The Making of a National Mortgage Market and Its Effects on American Cities*

Victoria Angelova Leonardo D'Amico

March 2026

PRELIMINARY

Abstract

How does a persistent change in mortgage rates affect city growth, home prices and construction, and household formation? We study the revolutions in mortgage financing that took place in the U.S. between 1933 and 1940, which created a national mortgage market facilitating mortgage capital to move from the financial centers to the rest of the country. By digitizing city-level census data and a new sample of loan-level data, we show that differences in mortgage rates across cities went from nearly 300 basis points to just over 100 in only six years. This national mortgage market allowed initially capital-scarce places to grow more than initially capital-abundant ones. In the decades following the housing policies, cities where mortgage rates declined as a result of the integration of mortgage markets saw higher growth in rates of homeownership, population, and housing construction. House prices moved only modestly, suggesting that, in 1940–50, housing supply responded robustly to higher demand for homes. Young households in these cities witnessed higher birth rates even before the post-World War II baby boom.

*Angelova: Harvard University, vangelova@g.harvard.edu; D'Amico: Princeton University, ldamico@princeton.edu. We are grateful to Edward Glaeser, Claudia Goldin, Nathan Hendren, and Larry Katz for their encouragement and guidance. We thank Gillian Brunet, Price Fishback, Claudia Goldin, Ronan Lyons, Jonathan Rose, Allison Shertzer, and Ken Snowden for generously sharing their data and expertise. We are particularly indebted to Ken Snowden for numerous insightful conversations. For helpful comments and suggestions, we thank Robert Barro, David Cutler, Jonathan Dingel, Gilles Duranton, James Feigenbaum, Martin Fiszbein, Joseph Gyourko, Sam Hanson, Paola Sapienza, Jeremy Stein, Thomas Storrs, Adi Sunderam, and Boris Vallée, as well as seminar participants at the Brookings Institution, UNC Chapel Hill, the Financial History Workshop at NYU Stern, ASSA, Princeton, the Federal Reserve Bank of Philadelphia, and Wharton. We thank Sarah Quincy for her excellent discussion. Leonardo Bianchi and Davor Djekic provided outstanding research assistance. The authors have no financial relationships or other potential conflicts of interest to disclose.

Introduction

How does a persistent decline in mortgage rates affect cities and households? This paper studies the evolutions that occurred in US mortgage markets between 1920 and 1940, documenting and exploiting a unique episode in U.S. history where city-level mortgage rates changed rapidly, persistently, and heterogeneously across cities.

While today prospective US homeowners face mortgage rates that are largely identical across space (Hurst et al., 2016), up until the 1930s a prospective American homeowner would have faced radically different mortgage conditions depending on where he or she lived. By digitizing new city-level data on mortgage rates, we show that, in 1920, for instance, mortgage rates in cities like Boston, Buffalo, and New York were all below 5.8 percent, while they were all above 7.8 percent in cities like Dallas, San Antonio, and Tampa.

Yet, by 1940, mortgage rates had become quite similar across these cities. Rates in Boston, Buffalo, and New York were around 5.3 percent, and around 5.7 percent in Dallas, San Antonio, and Tampa. Moving beyond these six cities, we show that the regional differences in mortgage rates (henceforth, "regional mortgage spreads") across cities eroded in the span of just six years. Differences between low- and high-rate cities went from 300 basis points in 1920 and 1934, to just over 100 basis points in 1940, and remained low thereafter. Given this empirical finding, we study the following research questions.

First, we ask what caused the rapid decline in regional mortgage spreads and show that the Federal housing policies of 1932-38 were the major catalyst of this narrowing. Second, we exploit these policies as a supply shock to credit conditions at the city level to study the real macroeconomic effects of a change in mortgage rates. We show that mortgage affordability was associated with rising homeownership, city growth in terms of population and buildings, and only very moderate increases in house prices—likely owing to a high responsiveness from the construction sector to rising demand for homes, which we discuss in relationship to the current debate on housing supply and housing affordability (Gyourko and Molloy, 2015; Glaeser and Gyourko, 2018; Council of Economic Advisers, 2024). Lastly, we show that households exposed to more affordable mortgage conditions had more children, shedding light on the relationship between macro-level housing policies and fertility choices.

Our results are based on two data series we create from newly-digitized data that trace mortgage

conditions between 1920 and 1950, which we describe in Section 1. The first is a long-run city-level panel of mortgage interest rates across 237 American cities in 1920 and 1940, which allows us to study mortgage conditions for a large set of cities. For subsets of these cities, we also observe mortgage rates in 1934 and 1950 from additional newly-digitized sources. The second is a sample, collected by the NBER throughout the 1940s, of 22,761 individual mortgage loans underwritten between 1920 and 1947, which allows us to construct yearly series on mortgage conditions at the regional level.

Our first set of results describes the developments in mortgage markets and highlights the role of the 1932–38 Federal housing policies in reducing cross-city differences in mortgage lending. Section 2 describes the institutional context and the policy background. Before the 1930s, 90% of lending came from local lenders with little access to national financial markets: local Building & Loan associations (B&Ls); individual lenders; and commercial banks that could not branch across space (Grebler et al., 1956; Fishback et al., 2019).[1] Life Insurance Corporations (LICs) were the only lender with a national footprint, but accounted for less than 10% of the market. This created substantial segmentation across space, partly explaining the differences in mortgage rates across cities as differences in the relative demand and supply of mortgage funds.

The Federal housing policies effectively removed geographical barriers to the flow of financial capital via two main channels. First, they introduced the Federal Home Loan Bank Board (FHLB), which extended financing to local Building & Loan associations (B&Ls) at the same price everywhere, effectively equalizing their marginal cost of financing. Second, the policies introduced government insurance through the Federal Housing Administration (FHA) and a secondary market for mortgages through the creation of Fannie Mae (FNMA). Mortgages could now be insured and sold on secondary markets, facilitating investment by national lenders, such as LICs, in places far from their headquarters.

Section 3 documents our main convergence fact and provides five separate pieces of evidence which point to the unique role of the Federal housing policies in eliminating the geographic segmentation in mortgage markets and the associated spreads. First, we show that the mortgage evolutions were consistent with a supply shock to city-level credit: a city where mortgage rates were one percentage point higher in 1920 saw its mortgage rates decrease by 0.78 percentage points by

[1] Building & Loan came to be known as Savings & Loan later on during the period we study. We keep referring to them as B&Ls for clarity.

1940 and, concurrently, mortgage quantities expand by 0.46 log points over the same period, both in absolute terms as well as relative to home values.

Second, we show that the bulk of convergence was concentrated in the years where the Federal housing policies became active. We use our individual mortgage data to show that regional mortgage spreads were relatively constant before 1934 and then narrowed by 1939. By digitizing a special report with data for 37 cities in 1934, we also show that most of the cross-sectional convergence in these cities occurred in 1934–40 rather than in 1920–34. The implied yearly convergence rate between 1920 and 1934 was of 1.9%, implying that it would have taken approximately 36.5 years for half of an initial gap in mortgage rates between a capital-scarce and capital-rich city to disappear. The implied yearly convergence rate between 1934 and 1940 was instead seven times as large, 14%, implying a half-life of only 5 years.

Third, we show that the convergence was unique to mortgage markets. We use data on commercial bank lending rates from Bodenhorn (1995), available only at the state-level, and compare the convergence across states in mortgage rates and in commercial lending rates. States with high mortgage rates also had high commercial lending rates, and between 1920 and 1934, the narrowing of mortgage and commercial rates occurred at a similar pace. However, by 1940 mortgage markets displayed essentially no regional segmentation, while commercial lending markets retained substantial regional differences.

These three facts suggest that the policy intervention had a role in driving the rapid convergence in regional mortgage spreads we documented, but are silent on the mechanisms through which it did. In particular, it is possible that part of the convergence was due to the role that the FHA had in insuring mortgages, if the pricing of insurance did not take into account place-based differences in risk. Our last two facts show that this cannot explain all of the convergence in mortgage differentials.[2]

First, data from our individual mortgage sample allows us to distinguish between the type of lender, and we show that the largest degree of convergence occurred within loans made by B&Ls, which, as our mortgage cards also show, made minimal to no use of FHA insurance. These lenders accounted for a third of total mortgage lending and were also the most geographically constrained

[2]Establishing quantitatively how much of the convergence in rates was due to insurance as opposed to a reshuffling of financial capital across space is beyond the scope of this paper and unnecessary for our purposes, as our main application simply uses the entire policy package as a shock to mortgage conditions. However, it would naturally be an important exercise if one wanted to quantify the aggregate welfare consequences of the policies we study.

ones, as they were active in only one location. Conversely, LICs made large use of FHA insurance, which applied to up to 75% of their mortgages. Yet, there was little to no convergence for rates charged by LICs, as these national lenders were already offering very similar rates across regions before the policy.

Finally, we show that, before the Federal interventions, mortgage rate differentials were correlated with relative imbalances in the supply and demand of capital from households, coherently with a segmented market view. We follow Auclert et al. (2021) and create the "net asset position" of each city based on the local age distribution and the asset position of each age group, measured at the national level using the Survey of Consumer Finances. This measure relies on the observation that younger households are net debtors towards the financial sector (i.e. have negative net asset positions), as they hold a higher fraction of all housing debt and a smaller fraction of all liquid assets. Older households, on the other hand, act as net lenders. In 1920, cities with a higher fraction of net debtors relative to net lenders had higher mortgage interest rates, consistent with a setting where pulling liquidity from national markets into capital-scarce cities is increasingly expensive (Becker, 2007; D'Amico and Alekseev, 2025). By 1940, after mortgage rates had rapidly converged, a city's local net asset position was uncorrelated with its mortgage interest rate, consistent with the fact that local imbalances in demand and supply of capital did not matter in determining local prices once regional markets were integrated.

Section 4 turns to the real effects of these revolutions in mortgage finance. We exploit the heterogeneous effects of the Federal housing policies to study the effects of lower mortgage rates on economic outcomes at the city level. We rely on a differences-in-differences strategy where we compare the outcomes of cities that experienced a greater reduction in mortgage rates, relative to the average city, before and after the policy change, estimating a dynamic regression model in the style of Hornbeck (2012). We proxy for the extent of the affordability shock in each city with the city's initial mortgage interest rate, since a city that had a 100 bps higher mortgage interest rate in 1920 would see it decrease by 78 bps by 1940.[3] In all models, we control for city-level demographic and economic characteristics that could be correlated with initial mortgage lending conditions.

