

A Service of

ZBW

Leibniz-Informationszentrum Wirtschaft Leibniz Information Centre for Economics

Quincy, Sarah; Gray, Rowena

# Working Paper Boomtowns: Local shocks and inequality in 1920s California

EHES Working Paper, No. 223

**Provided in Cooperation with:** European Historical Economics Society (EHES)

*Suggested Citation:* Quincy, Sarah; Gray, Rowena (2022) : Boomtowns: Local shocks and inequality in 1920s California, EHES Working Paper, No. 223, European Historical Economics Society (EHES), s.l.

This Version is available at: https://hdl.handle.net/10419/253737

#### Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

#### Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



# WWW.ECONSTOR.EU

# EHES Working Paper | No. 223 | March 2022

Boomtowns: Local Shocks and Inequality in 1920s California

> Sarah Quincy, Vanderbilt University

Rowena Gray, University of California, Merced

# EHES Working Paper | No. 223 | March 2022

### Boomtowns: Local Shocks and Inequality in 1920s California\*

## Sarah Quincy<sup>1</sup>, Vanderbilt University

## Rowena Gray, University of California, Merced

### Abstract

The 1920s in the United States were a time of high income and wealth growth and rising inequality, up to the peak in 1929. It was an era of technological innovations such as electrification as well as booms in consumer durables, housing, and asset markets. The degree to which these skill-biased opportunities shaped property wealth inequality depends on how local and macro-level industrial shocks were capitalized into real estate values. We uncover the pattern for California, a state where shocks in oil, housing and stocks were large, and which has annual data on city-level property values and population counts. We show that electricity both increased values and reduced inequality in property values, while other booms had more short-lived and localized effects.

JEL Codes: N12, N33, N92, R31

Keywords: wealth inequality; booms; Roaring 20s

<sup>1</sup>Corresponding Author: Sarah Quincy (<u>sarah.quincy@vanderbilt.edu</u>)

\* The authors thank participants at the 2022 AEA meetings.

### Notice

The material presented in the EHES Working Paper Series is property of the author(s) and should be quoted as such. The views expressed in this Paper are those of the author(s) and do not necessarily represent the views of the EHES or its members The 1920s in the United States were a time of high income and wealth growth and rising inequality, up to the peak in 1929 [Saez and Zucman, 2016, Williamson and Lindert, 1980]. It was an era of technological innovations as well as booms in consumer durables, housing, and asset markets. This leaves open the question of how sectoral innovations impacted the distribution of income and wealth. Workers' skill and education levels determined whether their labor market outcomes improved alongside these technological shocks [Goldin and Katz, 1998]. The degree to which these skill-biased opportunities shaped wealth inequality depends on how local industrial shocks were capitalized into real estate values [Roback, 1982]. We bring together these literatures on inequality and technological change to highlight the different ways in which local industry shocks impacted the distribution of real estate wealth in the Roaring Twenties.

In contrast to previous work on this setting, which use state or nationally aggregated tax return data, this paper utilizes annual city-level information for one major part of the wealth distribution, real estate property. This necessitates a focus on California where such information is available. California is also the ideal case study because it was at the

forefront of many of these decadal trends and had sectoral employment shares reflective of the national economy [Cleland, 1947]. We focus on three main California "boom" sectors—oil, automobiles, and the stock market. And we further look at the more generalized impact of earlier access to cheaper electricity as a boon to manufacturing. We uncover substantial heterogeneity in the impact of exposure to these booms on housing values in terms of city and household real estate gains, with only one boom, electricity, reducing inequality while increasing local growth.

# 1 Background

To link economic trends to wealth inequality, we combine household and city-level data on property values throughout the 1920s to 1920 local-level shock exposure data. We measure wealth in two ways. The first is a city-year panel of property values and population counts from 1919 onwards [Quincy, 2021]. These annual data measure the assessed value of all land and structures owned by non-financial businesses and households. We then use 1930 census home value data to characterize the housing wealth distribution within and across cities after the booms.

