67***
	(0.574)	(0.487)	(0.427)	(1.07)	(0.951)	(0.548)
Observations	2,795	2,795	2,795	699	699	699
Dep. Var. mean	–0.80	–0.80	–0.80	–0.72	–0.72	–0.72
Panel B. Dependent Variable: Rents						
Share of Dust Bowl Migrants	–0.498**	–0.540***	–0.664***	–0.778	–0.931**	–1.27***
	(0.196)	(0.156)	(0.152)	(0.573)	(0.436)	(0.379)
Observations	2,809	2,809	2,809	688	688	688
Dep. Var. mean	–0.34	–0.34	–0.34	–0.31	–0.31	–0.31
Weights:	N Families	N Families	N Families	N Families	N Families	N Families
Controls:						
Geography		✓	✓		✓	✓
Neighborhood Characteristics			✓			✓

Were neighborhood-level effects persistent in the long run?

	Shorter Run (1930–40)			Longer Run (1930–2010s)		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Dependent Variable: House Values						
Share of Dust Bowl Migrants	-2.861***	-2.798***	-2.362***	-0.578	-0.228	-0.385
	(0.879)	(0.544)	(0.475)	(0.906)	(0.557)	(0.549)
Observations	701	701	701	659	659	659
Panel B. Dependent Variable: Rents						
Share of Dust Bowl Migrants	-2.807**	-2.401*	-2.632**	-0.672	-0.442	-0.101
	(1.360)	(1.343)	(1.094)	(1.162)	(0.622)	(0.492)
Observations	688	688	688	689	689	689
Weights:	N Families	N Families	N Families	N Families	N Families	N Families
Controls:						
Geography		✓	✓		✓	✓
Neighborhood Characteristics			✓			✓

Neighborhoods that received more DB migrants had lower growth rates in average home values and rents between 1930 and 1940, but long-run effects seem to dissipate

Robustness and Extensions

- Robustness tests Results
  - Doubly Robust (DR) estimator
  - Medium-high erosion areas
  - *Conley (1999)* standard errors
- Percentile regressions Results

Concluding Remarks

- Using the 1930s Dust Bowl as a historical case study, we find:
  - Houses inhabited by Dust Bowl migrants in LA had lower growth in value and rents
  - Proximity to Dust Bowl migrants was priced as a real estate disamenity
  - Neighborhoods receiving more Dust Bowl migrants had lower housing price growth, but these effects dissipated in the longer run
- Results highlight potential housing market frictions and discrimination that climate refugees may face
  - Despite similar race/ethnicity, Dust Bowl migrants still perceived negatively
  - Housing is an important component of wealth, so lower price growth could exacerbate the refugees' economic vulnerability
- Addressing social perceptions and housing market disruptions will be key challenges as climate migration rises in the coming decades

Thank You!

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BACKUP SLIDES

The Address Linking Approach: Basic Steps

Back

1. Clean street names, and account for common abbreviations
   (e.g., St = Street, Ave = Avenue, N = North, ...)
2. Clean House number, removing special characters
3. Restrict the sample to addresses which are unique by state, city, street name, and house number in 1930.
4. For each record in 1930, look for records in 1940 that match exactly on state, city, street name, and house number.

- At this point there are two possibilities:

1. If there is a unique match, then this pair of observations is considered a match.
2. If there are no exact matches
   - ↪ The algorithm searches for exact matches among street names without suffixes
   - ↪ If there is a unique match, then this pair of observations is considered a match.

Balance Table

Back

House-level variables (1930)	Full Sample	Matched Sample	Sub-sample
Average Resident Age	37.64	37.88	37.90
Dwelling Size	3.91	4.16	3.84
Share Mexicans	0.006	0.005	0.025
Share White	0.91	0.92	0.90
Share Black	0.08	0.07	0.06
Share US-Born	0.76	0.79	0.84
Share Ownership	0.41	0.52	0.52
House Value 1930 US$	7,598.82	7,623.61	6,109.99
Rent 1930 US$	58.48	54.58	46.42
Observations	14,324,076	4,029,584	483,329

Summary Statistics

Back

Variables	Count	Mean	Std. Dev.	Min	Max
Migration and Population Movement					
DB Migrants	69,492	0.09	0.27	0.00	1.00
Other Internal Migrants	69,492	0.10	0.30	0.00	1.00
Housing Outcomes					
Δ Value	24,498	-0.74	0.74	-8.40	6.16
Δ Rent	25,364	-0.42	0.73	-7.69	6.55
Value 1930 ('000 1930 $)	35,654	690.01	965.49	0.67	49,983.08
Rent 1930 ('000 1930 $)	33,627	5.46	35.50	0.17	832.75
Employment and Skill Level Shares					
High Skill 1930	69,492	0.54	0.48	0.00	1.00
Employed 1930	69,492	0.76	0.41	0.00	1.00
Ethnicity and Nationality Shares					
White 1930	69,492	0.94	0.24	0.00	1.00
Black 1930	69,492	0.02	0.14	0.00	1.00
Native 1930	69,492	0.74	0.43	0.00	1.00
Foreign 1930	69,492	0.23	0.41	0.00	1.00
Mexican 1930	69,492	0.03	0.17	0.00	1.00
Address Characteristics					
N. Families 1930	69,492	1.27	2.05	1.00	246.00

Robustness

Back

	Full Sample			Only Migrants		
	(1) DR	(2) HM	(3) Conley	(4) DR	(5) HM	(6) Conley
Panel A. Dependent Variable: Δ log(House Values)						
Dust Bowl Migrant	-0.102**	-0.111**	-0.082*	-0.048	-0.108	-0.029
	(0.049)	(0.055)	(0.050)	(0.055)	(0.068)	(0.089)
Panel B. Dependent Variable: Δ log(Rent)						
Dust Bowl Migrant	-0.043***	-0.033	-0.029**	-0.066***	-0.040*	-0.048***
	(0.014)	(0.020)	(0.014)	(0.016)	(0.023)	(0.017)

Results are robust to different estimators, DB measures, and Standard Errors

Robustness

Back

	Sub-Division		Grid-Level Neighborhood	
	(1)	(2)	(3)	(4)
Panel A. Dependent Variable: House Values				
Share of Dust Bowl Migrants	-0.430***	-0.643***	-0.539	-1.06**
	(0.156)	(0.146)	(0.452)	(0.492)
Observations	2,795	2,795	699	699
Panel B. Dependent Variable: Rents				
Share of Dust Bowl Migrants	-0.090	-0.346***	-0.226	-0.864***
	(0.092)	(0.091)	(0.312)	(0.286)
Observations	2,809	2,809	688	688
Controls:				
Geography	✓	✓	✓	✓
Neighborhood Characteristics	✓	✓	✓	✓

Results are robust to different estimators, DB measures, and Standard Errors

The Los Angeles Times: March 13, 1940 Back

Supervisors Back Workers' Protest on Hiring of Migrants

A sympathetic ear was given yesterday by the Board of Supervisors to the plea of 25 La Verne citrus workers who sent a communication to the body complaining that migrant workers are taking their jobs on ranches and in orchards.

Acting on a resolution presented by Supervisor William A. Smith of Whittier, the board urged the employers of farm labor in the county to give employment preference to established residents.

"These dust-bowl migrants," Smith's resolution stated, "by agreeing to work at a lower wage, offer a threat to the present standard of living and the wage scale in this county.

"The displacement by newcomers will tend to increase the county tax rate by compelling displaced workers and their families to apply for charity."