Further, we leverage the fact that the impressive degree of convergence was unique to mortgage

[3]We use the interest rate in 1920, rather than in 1934, because we observe 237 cities in 1920 and 37 in 1934. As anticipated, rates in 1920 and 1934 are extremely correlated, with a correlation coefficient of 0.92.

markets, and we add initial commercial lending rates as a control. Since both initial commercial lending rates and initial mortgage rates proxy for capital scarcity, controlling for commercial lending rates helps us capture some of the omitted variable bias from initial economic conditions—such as unobserved differences in levels of economic development—that are likely to be correlated with both initial capital scarcity and higher subsequent growth. We find that, conditional on controls, cities with initially high mortgage rates did not experience differential pre-trends in homeownership. Our results satisfy the parallel trends conditions even in models where we control just for census region fixed effects and the commercial lending rate.

In cities with 100 bps higher initial mortgage interest rates in 1920, homeownership rates grew by 3 percentage points more between 1930 and 1950. Population grew between 7 and 10% more between 1930 and 1950, all concentrated in 1940–50. In terms of semi-elasticities, a persistent 100bp decline in mortgage rates, instrumented using 1920 mortgage rates, is associated with a 3.57 p.p. increase in homeownership between 1930 and 1950 and a 7% increase in building, measured using the log change in the number of dwellings over the same period. Home prices move very little, and the coefficient is indistinguishable from zero in the specification with all controls.

We corroborate the strong movement in quantities and the relatively muted movement in prices using data made available by the Federal Reserve Bank of Philadelphia (2024) (used in Lyons et al., 2026), which covers prices at a yearly level for 26 U.S. cities.[4] The data shows that, while cities with initially high vs. low mortgage rate in this subsample were on similar trends before the policy, building, as measured by a 5-year moving average of new building permits, increased by 50% more, after the policy, in cities where mortgages became relatively more affordable. Coherently with our other findings, price movements were more muted, with the coefficients displaying at most a 10% appreciation that is statistically indistinguishable from zero.

Finally, we find that cities where mortgages became more affordable also witnessed higher fertility. We show that younger couples in cities with initially higher mortgage rates had more children at home after the policy, while older households saw fewer adult children co-residing. These results suggest that mortgage affordability enabled earlier family formation and earlier nest-leaving by grown children. In a cross-sectional comparison of households from the 1950 census, we estimate that having a 100bps lower mortgage interest rate over the child-bearing years of female spouses is associated with having 0.13 (13%) more children in the household. Collectively,

[4]We thank Allison Shertzer and Ronan Lyons for generously sharing with us data on permits for those same cities.

our results highlight the important demographic effects of expanding mortgage credit access during this period.[5]

Previous Literature. This paper relates to several strands of the literature. In economic history, a large literature has studied differentials in the cost of borrowing across space, mostly focusing on the "National Banking Era" (1863-1913).[6] We contribute to this strand by tracing out the evolution of mortgage differentials across US cities and the impact of the Federal housing policies of the 1930s on their convergence.[7]

Our results speak to the strand of the literature that highlights the importance of mortgage markets for the US economy, and especially to recent work that, within this theme, highlights how government involvement in the housing market affects regional spreads in mortgage interest rates (Hurst et al., 2016) and to work that exploits cross-sectional variation to estimate how changes in mortgage rates can affect economic activity (e.g. Di Maggio et al., 2017).[8] We contribute to this strand of the literature by exploiting a large and persistent shock to mortgage rates at the city level, which allows us to trace its effects over long horizons.

Finally, our findings on the effects of easier mortgage financing on real estate markets relate to the recent debate on housing affordability and housing supply elasticities (Gyourko and Molloy, 2015; Glaeser and Gyourko, 2018; Molloy, 2020; Glaeser and Gyourko, 2025; Lyons et al., 2026).

[5] A related paper is Dettling and Kearney (2025), who show that states with higher issuance of government-backed mortgages experienced greater increases in birth rates over the same period. Among others, Hacamo (2021) demonstrates that young households exposed to mortgage market deregulation in the early 2000s were more likely to purchase a home and have children. Cumming and Dettling (2024) find that declines in mortgage interest rates following policy rate reductions during the Great Recession in the U.K. and U.S. led to higher birth rates in both countries. Fazio et al. (2025) use random variation from Brazilian housing credit lotteries to show that young adults who obtain housing see a 32 percent increase in the probability of having children.

[6] This literature highlighted how regional differentials evolved in response to changes in market power and state-level regulation (Sylla, 1969; James, 1976a,b), risk (Rockoff, 1977; Bodenhorn, 1992, 1995; Gendreau, 1999), as well as to the development of national capital markets (Davis, 1965; Sylla, 1972; Smiley, 1975; James, 1978; Smiley, 1981; Sushka and Barrett, 1984; Smiley, 1985; Sushka and Barrett, 1985; Redenius, 2006) and the level of aggregate rates (D'Amico and Alekseev, 2025). A subset of this literature has focused especially on mortgages (Schaaf, 1966; Ostas, 1977; Snowden, 1987; Snowden, 1995).

[7] In this we relate to the literature that studied the Great Depression (Bernanke, 1983; Boustan et al., 2010; Carlson and Rose, 2015; Fishback, 2017; Fishback and Kachanovskaya, 2015; Fishback et al., 2022a; Fishback et al., 2007, 2005, 2006, 2003; Neumann et al., 2010; Rose, 2010, 2014; Rose and Snowden, 2013; Stuckler et al., 2012; White et al., 2014; Quincy, 2024) and especially the mortgage policies of that era (Rose, 2011; Chambers et al., 2014; Fishback et al., 2019).

[8] Several other papers studied the effects of easier credit conditions on US home prices, quantities, and real outcomes, using different identification strategies. See, for instance, Lustig and Van Nieuwerburgh (2005), Piazzesi et al. (2007), Mayer et al. (2009), Adelino et al. (2012), Agarwal et al. (2012), Mian et al. (2013), Scharfstein and Sunderam (2013), Favara and Imbs (2015), and Mian and Sufi (2022).

Some of the literature argues that part of the rise in house prices over the last fifty years is due to supply constraints, which became more stringent compared to the past due, in part, to tighter regulation. Our results bolster this view, as we show that a large demand shock that occurred at a time where regulation was likely much more permissive was met with a large supply response that muted its impact on prices.[9] Coherently, we find large impacts on homeownership, suggesting that more affordable mortgages did translate into more affordable housing and, in turn, higher homeownership—something that would likely not occur today given the extant evidence on low housing supply elasticities.[10]

1 Data

1.1 City-Level Series

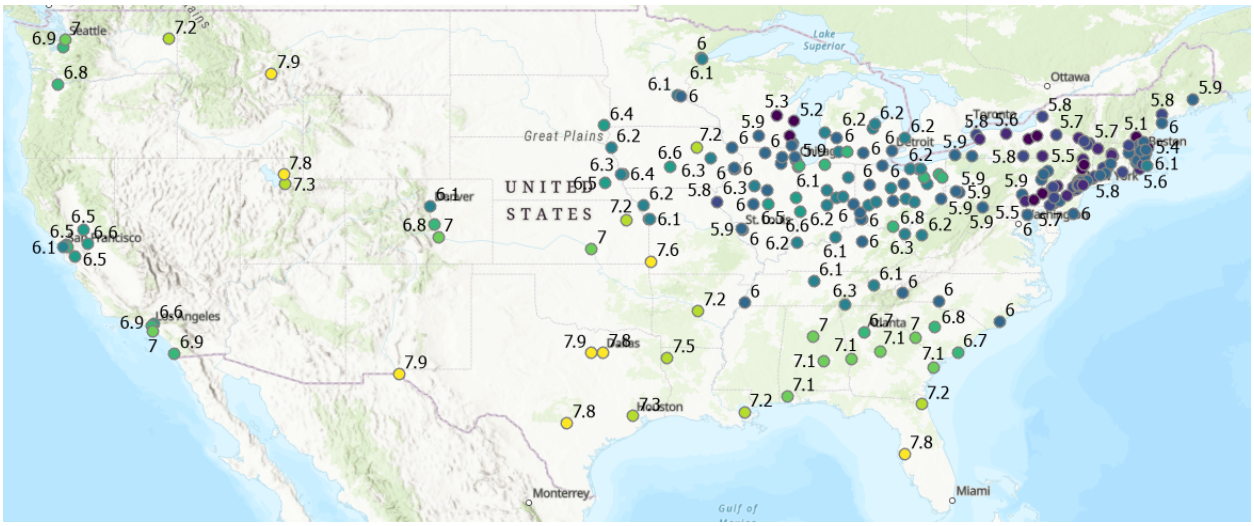
We assemble several data sources. The backbone of this analysis is a city-level panel of mortgage interest rates for 237 of the largest cities in the U.S. in 1920 and 1940, assembled using newly-digitized Table 38 of the 1920 Census special report on non-farm mortgages (U.S. Census Bureau, 1923), and Table 8 of the 1940 Housing Census (U.S. Census Bureau, 1943). The 1920 special report collected information through questionnaires to the owners of mortgaged homes and provides city-level averages on the value of mortgaged homes, amount of mortgage debt and rate of interest for cities with more than 25,000 people in 1920. The 1940 Housing Census obtained information on home financing as part of the census of owner-occupied nonfarm dwelling units in structures without business and containing no more than 4 dwelling units.[11] Figure 1 shows a map of the 237

[9] This is especially interesting when compared with results on the modern environment by Favara and Imbs (2015), who show that credit expansions tend to be capitalized into higher house prices rather than new construction.

[10] The U.S. homeownership rate rose from 44 to 62 percent between 1940 and 1960, and a growing literature has sought to identify the drivers of this transformation. For instance, Collins and Niemesh (2023) show that rising real incomes can account for a substantial share of this increase, and Fetter (2013) estimates that GI Bill mortgage subsidies explain about a quarter of the ownership increase for affected cohorts (see Fetter, 2014 for a comprehensive review of other papers and hypotheses on the homeownership boom, as well as Fishback et al., 2020; Quincy, 2022). Our paper complements this work, and especially that related to mortgage financing, by offering new quasi-experimental evidence on the impact of lower rates on homeownership. In our setting, cities that experienced larger declines in mortgage rates did not see differentially higher income growth, suggesting that the cost-of-credit channel we identify is distinct from the earnings channel.

[11] We note that mortgage data for 1920 were obtained for all owner-occupied nonfarm homes, whereas the 1940 data are restricted to those in 1- to 4-family dwelling structures without business. We expect that the 1940 figures are a slight understatement of the actual number of mortgaged homes, but as argued in census documents, "the difference is not large enough to invalidate comparisons of the figures with those obtained in earlier censues." (U.S. Census Bureau, 1943). We also note that whereas the 1920 report aggregated data at the city-level, the 1940 report is at the county-level. For cities contained within a single county (98 percent), we assume that the county-wide average interest

Figure 1: Map of Cities in Main Analysis Sample



Notes. This figure maps the location of the 237 cities that form our main analysis sample. Lighter-colored dots denote places with higher initial interest rates in 1920, while darker-colored dots denote places with lower initial interest rates in 1920. Labels report the mortgage interest rate in 1920.

cities in our main sample.