We combine these wealth data with both city and worker-level employment data from the 1920 and 1930 censuses [Ruggles et al., 2021]. In order to capture cities' exposure to booming industries, we report the share of male household heads working in a relevant industry or occupation.<sup>1</sup>

<sup>&</sup>lt;sup>I</sup>For example, to find men working in the oil industry, we flag all industry codes related to oil extraction, petroleum refining, gasoline stations, and wholesale petroleum and then search the raw industry strings for key terms like "petrol," "gasol," and "oil refin" while excluding gas lamp and vegetable oil production.

Finally, we map these city-level data to a linked sample of California household heads in the 1920 and 1930 censuses and manufacturing establishment-level Census of Manufacturing data in 1929 [Abramitzky et al., 2012, Vickers and Ziebarth, 2018].<sup>2</sup>

We use data on the existing electric grid as of 1920 from digitized US Army Corps of Engineers maps, dividing counties into above and below median length of transmission lines per 1,000 square kilometers of land.<sup>3</sup> California was an early adopter of electricity, due to specialization in electricity-intensive industries such as mining, and to the abundance of hydroelectric opportunities (Gray and Kitchens [2018]: 57). Indeed, California ranked second in the nation in 1920 in the electrical share of energy used in manufacturing and first in the nation in the share of manufacturing electricity generated outside of the plant, reflecting the developed electricity system.

Rhode [2001] describes the 1920s as a period of brisk growth for California, with large periodic shocks, particularly in newer industries. Several major components of wealth–durable goods like automobiles, real estate and the stock market– soared during the decade [Olney, 1991, White, 1990, 2014]. Petroleum induced widespread growth more specifically in California [Cleland, 1947]. California agriculture maintained its position as a leading supplier of produce nationwide and created demand for complementary manufacturing.

Due to the disaggregated nature of our property value data, we provide the first spatial analysis of local real estate booms during the Roaring Twenties. Most of the state experienced growth in average property values over the decade, as displayed in Figure 1. The darker the circle, the larger the growth of per capita real estate values from 1919 to 1929. Light-shaded counties were below the state's median electricity grid density in 1920. Regionally, gains are largest in southern California, as the historical narrative would suggest. Both the coastal centers of Los Angeles and the San Francisco Bay Area experienced growth, as did the more agricultural area running through the center of the state. However, roughly one-quarter of California cities saw declines. These areas were spread throughout the state, indicating that prosperity was not guaranteed during the 1920s.

## **2** The size and distribution of the boom

In a standard framework, the land value gains from increased labor demand depend on both labor and housing supply elasticities [Roback, 1982]. These booms likely had differential impacts on housing and other variables, however. The gains from stock market employment depend on potential shifts between financial and real estate assets, for example. Electricity would be expected to have the longest-lasting impact on productivity and thus housing values, and it may have increased home ownership and values at the lower end of the distribution if production worker wages increased, which we find evidence for below.

<sup>&</sup>lt;sup>2</sup>We match 19 percent of possible 1920 male California residents above the age of 20 using the NYSIISconservative matching criteria in Abramitzky et al. [2012].

<sup>&</sup>lt;sup>3</sup>See Gaggl et al. [2021] for full details.

Oil booms also affected production workers, but did not alter the value of housing amenities, potentially lessening the degree to which they were capitalized into real estate. Unlike electricity, the automobile shock also lowered transit costs, creating new amenities through the rise of suburbs.