For a subset of 37 cities (out of the 237), we supplement this two-period panel with an additional time stamp of mortgage conditions in 1934 using the Financial Survey of Urban Housing (Wickens, 1935). The survey obtained reports (through interviews and over mail) from owner-occupants on value, amount of indebtedness, source of loan, and interest rate from 5 to 30 percent samples of the families in each city. This dataset provides a snapshot of mortgage conditions on the eve of the roll-out of the biggest housing policies; hence, for these thirty-seven cities we have data in the immediate pre- and post-periods of the housing policies.[12] Finally, for a different and smaller subset of 26 cities (out of 237), we digitize data on interest rates from the 1950 Census of Housing (U.S. Census Bureau, 1952).

We rely on many additional data sources to supplement our analysis of these cities. From the City and County Data Books (Haines and Inter-university Consortium for Political and Social Research, 2010), we collect socio-economic and demographic characteristics, such as total population, fraction of city residents who are white, U.S.-born, or male; the average manufacturing wage

rate was the average at the city-level. For cities contained within multiple counties (2 percent), we take the average of the county-wide interest rates as the average at the city-level.

[12]The actual samples contain 287 for 1920, and 52 for 1934, but we limit our panel to cities that appear in all years and for which we have non-missing demographic and economic variables.

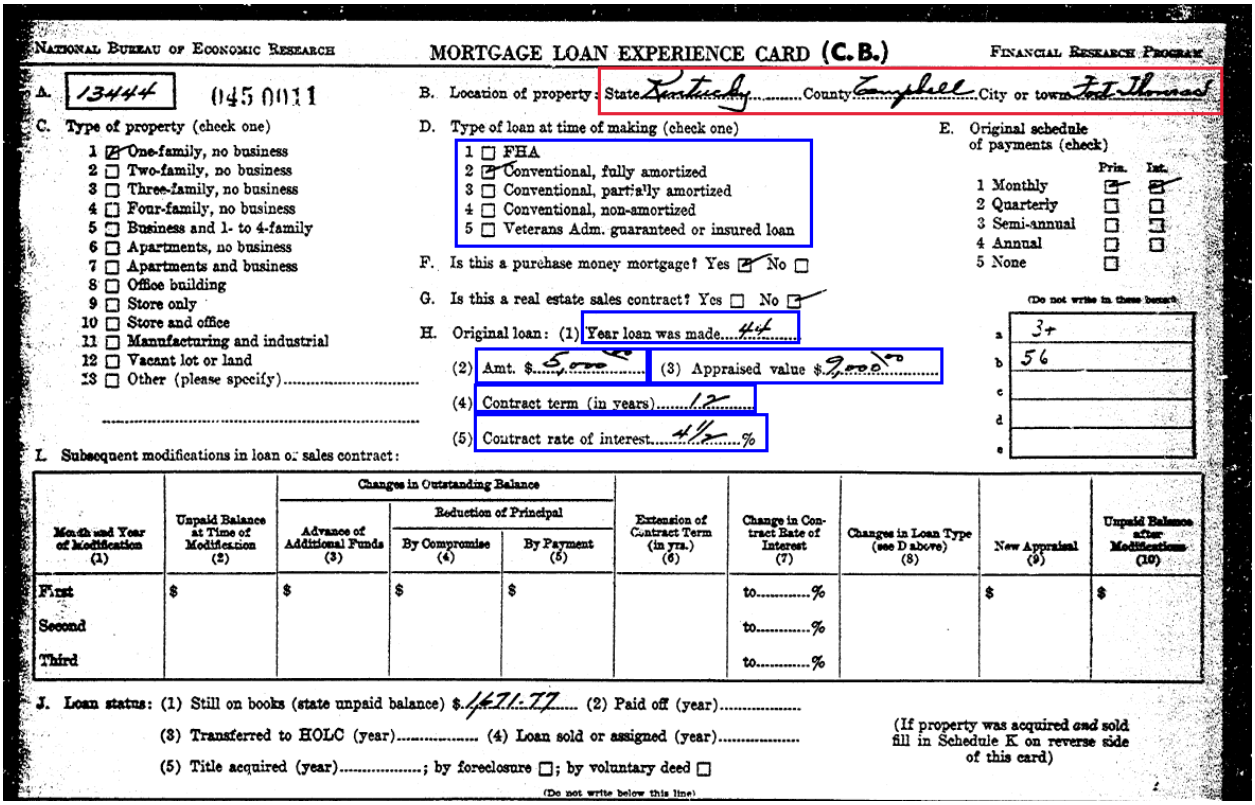
and number of manufacturing establishments. Key economic controls are the amount of New Deal relief spending at the city level, retail sales per capita in 1929 and growth in retail sales per capita between 1929 and 1933 (Fishback et al., 2003), and the amount of World War II military spending in each city (Brunet, 2024). We also rely on the average commercial lending rate at the state level over time measured as the total amount of interest and charges on all loans made by commercial banks divided by the total amount of loans (Bodenhorn, 1995). To measure new construction activity in cities over time we rely on city-level data for around 100 cities on the age structure of buildings from the 1960 Census (U.S. Census Bureau, 1963).

1.2 Individual Mortgage Loans

A key limitation of our city-level series is that, while spanning the entire U.S. at a granular level, the data are over long horizons, and the only mortgage characteristics available are the mortgage interest rates and LTV ratios. To supplement our analysis we digitize 22,761 individual mortgage loans made between 1920 and 1947 sampled in a survey conducted by the National Bureau of Economic Research in the 1940s. The survey was made in response to the paucity of disaggregated data on nonfarm mortgage investment and constituted the empirical backbone of several volumes published by the NBER in the 1950s (Saulnier, 1950; Harriss, 1951; Fisher, 1951; Behrens, 1952; Grebler, 1953; Morton, 1956). Its primary purpose was to obtain a random sample of individual mortgages to study the characteristics of the nonfarm mortgage loans made by major institutional lenders and to describe the lenders' experience with such mortgages since 1920.

The survey itself was implemented in two steps. First, a random sample of large institutional holders from three groups (life insurance companies, commercial banks and savings and loans associations) was selected. Second, within each selected institution, a random sample of all underwritten individual mortgages was chosen. For each individual mortgage, the institution had to fill out a uniform "mortgage loan card" which collected key characteristics, such as the type of loan (FHA-insured, conventional amortized, conventional non-amortized, etc.), the year loan was made, the contract rate of interest, the contract term, the amount of the loan and the appraised value of the property. Figure 2 shows an example of mortgage loan card for a loan made by a commercial bank. Panel A of Appendix Figure A.3 reports the number of loan cards by year and by whether or not they were government-insured, and Panel B reports the number of loan cards by year and by

Figure 2: Example NBER Loan Card


NATIONAL BUREAU OF ECONOMIC RESEARCH — MORTGAGE LOAN EXPERIENCE CARD (C.B.) — FINANCIAL RESEARCH PROGRAM

A. 13444 045 0011

B. Location of property: State Kentucky County Campbell City or town Fort Thomas

C. Type of property (check one)
1 ☑ One-family, no business
2 ☐ Two-family, no business
3 ☐ Three-family, no business
4 ☐ Four-family, no business
5 ☐ Business and 1- to 4-family
6 ☐ Apartments, no business
7 ☐ Apartments and business
8 ☐ Office building
9 ☐ Store only
10 ☐ Store and office
11 ☐ Manufacturing and industrial
12 ☐ Vacant lot or land
13 ☐ Other (please specify)

D. Type of loan at time of making (check one)
1 ☐ FHA
2 ☑ Conventional, fully amortized
3 ☐ Conventional, partially amortized
4 ☐ Conventional, non-amortized
5 ☐ Veterans Adm. guaranteed or insured loan

E. Original schedule of payments (check)

	Prin.	Int.
1 Monthly	☑	☑
2 Quarterly	☐	☐
3 Semi-annual	☐	☐
4 Annual	☐	☐
5 None	☐	

F. Is this a purchase money mortgage? Yes ☑ No ☐

G. Is this a real estate sales contract? Yes ☐ No ☑

H. Original loan: (1) Year loan was made 44
(2) Amt. $ 5,000 (3) Appraised value $ 9,000
(4) Contract term (in years) 12
(5) Contract rate of interest 4½ %

(Do not write in these boxes)
a 3+
b 56
c
d
e

I. Subsequent modifications in loan or sales contract:

Month and Year of Modification (1)	Unpaid Balance at Time of Modification (2)	Changes in Outstanding Balance: Advance of Additional Funds (3)	Reduction of Principal: By Compromise (4)	Reduction of Principal: By Payment (5)	Extension of Contract Term (in yrs.) (6)	Change in Contract Rate of Interest (7)	Changes in Loan Type (see D above) (8)	New Appraisal (9)	Unpaid Balance after Modification (10)
First	$	$	$	$		to ...%		$	$
Second						to ...%			
Third						to ...%			

J. Loan status: (1) Still on books (state unpaid balance) $ 4471.77 (2) Paid off (year) .....
(3) Transferred to HOLC (year) ..... (4) Loan sold or assigned (year) .....
(5) Title acquired (year) .....; by foreclosure ☐; by voluntary deed ☐

(If property was acquired *and* sold fill in Schedule K on reverse side of this card)

(Do not write below this line)

Notes. This figure shows an example of a loan card from the National Bureau of Economic Research's survey on individual mortgage loans. Cards were filled by lenders with information on the location of the mortgaged property, including state, county and town (annotated in red), as well as details on the contract (annotated in blue).

institution.

The collection of these loan cards is the only available microdata of individual mortgages from this period, and we are the first to digitize it in full (Ghent, 2011; Rose, 2011, have focused on smaller subsets of this data). We note, however, that despite its richness and novelty, there are potential concerns about the representativeness of the data. First, some commercial banks and savings and loans institutions contained no information on their inactive loans, but such bias concerns are small for the sample of life insurance companies. In our results, we highlight that mortgage conditions change across all institutions. Most importantly, the sample is limited to large institutions that remained in business during the Great Depression. Under the assumption that the institutions that survived engaged in less risky mortgage lending, we might be understating changes in mortgage spreads with this sample if risk premia narrowed over time or differences in riskiness also converged.

2 Institutional Background

We provide a brief overview of the institutional characteristics of mortgage markets between 1920 and 1950, and summarize the main aspects of the Federal mortgage legislation passed over this period. Grebler et al. (1956), Snowden (2010), Price and Walter (2019), Fishback et al. (2019), and Fishback et al. (2022b) offer a much richer review of this era.

Mortgage Markets between 1920 and 1933. Mortgage markets in the 1920s and early 1930s were dominated by local lenders. More than two-thirds of the mortgage debt in 1920 was held by local actors: building and loans association (B&Ls), commercial banks and individual investors (Grebler et al., 1956). Most B&Ls had few members, and membership was confined to a single city (Price and Walter, 2019). Commercial banks were prohibited from branching across states or, in many cases, even across cities. Life insurance corporations (LICs), mostly based out of New York or Connecticut, constituted the only significant source of inter-state lending, but they never held more than 15 percent of *all* mortgages prior to 1934 (Grebler et al., 1956) as they faced costs in maintaining large long-distance portfolios and were unwilling to be over-exposed to a single region (Snowden, 2010). The modal mortgage in the years before the housing policies was a non-amortizing 5-year balloon mortgage.[13]

The Policy Intervention. The Great Depression decimated the housing market with a rapid decline in housing prices and spikes in unemployment, causing many households to default on their mortgages once their terms expired and the entire principal came due. The Federal government responded with a far-reaching policy package aimed at stabilizing the mortgage market.

1. It established the Federal Home Loan Bank (FHLB) system in 1932, which, among other things, acted as a discount facility to B&Ls providing liquidity ("advances") to these local lenders against mortgages pledged as collateral. B&Ls came to be known as savings and loans associations (S&Ls), and started being regulated by the FHLB.[14,15]

[13] An exception to these kinds of loans were those offered by B&Ls, which had been in the business of offering a long-term amortizing mortgage plan to their members since the end of the 19th century (see Rose and Snowden, 2013, for more details). Mortgages made by Building & Loan associations had on average 83 bps higher interest rates than those made by life insurance companies and commercial banks, and their terms were 6 years longer.

[14] For clarity, we will keep referring to S&Ls as B&Ls.

[15] The government also established the Federal Savings and Loan Insurance Corporation (FSLIC), whose goal was

2. The government also supported mortgage lending done by other institutions, such as commercial banks and life insurance companies, by founding the Federal Housing Authority (FHA) in 1934 and the Federal National Mortgage Association (FNMA) in 1938. The role of the FHA was to provide insurance on mortgages made by private institutions, while FNMA offered a secondary market on FHA-insured mortgages.[16] Importantly, a second purpose behind the FHA was the recovery of the residential construction industry. In particular, starting in 1938 the FHA offered insurance for mortgage loans with better terms, such as longer durations and lower down payments, only if the loan was for a newly constructed property (Fishback et al., 2022b).

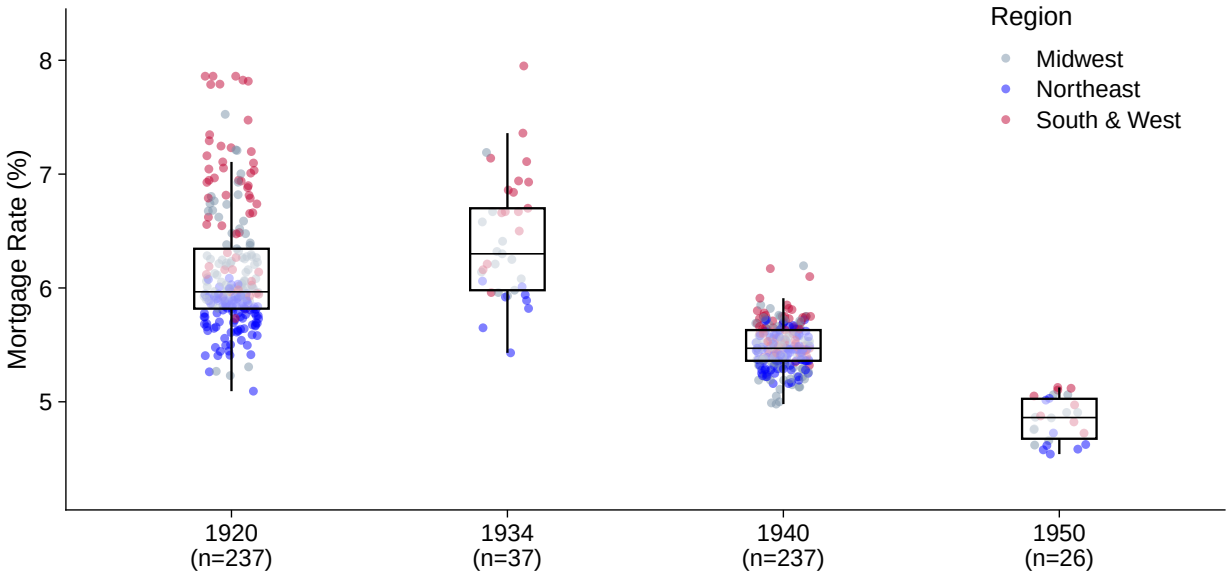
3. The government also set up the Home Owners' Loan Corporation (HOLC) in late 1933, which bought and restructured mortgages from borrowers judged to have defaulted on the loan "through no fault of their own" (Fishback et al., 2019). At the peak of its activity HOLC held up to a fifth of all mortgage loans in the U.S. HOLC restructured all mortgages the same way: increasing the term to 15 years, fixing the rate at 5 percent regardless of location and making them fully amortizing.

to insure B&L deposits, similarly to the role played by the Federal Deposit Insurance Corporation for commercial banks.

[16]FHA insurance for a new mortgage loan was limited to contracts where the underlying project was "economically sound," which was often interpreted as housing with small risk of deterioration in the physical structure and low risk of neighborhood change (Fishback et al., 2022b).

3 The Making of a National Mortgage Market

Figure 3: Distributions of Mortgage Interest Rates across Cities, 1920-1950



Notes. This figure plots the distribution of mortgage interest rates across cities for different years. We winsorize the values for two outlier cities that had 1920 mortgage interest rates above the 99th percentile of 7.9 percent. Dots indicate cities, colored by region.

In this section, we describe the evolution of mortgage conditions across cities and over time.

Figure 3 shows the distribution of average mortgage interest rates across our full sample of 237 cities in 1920 and 1940, and across the subsamples available in 1934 and 1950. Mortgage rates varied widely across cities prior to 1934. In 1920 rates ranged between 5.1 percent and 7.9 percent across the full sample. For the subsample of 37 cities in 1920, we observe virtually the same spread across cities, but a slightly higher average (6.4 percent compared to 6.0 percent). By 1934, the spread and the average of these 37 cities had not changed. By 1940, however, the spread in average interest rates had fallen to just over 100bps (from nearly 300bps), converging to an average of 5.5 percent, both for the full sample and for the restricted sample. By 1950, spreads across cities remained compressed.

The next subsections show that part of the initial segmentation in interest rates reflected barriers to the mobility of financial capital across space, and that the rapid convergence in mortgage rates was brought by the Federal Housing Policies discussed in Section 2. We present five distinct pieces of evidence, which lead to two main conclusions. First, the bulk of the convergence was due to the

Federal Housing Policies, and would not have happened under normal market conditions. Second, part of this convergence reflected an easing of barriers to the mobility of financial capital across space, and not only the effects of introducing government insurance on mortgages via the FHA. That is, the Federal Housing Policies facilitated an inflow of capital to initially high-rate places that were constrained in their lending capacity.

3.1 High-Rate Cities Received a Positive Supply Shock

We start showing that the mortgage evolutions of 1920 to 1940 had the features of a supply shock, coherently with the Federal Policies enabling an inflow of capital into initially capital-scarce cities. Figure 4 shows a plot of the city-level changes between 1920 and 1940 in mortgage rates (Panel a) and mortgage debt (Panel b), against the 1920 mortgage rate.[17] Panel (a) shows the strong degree of convergence already evident in Figure 3. Cities with a one percentage point higher mortgage rate in 1920 saw their rate decline by 0.78 percentage points on average. Panel (b) shows that, as prices declined in initially high-price cities, quantities rose, as measured by the increase in outstanding mortgaged debt relative to home values. Cities with a one percentage higher mortgage rate in 1920 saw a 46% increase in mortgage debt relative to home values.[18]

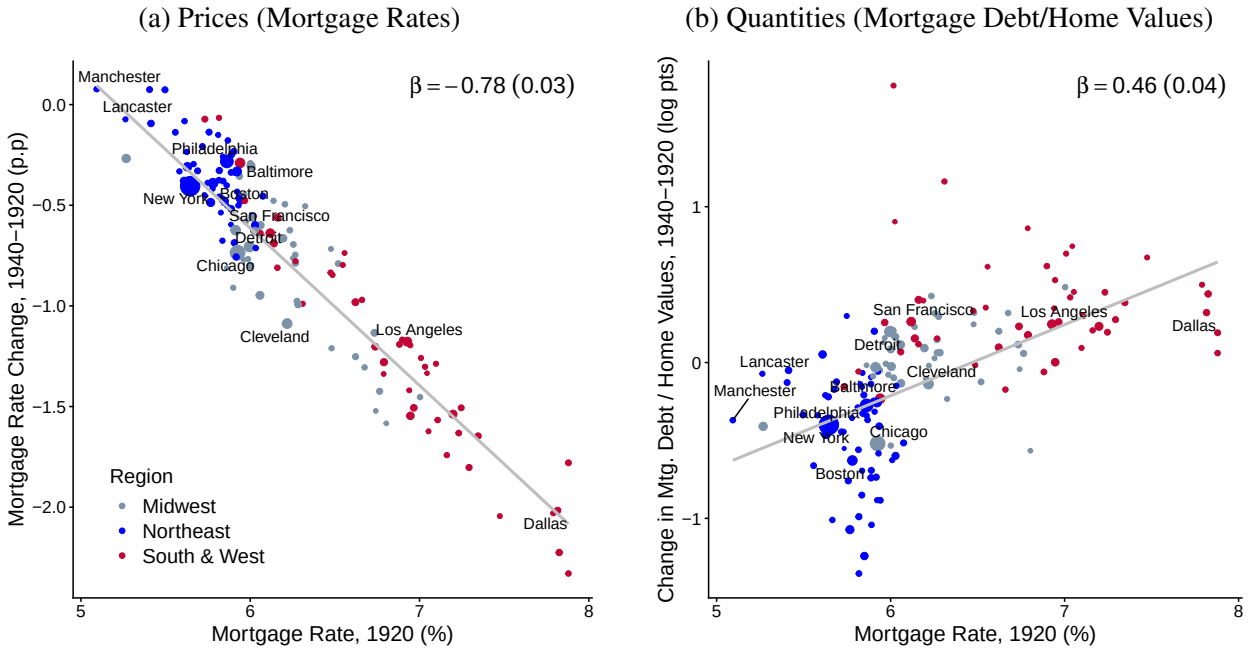
3.2 Most of the Convergence Happened After the Federal Housing Policies

The second feature of the convergence we documented is its very rapid pace concentrated in 1934-40. This is also already apparent in Figure 3, where, as discussed above, we notice that the spreads across cities in 1934 are roughly as large as those in 1920. To corroborate this finding, we repeat the exercise of plotting changes of mortgage rates against mortgage rates in 1920 for the two subperiods we have available, 1920-34 and 1934-40, for the sample of cities for which we have data in 1934. Panel (a) of Figure 5 reports the change in rates over the 1920-40 period against the initial rate. Also in this smaller subsample, the coefficient is -0.8, very similar to the -0.78 in

[17] The sample in both panels is a subset of the 237 cities available for 1920 and 1940. This subset includes the 149 cities for which we also have data on the number of mortgage homes, which is available only for cities with more than 50,000 people in 1940, and is necessary to construct the city-level amount of mortgage debt relative to home values (see Appendix Section A.1). Appendix Figure A.1 repeats Panel (a) for the full set of cities. The coefficient is virtually identical.