We therefore examine these shocks' role in local housing markets separately in a crosscity empirical framework. Specifically, we regress changes in city housing and employ- ment outcomes from 1920 to 1930,  $\Delta Y_c$ , on a variety of 1920 observable city characteristics,  $X_c$ and 1920 sectoral shock exposure,  $BOOM_c$ :

$$\Delta Y_c = \beta_0 + \beta_1 BOOM_c + \gamma X_c + \epsilon_c \tag{1}$$

We control for 1920 population shares of white households, farm residents, self-employment, any employment, homeownership, and literacy, as well as average 1920 household head age to isolate the correlation between a given boom and 1920s city growth. Except for the power grid variable, defined above, each 1920 exposure measure is defined using the share of employed male household heads working in that sector. Standard errors are clustered at the county level. The capitalization of these 1920s sectoral shocks into local booms varied greatly by the type of shock. Across all three panels of Table 1, there is no evidence that the level of auto sector employment correlated systematically with any measures of 1920s city growth. Although a crucial part of the Roaring Twenties, these results indicate that the auto shock did not differentially alter housing markets through the employment channel.

In contrast, cities with more oil sector employment saw a shift towards non-tradable employment from 1920 to 1930. The effects of oil boom exposure are noisy and statistically insignificant in real estate in Panels A and B. Together, these results are consistent with commodity sector employment benefiting local economies through increased consumption without shifting housing demand. The distributional effects of oil booms therefore depend on the pass-through from heightened non-tradable production to service worker incomes.

Having stock market-oriented workers in 1920 lowered both overall property values per capita and housing inequality. A reduction in property values' average and dispersion suggest a reallocation out of real estate for those who already owned homes, reducing housing demand through the substitution effect, lowering prices, and making home purchases more affordable for others. If anything, stock market employment reduced non-tradable employment, leaving open the question of who benefited from these lower housing prices.

Only one innovation, electricity, induced both higher average property value growth and lower inequality. It appears that electricity boosted housing demand without creating non-tradable sector externalities, as may be expected from its use in both consumer durables and production.

Boom type:	Autos	Oil	Stocks	Power Lines
A: Property values				
$BOOM_c$	-3.927	0.827	-20.75	0.258
	(3.914)	(0.695)	(12.35)	(0.136)
B: Housing Gini				
$BOOM_c$	-0.491	0.0796	-3.878	-0.0412
	(0.387)	(0.128)	(0.935)	(0.0217)
C: Non-tradable labor				
$BOOM_c$	0.106	0.115	-0.275	-0.0258
	(0.305)	(0.0547)	(0.867)	(0.0162)
Shock mean	0.02	0.10	0.00	0.33
Ν	211	211	211	211

Table 1: City Growth and Local Booms in the 1920s

Sources: Quincy [2021], Gaggl et al. [2021], Ruggles et al. [2021], and authors' calculations. Standard errors clustered at the county level. Control variables in each regression of 1920s growth on a given shock are 1920 population shares of white households, farm residents, self-employment, any employment, homeownership, and literacy, as well as average 1920 household head age. Except for power lines, shock exposure is the city's male household head employment share in 1920 for each sector. Power lines are measured per 1,000 square km at the county level. Per capita property value growth measured from 1919 to 1929. Gini coefficients calculated using Archsmith [2022] on all non-farm non-group quarters homes in 1930. Non-tradable labor refers to the change in transportation, trade, and services employment shares between 1920 and 1930.

To isolate the degree to which these booms accrued solely to participating households, we turn to a sample of linked California household heads in the 1920 and 1930 censuses. We model 1930 housing values as a function of city, household, and neighborhood characteristics in 1920 using the following specification for 1930 home value for person *i* living in enumeration district *n* in city *c* and working in occupation *o* in 1920:

$$Y_{i} = \beta_{0} + \gamma_{o} + \gamma_{n} + \beta_{1}BOOM_{oc} + \gamma X_{i} + \epsilon_{c}$$
<sup>(2)</sup>

 $\beta_1$  reflects the home value gains specific to working in a designated booming occupation in a city with higher exposure to that sector. Individual controls include a quadratic in age, marital status, reporting race as white, farm residence, homeownership in 1920, as well as industry, occupation, enumeration district, and state of birth fixed effects. Table 2 reports the results. Again, there appear to be no effects of oil employment, suggesting that historical

narratives linking real estate and oil booms did not differentially accrue to those working in the industry. The finance boom lowered inequality by moving those in the sector up the housing ladder, in marked contrast to auto workers. Unlike the other sectors examined in this

Boom type:	Autos	Oil	Stocks	Power Lines
BOOM <sub>oc</sub>	-0.0726	-0.00382	0.130	0.00417
	(0.0294)	(0.0126)	(0.0201)	(0.0248)
N	64859	64859	64859	64859

Table 2: 1930 Home Values Depending on 1920s Boom Exposure

Sources: Gaggl et al. [2021], Ruggles et al. [2021] and authors' calculations. Standard errors are clustered at the county level. Control variables in each regression include a quadratic in age, marital status, reporting race as white, farm residence, homeownership, as well as industry, occupation, enumeration district, and state of birth fixed effects, all measured in 1920. Exposure defined as individual working in boom sector in 1920 in a city with an above median local shock measure.

paper, electricity both decreased inequality, as shown in Table 1, and increased local growth, as seen in Table 3. Because electricity is a general-purpose technology, it is ex ante unclear whether it operated through changes in consumer or producer behavior. We test for producer effects in a two-way fixed effects difference-in differences regression on establishment-level microdata from the 1929 Census of Manufactures of the form:

$$W_e = \beta_0 + \gamma_h + \gamma_c + \beta_1 E L E C_{hc} + \gamma X_e + \epsilon_c$$
(3)

Here,  $\beta_1$  identifies the effect of being a high-electricity usage industry *h* in a city *c* located in a high-electricity county on the establishment *e*'s average daily blue-collar wage, controlling for log annual output. We define industry electricity usage in two ways based on the establishment sample: the industry's average share of energy coming from electricity and the industry's average usage of electric motors. In both cases, it appears that electricitydependent establishments in places with more developed electricity grids paid higher wages, as seen in Table 3. This indicates that electricity raised average property values and reduced inequality by paying its wage workers more.

Table 3: Average Daily Wages in 1929 Based on 1920 County and Industry Electricity Use

	Motor Use		Fuel Use	
$ELEC_{hc}$	117.2	57.12	313.0	292.8
	(34.30)	(28.49)	(225.7)	(213.7)
N	1077	1077	1077	1077
Controls	Ν	Y	Ν	Y

Sources: Vickers and Ziebarth [2018], Gaggl et al. [2021], and authors' calculations. Standard errors clustered at the county level. Exposure defined as establishment in high electricity usage industry in 1929 in a county with an above median power line density in 1929. Includes controls for log establishment output and industry and city fixed effects. All establishments in California reporting positive output in 1929 included in sample.

# Conclusion

In a period of both rising national incomes and widening opportunity gaps, the type of local exposure to technological change mattered for the evolution of property values. By focusing on one state, California, with both disaggregated data and a diverse economy, we contrast how one major source of growth, electricity, increased local wealth and lowered within-city housing inequality during the Roaring Twenties, while other major sectoral innovations did not. The spatial pattern of values and inequality identified here for the first time may be unpacked in future research into the components of population movement, housing supply changes, sectoral spillovers and changing amenities.

# References

Ran Abramitzky, Leah Platt Boustan, and Katherine Eriksson. Europe's tired, poor, huddled masses: Self-selection and economic outcomes in the age of mass migration. *American Economic Review*, pages 1832–1856, 2012.

James Archsmith. fgini. https://github.com/drofphilosophe/Stata-fgini, 2022.

Robert Glass Cleland. California in our time (1900-1940). AA Knopf, 1947.