[18] Dividing by home values controls for the fact that part of this increase in mortgage debt could capture house price appreciation, without effectively changing the amount of debt per quantity of purchasable assets. Panel (b) of Appendix Figure A.1 shows that the coefficient is positive and very significant also when using the change in total mortgage debt. For this measure, we can use the full sample of 237 cities.

Figure 4: Changes in Prices and Quantities on Initial Mortgage Rates



Notes. This figure plots changes in city-level mortgage conditions between 1920 and 1940 against the initial mortgage interest rate in 1920 for 149 cities for which we can construct a measure of city-level mortgage debt over all home values (see Appendix Section A.1). Panel (a) plots the change in average mortgage interest rates between 1940 and 1920. Panel (b) plots the change in outstanding mortgage debt relative to home values between 1940 and 1920. Each panel reports the coefficient from a bivariate regression, where each city is weighted by city population in 1920. The size of each dot is proportional to population in 1920. Colors indicate census regions. Robust standard errors are in parentheses.

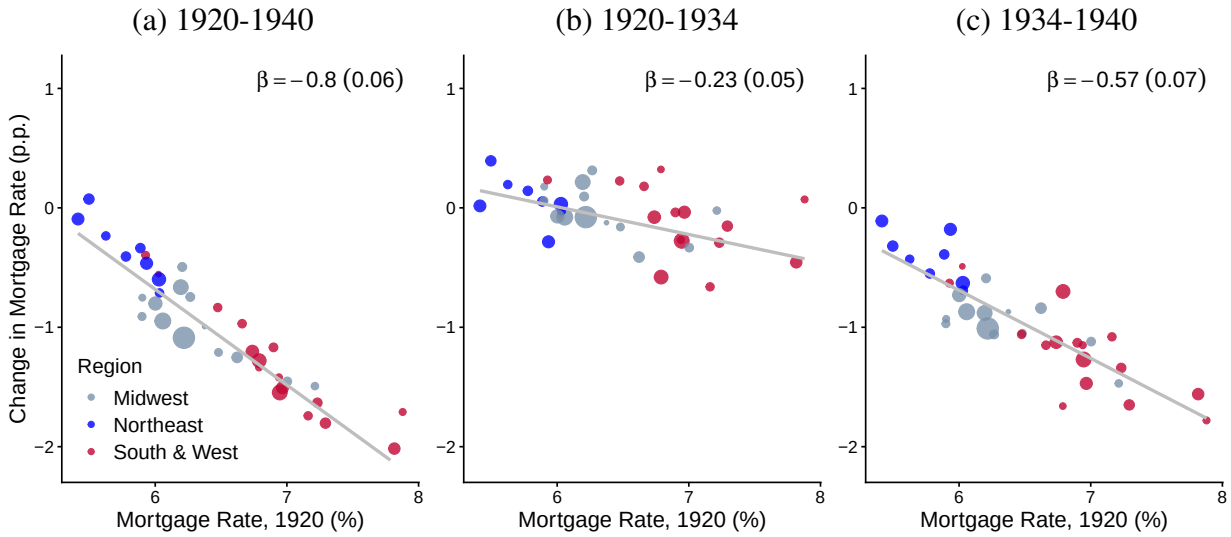
Panel (a) of Figure 4. The implied annual rate of convergence over the entire time period is 8%, but Panels (b) and (c), which report convergence in 1920-34 and 1934-40, respectively, show that this is mostly driven by 1934-40.[19] The implied annual rate of convergence in 1920-34 is of 1.9%, similar to Barro (2015)'s "iron law" of convergence of 2% for poor countries to rich ones. Yet, for 1934-40 the implied annual rate of convergence is of 14%, seven times as large.

To provide evidence at a higher frequency, we turn to our newly digitized sample of individual mortgages. Given the size of our sample, we aggregate our individual loan cards to the regional level, keeping only observations in states with loan data in at least twenty years between 1922 and 1947 (equal to 98.2 percent of the full sample of loans made in those years).[20] We aggregate the rates across the same three regions used to color the scatterplots: Northeast, Midwest, and South

[19] Letting r_{jt}^M be the mortgage rate in city j and year t, and r^* be a steady state mortgage rate, letting ρ be the annual rate at which the city converges to its steady state value, i.e. ρ is such that $dr_{jt}^M/dt = -\rho(r_{jt}^M - r_t)$, then the β in the estimated regressions is such that $\rho = -\log(1+\beta)/(t-1920)$, where $t = 1934, 1940$.

[20] Due to the small sample size, we group loans made in 1920, 1921 and 1922 together. We also group the loans made in 1933 under 1934.

Figure 5: Change in Mortgage Rates Against Initial Mortgage Rate, by Period



Notes. This figure plots the change in mortgage interest rates across cities, over different time horizons, against initial mortgage rates in 1920 for the 37 cities with data in 1934. Panel (a) plots the change in mortgage rates between 1940 and 1920 against the 1920 rate. Panel (b) plots the change in rates between 1934 and 1920. Panel (c) plots the change between 1940 and 1934. Each panel reports the coefficient from a bivariate regression weighted by city population in 1920. The size of each dot is proportional to population in 1920. Colors indicate census regions.

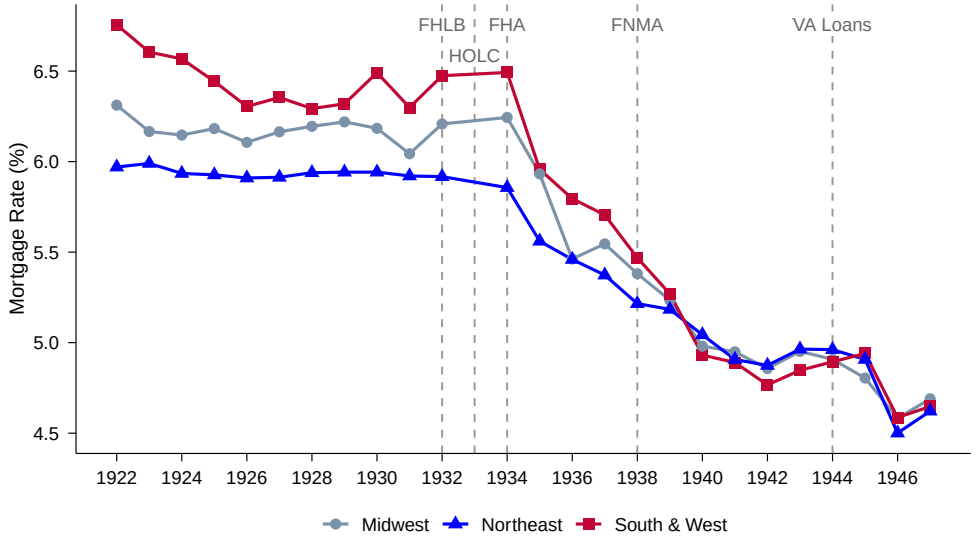
& West. Figure 6 reports the average rate for new mortgages issued in the three regions between 1920 and 1947. The figure shows that differences across regions in mortgage rates were roughly stable between 1920 and 1934, with a dramatic convergence concentrated between 1934-40, right after the Federal Housing Policies were enacted, which then stabilized between 1940 and 1947.

This evidence points to a very special role of the period in which the FHLB, FHA, and FNMA were introduced. The very asymmetric degrees of convergence over time cast doubt on other more secular explanations of convergence, such as secular catch-up of less developed cities to more developed ones or simple mean reversion.

3.3 Convergence was Specific to Mortgage Markets

Comparing the degree of convergence in mortgage markets, which were targeted by the Federal Housing Policies, to other lending markets further points to these policies being an important catalyst for convergence. To do this comparison, we use data from Bodenhorn (1995) on lending rates charged by commercial banks, which is available at the state level. Commercial banks were active in residential mortgage lending, but their lending rates also capture lending to businesses, farms, and consumers.

Figure 6: Mortgage Rates by Region



Notes. This figure plots average regional interest rates on newly originated mortgages from our digitization of the NBER's survey of individual mortgage loans. We aggregate the individual loans to the regional level, and report the average mortgage rate for all loans originated in a given year in a given region. Regions are: Northeast (blue, triangles), Midwest (gray, circles), and the South & West (red, squares). Due to small sample sizes, loans made in 1920–1922 are grouped together, and loans made in 1933 are grouped with 1934.

Panel (a) of Figure 7 shows that commercial lending rates and mortgage interest rates are indeed strongly correlated in the pre-period of 1920. The R^2 from the bivariate OLS regression is 0.6. Yet, the evolution of mortgage and commercial lending rates is very different. Panel (b) plots the distribution across states in commercial lending rates and mortgage rates (averaging city rates at the state level, to make it comparable). The distributions show that commercial lending markets featured higher variation compared to mortgage markets both in 1920 and 1934, but both types of rates feature substantial geographic variation. Yet, by 1940, mortgage rates were effectively all concentrated around 5.5 percent, while commercial lending rates retained substantial differences across states.