- Paul Gaggl, Rowena Gray, Ioana Marinescu, and Miguel Morin. Does electricity drive structural transformation? evidence from the united states. *Labour Economics*, 68:101944, 2021.
- Claudia Goldin and Lawrence F Katz. The origins of technology-skill complementarity. *The Quarterly Journal of Elconomics*, 113(3):693–732, 1998.
- Rowena Gray and Carl Kitchens. Energy in american economic history. In *The Oxford Handbook of American Economic History*. University of Oxford Press, 2018.
- Minnesota Population Center. National historical geographic information system: Version 14.0 [dataset]. minneapolis: University of minnesota, 2019.
- Martha L Olney. *Buy now, pay later: advertising, credit, and consumer durables in the 1920s.* University of North Carolina Press, 1991.
- Sarah Quincy. 'loans for the little fellow:' credit, crisis and recovery in the great depression. Technical report, 2021.
- Paul Rhode. *The evolution of California manufacturing*. Public Policy Institute of California San Francisco, 2001.
- Jennifer Roback. Wages, rents, and the quality of life. *Journal of Political Economy*, 90(6): 1257–1278, 1982.
- Steven Ruggles, Sarah Flood, S Foster, R Goeken, J Pacas, M Schouweiler, and M Sobek. Ipums usa: Version 11.0 [dataset]. minneapolis, mn: Ipums, 2021.

- Emmanuel Saez and Gabriel Zucman. Wealth inequality in the united states since 1913: Evidence from capitalized income tax data. *The Quarterly Journal of Economics*, 131(2): 519–578, 2016.
- Chris Vickers and Nicolas L Ziebarth. United states census of manufactures, 1929–1935. Ann Arbor, MI: Inter-university Consortium for Political and Social Research, 2018.
- Eugene N White. The stock market boom and crash of 1929 revisited. *Journal of Economic Perspectives*, 4(2):67–83, 1990.
- Eugene N White. *Lessons from the Great American Real Estate Boom and Bust of the 1920s.* University of Chicago Press, 2014.
- Jeffrey G Williamson and Peter H Lindert. *American inequality: A macroeconomic history*. New York: Academic Press, 1980.



Figure 1: The distribution of property value growth in the 1920s

Each dot corresponds to a given city's growth in per capita property values between 1919 and 1929 as a decimal fraction. Dot colors correspond to each quartile of this variable's distribution. Shaded counties are above the median electricity grid density in 1920. Sources: Quincy [2021], Gaggl et al. [2021], Minnesota Population Center [2021], and authors' calculations..

European Historical Economics Society

# **EHES Working Paper Series**

# **Recent EHES Working Papers**

### 2021

EHES 222	Poverty in early modern Europe: New approaches to old problems Guido Alfani, Francesco Ammannati, Wouter Ryckbosch
EHES 221	Human Capital and Industrialization: German Settlers in Late Imperial Russia <i>Viktor Malein</i>
EHES 220	Resilience, Adaptability and Transformability: Danish Butter Factories in the Face of Coal Shortages Sofia Teives Henriques, Paul Sharp, Xanthi Tsoukli, Christian Vedel
EHES 219	Ireland in a Danish mirror: A microlevel comparison of the productivity of Danish and Irish creameries before the First World War <i>Eoin McLaughlin, Paul Sharp, Xanthi Tsoukli, Christian Vedel</i>
EHES 218	Interest Rates, Sanitation Infrastructure, and Mortality Decline in Nineteenth- Century England and Wales Jonathan Chapman
EHES 217	China, Europe, and the Great Divergence: Further Concerns about the Historical GDP Estimates for China <i>Peter M. Solar</i>
EHES 216	Sovereign Debt and Supersanctions in Emerging Markets: Evidence from Four Southeast European Countries, 1878-1913 Andreea-Alexandra Maerean, Maja Pedersen, Paul Sharp
EHES 215	Fringe Banking and Financialisation: Pawnbroking in pre-famine and famine Ireland <i>Eoin McLaughlin, Rowena Pecchenino</i>
EHES 214	Vanishing borders: ethnicity and trade costs at the origin of the Yugoslav market David Chilosi, Stefan Nikolić

All papers may be downloaded free of charge from: <u>http://www.ehes.org/</u> The European Historical Economics Society is concerned with advancing education in European economic history through study of European economies and economic history. The society is registered with the Charity Commissioners of England and Wales number: 1052680