That is, geographic convergence was much stronger in mortgage markets—where the Federal government intervened—than in commercial lending markets.[21] The difference in rates of convergence further highlights the unique role of the Federal interventions, and further assuages the concern that the convergence in mortgage rates we document is the result of convergence in economic conditions, of other market-driven forms of convergence, or of mean reversion. These competing explanations are hard to rationalize with the dramatic pace of convergence in the mortgage market

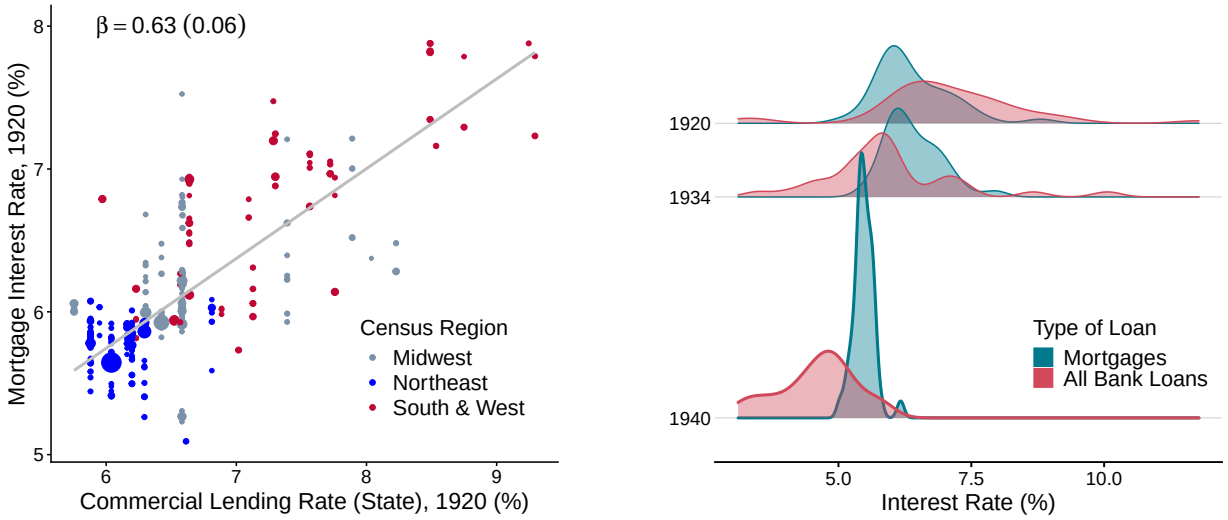
[21] This finding is even more surprising as, naturally, there are spillovers across markets within each locality.

and with the lack of convergence in the commercial lending market.

Figure 7: Geographic Dispersion of Mortgage Rates and Commercial Lending Rates

(a) Correlation in 1920

(b) Distribution Across States, by Year



Notes. Panel (a) plots the average city-level mortgage interest rate against the state-level commercial lending rate in 1920 for our sample of 237 cities, as well as the coefficient and R^2 from a bivariate regression of the mortgage rate on the commercial rate, weighting each city by its population in 1920. The size of each dot is proportional to population in 1920. Colors indicate census regions. Panel (b) plots the cross-sectional distribution of mortgage interest rates (in blue) and commercial lending rates (in pink) across states in 1920, 1934, and 1940. For the 1934 distribution, mortgage rates are based on the subsample of 37 cities. Commercial lending rates are from Bodenhorn (1995).

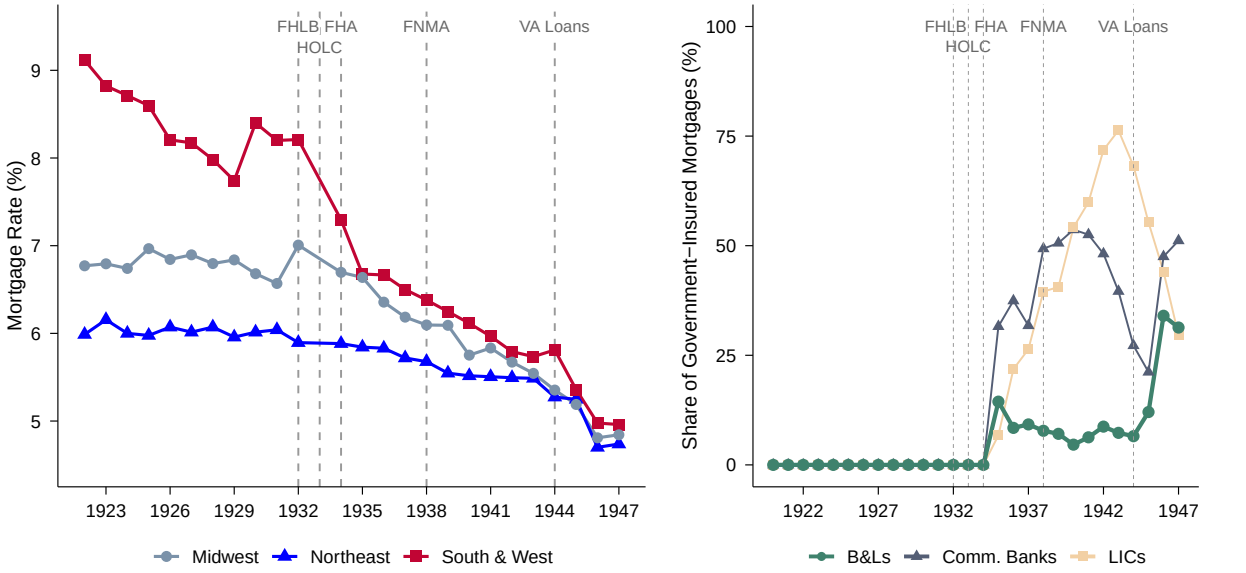
3.4 Convergence Without FHA Insurance

Although the evidence presented above points at a unique role of the Federal policies in driving the convergence, it does not discriminate between the different parts of the policy package. Part of the convergence might have been driven by the inflow of financial capital into capital-scarce places, through the FHLB providing advances at the same rate everywhere, or the FNMA creating a national secondary market for mortgages. Another part of it, however, might have been driven by risk differences across space being eliminated by the government insuring mortgages through the FHA, if this insurance was not priced differentially across space.

To discriminate between these two sources of convergence, at least qualitatively, we use the NBER mortgage cards to focus on the convergence in rates charged by B&Ls, who did not make use of the FHA insurance (as also shown by Rose and Snowden, 2013). Panel (b) of Figure 8 plots the share of mortgages originated under the FHA program (and the VA program, after 1944),

Figure 8: Large Convergence for B&Ls Despite Minimal FHA Takeup

(a) Rates on New Mortgages by B&Ls, by Region (b) Take-up of Gov. Insurance, by Lender



Notes. Panel (a) plots average interest rates on newly originated mortgages by Building & Loan associations (B&Ls), separately by region, from our digitization of the NBER's survey of individual mortgage loans. Panel (b) plots the share of newly originated mortgages that were government-insured (FHA or VA) by type of institutional lender: B&Ls, commercial banks, and life insurance corporations.

which received government guarantees, by type of lender. The green bold line (bottom) shows that take-up of FHA-insurance by B&Ls was minor, especially compared to the other lenders active in mortgage markets (banks and life insurance corporations), with less than 10% on average of new B&Ls mortgages being FHA-insured against more than 40% for other lenders. Yet, B&Ls mortgage rates converged dramatically after the introduction of the FHLB. Panel (a) shows that regional spreads were around 250bps before 1933, and then stabilized to less than 50bps by the early 1940s.[22]

3.5 Capital Scarcity and Mortgage Rates

Finally, we show that the relationship between city-level capital scarcity, the difference between the supply of savings and the demand for mortgage borrowing, and local mortgage rates across time is consistent with the integration of mortgage markets. While capital scarcity is strongly correlated with the mortgage rates in 1920, when lending markets were segmented, it exhibits no statistical

[22]B&Ls did take up VA guarantees instead, but these started in 1944, when the bulk of the convergence already happened.

correlation with the 1940 rates following the implementation of the housing policies.

The idea that local lending rates partially reflect an imbalance between the supply of funds from households to lenders and the demand for mortgage borrowing is supported by qualitative contemporaneous accounts. A 1929 Brookings report, for instance, points to the imperfect geographic mobility of financial capital as a main driver of mortgage rate differences across space:

> The existence of substantial geographical differentials in interest rates not attributable to the character of the security indicates an insufficient fluidity in the movement of loan funds, a defect which may be due to a number of conditions, including differences in the cost of administering loans at a distance. (Gray and Terborgh, 1929)

We measure cities' local capital scarcity by constructing their "net asset position," based on each city's age distribution and following the approach of Auclert et al. (2021). The approach assumes that individuals differ over their age profile in how much assets they hold compared to how much debt they owe. For example, younger households are more likely to be net borrowers, while older households are more likely to be net lenders of funds to the banking sector. Thus, cities with a higher fraction of older households relative to younger households would exhibit a larger supply of funds relative to demand (as in Becker, 2007).

Mechanically, we calculate the local net asset position of each city through the following steps. We split households into five age bins according to the age of the household head.[23] Using the earliest wave of the Survey of Consumer Finances from 1949, we measure the national net asset position associated with each age group by estimating the fraction of *all* household debt held by households in each bin and the fraction of *all* assets held by households in each bin. The net asset position of each age bin equals the difference between the fraction of assets held and the fraction of housing debt.[24] Thus, the sign of each group's net asset position reflects whether households of that age are on average net debtors or net lenders. Its magnitude captures each group's imbalance between its supply and demand of capital. Each city's net asset position in a given period then sums the age-specific net asset positions weighted by the fraction of households in the relevant age group living in that city and period.

[23] The age bins are: 18-30, 31-40, 41-50, 51-60 and 61+.

[24] For example, households in the lowest age bin hold 24 percent of all US housing debt, but only 8 percent of all US assets, resulting in a net asset position of $-0.24 + 0.08 = -0.16$. On the other hand, households in the highest age bin hold 4 percent of housing debt, but 15 percent of liquid assets, with a net asset position of approximately $-0.04 + 0.15 = 0.11$.

Table 1: Local Mortgage Rates and Local Abundance of Savings Relative to Debt, 1920 and 1940

	Dependent Variable: Mortgage Rate in City j in Year t					
	Segmented Markets ($t = 1920$)			Integrated Markets ($t = 1940$)		
	(1)	(2)	(3)	(4)	(5)	(6)
City-Level Net Asset Position$_{jt}$	-8.90^{**}	-7.62^{**}	-12.75^{***}	-2.94^{*}	2.57	.59
	(4.41)	(3.31)	(3.53)	(1.61)	(3.00)	(2.40)
Avg. Manufacturing Wage$_{jt}$			$-.08$			$-.18$
			(.27)			(.11)
Fraction Rural$_{jt}$			.51			.06
			(.34)			(.19)
log(Tot. Population)$_{jt}$			$.40^{***}$			.10
			(.15)			(.06)
Region FE		✓	✓		✓	✓
Observations	237	237	237	237	237	237
R^2	.037	.55	.68	.017	.28	.46

Notes. This table reports WLS regressions of city-level mortgage interest rates on the local net asset position, weighting each city by population in 1920. Columns 1–4 use the 1920 mortgage rate as the dependent variable; columns 5–8 use the 1940 mortgage rate. The net asset position is constructed using each city's demographic age distribution and national net asset positions by age group from the 1949 Survey of Consumer Finances (see main text for details). Controls are added progressively across columns within each panel. Robust standard errors are in parentheses.

Table 1 summarizes the results from regressions of mortgage interest rates on the cities' local net asset positions for the two periods before and after the policy reforms. Columns 1 to 4 show that initial mortgage interest rates in 1920 are strongly negatively correlated with the 1920 net asset position even when we include a host of city-level controls in the last specification. Cities where capital was relatively scarce had significantly higher mortgage rates consistent with market segmentation and limited access to national (or non-local) funds.[25] This significant relationship, though, has disappeared by 1940 (columns 5-8 of Table 1). In line with the integration of regional mortgage lending markets into a national lending market, a city's capital scarcity as captured by its net asset position is not predictive of the mortgage interest rate once we introduce even simple regional controls. The initial imbalance between local demand and supply forces has, thus, become irrelevant in shaping local prices (mortgage rates) once these prices are set on a national market.[26]

[25] Appendix Table A.1 shows that mortgage rates are correlated with other proxies for capital scarcity: the historical fraction of B&L debtors over all B&L members from 1893, as well as cities with a larger historical fraction of bank deposits over total bank assets from 1904. These results complement other work on geographic segmentation of commercial lending markets by Becker (2007) and D'Amico and Alekseev (2025).

[26] These results are robust to using 1920 controls, rather than contemporaneous controls for the regressions in columns 5-8 (see Appendix Table A.2), as well as to using the fraction of older households as a proxy for the relative capital scarcity (see Appendix Table A.3).

4 Effects on Cities: Homeownership, Prices, and City Size

In this section, we study how shocks to mortgage rates affect city growth, real estate prices, and construction. A decline in urban mortgage rates due to a higher supply of credit makes homeownership more affordable and morphs into a demand shock to owner-occupied homes in the city. We expect this shock to lead to increases in the rate of homeownership, total population growth, as well as in housing prices and quantities, where the relative magnitude of the predicted effects will mostly depend on the elasticity of supply of ownable homes. Such predictions would follow from any supply shock to mortgage credit, and are not tied to this particular historical episode. However, what is unique about the context we study is that the Federal housing policies were also aimed at boosting construction: the FHA would only insure mortgages on newly-built houses and would even collaborate with property developers to pre-certify that borrowers would have access to FHA insurance. Therefore, we also expect to see an especially robust response in the construction sector.

4.1 Empirical Strategy

Our key insight in addressing these questions is that the size of the change in mortgage rates brought about by the Federal policies differed across cities as illustrated in Panel (a) of Figure 4. We leverage this heterogeneity and study whether places that experienced a higher decline in rates also saw greater changes in homeownership, population, or rates of construction.[27] The main threat to our empirical strategy is that cities that had initially higher interest rates were less economically developed, and rather than capturing the effect of shocks to mortgage affordability, we are estimating the effects of economic convergence across space more broadly. In other words, less-developed cities (that happened to have higher mortgage interest rates) would grow at higher rates by virtue of overall economic convergence forces (as in Barro and Sala-i-Martin, 1992).

Our empirical strategy uses a dynamic regression approach in the spirit of (Hornbeck, 2012), following a differences-in-differences intuition. We are comparing the difference in a given out-

[27] Ideally we would measure the change in rate between 1934 and a given year t in our sample. We do not have mortgage rate data for all cities for all years, and for 1934 we only have data for 37 cities. However, Section 3 shows that: *i.* the bulk of the convergence occurred between 1934 and 1940, rather than 1920–34, *ii.* spreads remained compressed thereafter. Thus, we use the mortgage rate in 1920 directly as the independent variable, which as a proxy for the permanent decline in mortgage rates mostly occurring between 1934 and 1940. To directly measure the semi-elasticity of our outcomes of interest to changes in mortgage rates, we also estimate 2SLS regressions where we instrument the post-1934 change in mortgage rates in each city (as measured by the change between 1920 and 1940) with the 1920 mortgage rate.

come between 1930 (which we consider our base year) and any other year for cities that experienced a higher decline in mortgage rates relative to the average city. In particular, we estimate the following regression equation for each city j and census decade t:

$$Y_{jt} - Y_{j,1930} = \alpha + \sum_{t \neq 1930} \beta_t^M \cdot r_{j,1920}^M + \sum_{t \neq 1930} \beta_t^C \cdot r_{s(j),1920}^C + \sum_{t \neq 1930} \boldsymbol{X}_j \cdot \boldsymbol{\theta_t} + \phi_{tl} + \varepsilon_{jt} \quad (1)$$

where Y_{jt} is an outcome of interest (homeownership, population, house prices, or the total number of dwellings). $r_{j,1920}^M$ is the mortgage interest rate in 1920, $r_{s(j),1920}^C$ is the state commercial lending rate in 1920, and $\boldsymbol{X}_j$ is a vector of city characteristics in 1930, 1920, and 1910. As anticipated, $r_{s(j),1920}^C$ is an especially reassuring control, as it captures many of the confounders that are associated with low financial development.

In terms of city-level pre-period characteristics, we control for initial demographics in 1930 (percent native-born population, percent Black population, the log of total population, the log of total dwellings) and levels of economic development in 1930 (average manufacturing wages, the log of the number of manufacturing establishments, the fraction of state population that is rural) as well as the homeownership rate in 1930. We also control for possible differences in the incidence of the Great Depression, using the proxies available from the literature: the change in retail sales per capita, initial retail sales per capita in 1929, and the log amount of New Deal relief grants (see Fishback et al., 2005). We also define a "housing boom" index as the total number of building permits issued in the city between 1921 and 1928 divided by the number of families in 1920 to capture the extent to which the city experienced higher-than-normal construction activity in the years leading up to the Great Depression. We control for shocks to amenities via average January temperatures (Glaeser and Tobio, 2008) and World War II military spending (see Brunet, 2024). Finally, we add controls, when available, for the 1930 values of our outcome variables. Region-by-year fixed effects ϕ_{tl} are included throughout, which allows us to compare cities within broad regions of the US (Dallas against Houston, and Chicago against Cleveland, rather than Dallas against Chicago) and controls for time-varying differential trends across US regions.

Following Hornbeck (2012), we also estimate a version of Equation (1) where we also control for the lags of the economic and demographic characteristics in 1920 and 1910, including the lags of our outcomes.[28] When controlling for the level of outcomes in the pre-period, we cannot

[28] We don't yet have available the manufacturing characteristics for 1910.

estimate Equation (1) for 1910–30.

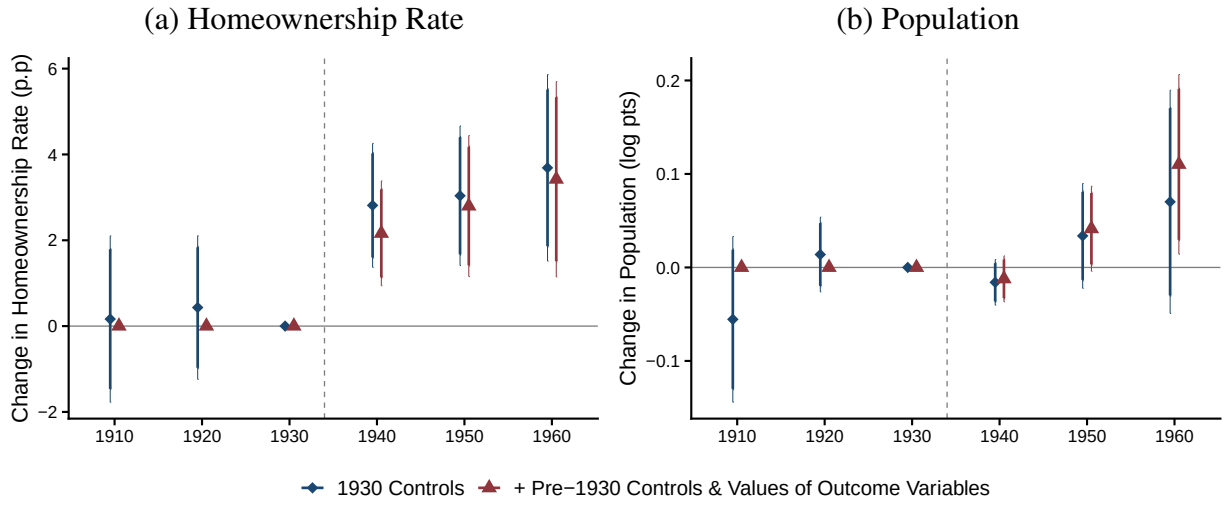
4.2 Event Study Results

Figure 9 summarizes our results for the two main outcomes for which we have consistently defined data from 1910 onward: the homeownership rate and log city population. Navy diamonds show coefficients from the baseline specification described above; maroon triangles add the 1920 and 1910 lags of the baseline controls and of our outcomes.

Panel (a) shows that cities with higher initial mortgage rates experienced significantly higher growth in homeownership after the Federal housing policies. A city with a 100 bps higher mortgage rate in 1920 saw an approximately 2.2 p.p. higher increase in the homeownership rate between 1930 and 1940 and 2.8 p.p. between 1930 and 1950. Importantly, the pre-period coefficients for 1910 and 1920 are close to zero and statistically insignificant, supporting the parallel trends assumption. Indeed, when we directly control for lags of homeownership, the coefficients barely move, as one can see by comparing the navy diamonds and maroon triangles.

Panel (b) shows that there is no differential population growth in the immediate aftermath of the policies (1930–1940), but cities with higher initial mortgage rates witness higher population growth in the following decade. This pattern is consistent with increased mortgage affordability first raising homeownership, which then attracted in-city migration. We note that although the pretrends for this outcome are limited, they are not as flat as for homeownership.

Figure 9: Changes in Homeownership Rate and Population in Cities with a Larger Reduction in Mortgage Rates after 1934, relative to 1930



Notes. This figure plots the coefficients β^M estimated in the dynamic regression in Equation (1) of the change in homeownership rate between each year and 1930 (left panel) and the change in log population (right panel) between each year and 1930, against the average mortgage interest rate in 1920. Navy diamonds show estimates from a regression that controls for census region fixed effects, demographic and economic conditions in 1930, average January temperatures, state commercial lending rate in 1920, and proxies for heterogeneous exposure to the Great Depression, World War II spending, and the 1920s housing boom. Maroon triangles add pre-1930 controls (1920 and 1910 demographic and economic controls) and lagged values of the outcome variables, which absorb all variation in the pre-period regressions. Thin bars denote 95% confidence intervals; thick bars denote 90% confidence intervals. All regressions are weighted by city population in 1930 with robust standard errors.

4.3 Semi-Elasticity Estimates

To estimate the semi-elasticity of housing market variables to a decline in mortgage rates, we explicitly instrument the change in mortgage rates between 1920 and 1940 with the initial mortgage interest rate in 1920. The first stage results show that the initial rate is highly predictive of the change, with minor changes in the coefficient across specifications.

Table 2 reports the 2SLS estimates for three outcomes measured as changes between 1930 and 1950: log median home prices, log number of dwellings (as a proxy for the rate of construction), and the homeownership rate. We start by controlling only for region fixed effects; we then add the full set of demographic, economic, Great Depression, and World War II controls, as well as pre-1930 lagged controls (see Section 4.1 for details). Lastly, we also include the state commercial lending rate in 1920.

We find that a 1 percentage point decline in mortgage rates is associated with little movement

Table 2: Effect of a 1 p.p. Decrease in Mortgage Rates on Housing Market Outcomes, 1930–1950

	Dependent Variable: City-level change between 1950 and 1930 in								
	Home Prices (log pts)			# Dwellings (log pts)			Homeownership Rate (p.p.)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$-\widehat{\Delta r}^{M}_{j,1940-20}$ (p.p.)	.04	.11***	−.02	.01	.09***	.07**	6.08***	3.04***	3.57***
	(.04)	(.04)	(.05)	(.06)	(.03)	(.03)	(1.44)	(.80)	(.95)
$r^{C}_{j,1920}$			.14***			.02			−.61
			(.03)			(.02)			(.56)
Building Boom$_{1921-28}$		−.31**	−.26*		.08	.09		1.83	1.64
		(.15)	(.15)		(.09)	(.09)		(1.78)	(1.80)
Region FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Controls		✓	✓		✓	✓		✓	✓
Observations	219	219	219	219	219	219	219	219	219
R^2	.292	.534	.585	.112	.857	.861	.269	.811	.812

Notes. This table reports 2SLS estimates of the effect of changes in mortgage interest rates on housing market outcomes between 1930 and 1950. The endogenous variable is the change in average mortgage rate ($\widehat{\Delta r}^{M}_{1940-20}$), instrumented with the 1920 mortgage rate. Columns (1)–(3) report effects on log median home prices; columns (4)–(6) on log number of dwellings; columns (7)–(9) on the homeownership rate in percentage points. All regressions are weighted by 1930 city population. Robust standard errors in parentheses. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

in prices. Column (2) shows an increase of prices of 11% (consistent with Glaeser et al., 2012), but this coefficient goes to zero when we add the control for the commercial lending rate. On the other hand, we find positive effects on homeownership and construction across specifications. Dwellings increase by 0.07 to 0.09 log points, while the homeownership rate, consistent with the event study results, increases by 3 to 3.5 percentage points. These findings indicate that higher demand for owning a home was met with a robust response from the housing supply sector, suggesting that at the time the supply of homes was quite elastic.

To shed further light on the responsiveness of housing supply to this shock, we study a yearly dataset of prices and quantities for 24 cities in our sample. The data on prices is made available by the Federal Reserve Bank of Philadelphia (2024), and used in (Lyons et al., 2024). On quantities, we use data on building permits at the city level collected by Ronan Lyons and Allison Shertzer, who generously shared it with us. Figure 10 presents results for house prices (Panel a) and building permits (Panel b).[29]

[29]The full data actually covers 26 cities. We exclude Tampa Bay from both panels as it was a large outlier for both prices and quantities, both before and after the policy. Charleston, S.C., has incomplete data for permits, and we exclude it from both panels. Adding back these cities does not alter the results as shown in Appendix Figure A.5.

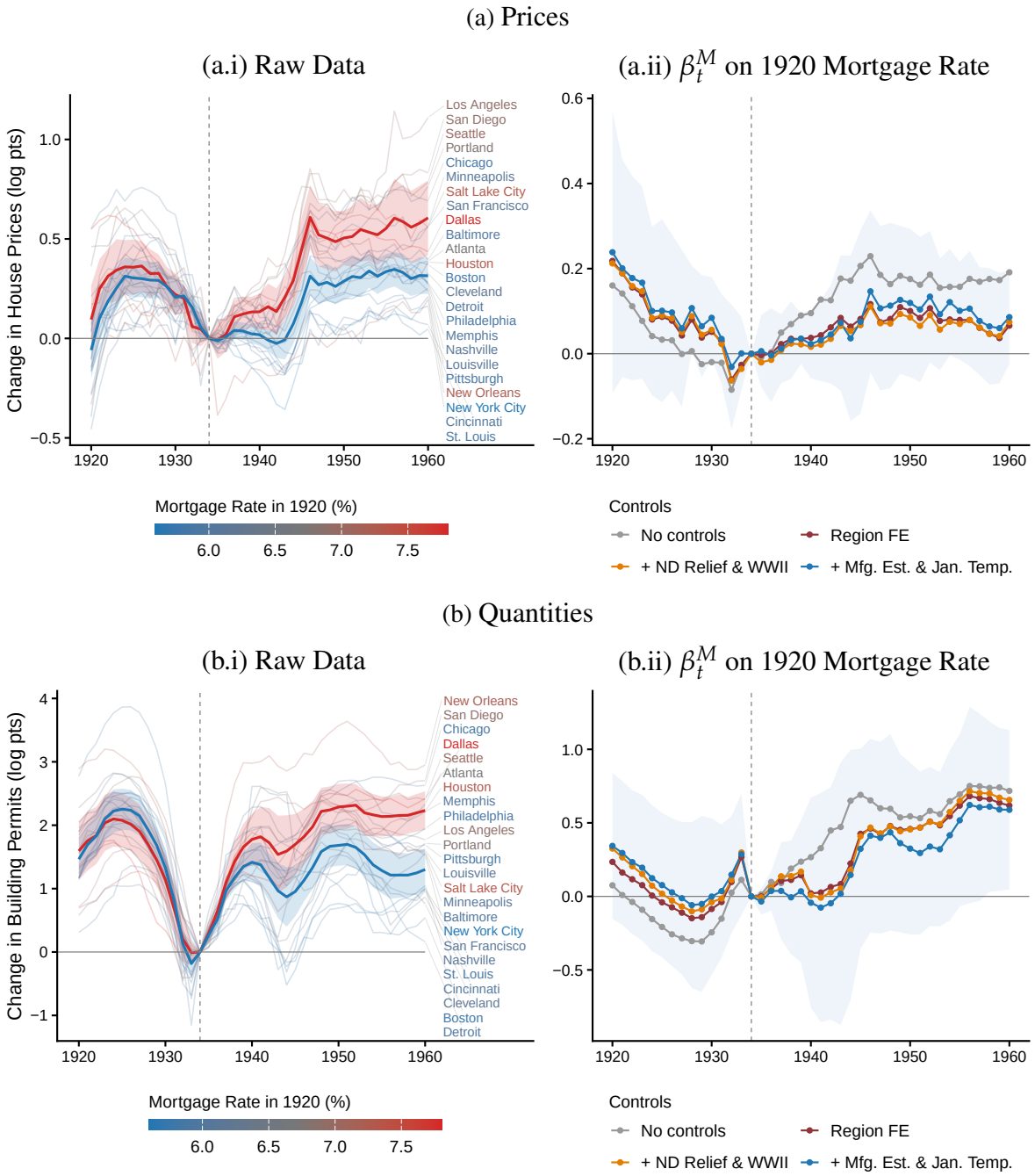
The left sub-panels plot the raw trajectories for each city, colored on a gradient from blue (low 1920 mortgage rate) to red (high rate). Bold lines show means for cities above and below the median rate. Before the policy, construction behaved on average almost in the exact same way across high and low rate cities, but then diverged after the policy. In cities that receive a relatively larger inflow of financial capital, the demand shock was met with much more construction, at a rate of 0.5 log points. Prices also went up, but the raw difference was much lower, around 0.2 log points.

In the right sub-panels, we report the β^M coefficient from repeated cross-sectional regressions of changes in prices (a.ii) and quantities (b.ii) between year t and 1934, against the mortgage rate in 1920, following Equation (1). We add controls progressively but, given the small sample, we can only add a limited number of controls. The gray line show the unconditional result, which approximately coincide with the difference between the red and the blue line in the left hand side panel. The dark red line controls for census region fixed effects; the orange for New Deal relief and WWII spending (orange); and the blue for manufacturing establishments and January temperatures.[30]

The richest specification shows that house prices reach at most a 10% appreciation, which is, however, statistically indistinguishable from zero. The results for building permits are more striking. With the full controls, cities with a 100 bps higher initial mortgage rate saw building activity grow approximately 50% more between 1934 and the late 1940s. These results confirm the evidence of Table 2, namely that the increase in demand was met with a strong supply response. As anticipated, this is particularly interesting when contrasted with evidence on the modern period suggesting that easier credit translates to higher prices rather than more construction (Favara and Imbs, 2015), suggesting that US housing supply became much tighter compared to the 1950s.

[30]We chose the controls that were most correlated with mortgage rates in this subsample. Results are quite stable even with other permutations of controls.

Figure 10: Changes in House Prices and Building Permits in 24 Cities, by Mortgage Rate in 1920



Notes. This figure shows the evolution of housing prices and building activity for 24 cities with yearly data provided by the Federal Reserve Bank of Philadelphia (2024). Each subfigure has two panels. Left panels plot individual city trajectories of the log change from 1934 in house prices (Panel a) and building permits (Panel b), with cities colored on a gradient from blue to red depending on their 1920 mortgage rate. Cities in red (blue) saw a larger (smaller) reduction in mortgage rates between 1934 and 1940, relative to the average city. Bold lines show group means for cities above and below median 1920 mortgage rate; shaded bands indicate 95% confidence intervals around each group mean. Right panels plot the β^M coefficients from yearly cross-sectional regressions of the outcome on the 1920 mortgage interest rate, adding controls progressively: no controls (gray); census region fixed effects (dark red); New Deal relief grants and World War II spending (orange); the log of the number of manufacturing establishments and average January temperatures (blue). The shaded band around the blue line denotes 95% confidence intervals based on robust standard errors. All outcomes are measured in log changes relative to 1934. Building permits are smoothed using a five-year centered moving average. The dashed vertical line marks 1934.

5 Effects on Households: Fertility

Beyond city-level effects, we study how mortgage conditions impact intra-household decision-making, focusing specifically on fertility choices. A burgeoning literature and recent public debate have highlighted the close relationship between housing affordability and fertility outcomes (see footnote 5 for an overview of related literature). We study whether changes in local mortgage conditions affected households' fertility decisions. We offer suggestive evidence that cheaper mortgage conditions brought on by the 1930s housing policies facilitated young couples' move out of their parents' homes and purchase of their own homes, allowing them to subsequently marry and have children at an earlier age.[31]

We document that cities that experienced a greater shock to mortgage affordability had greater fertility by first exploiting variation in women's exposure to high mortgage interest rates during their childbearing years. We focus on white women between the ages of 20 and 50 from the 1950 Census and assume that they lived in the city where they were recorded in 1950 throughout their fertility window (ages 15 to 40).[32] For each woman, we then calculate the average mortgage and commercial lending rates experienced during her fertility window.[33] For example, a woman born in 1900 who resided in Dallas during her childbearing years would have faced an average mortgage interest rate of about 7.5%, while a woman born the same year in Boston would have faced a significantly lower average rate of just over 5.5%. Among women born in 1920, this city-level difference narrows to about 50 basis points. We estimate the following regression for each woman i, observed in city j in 1950 and born in year b:

$$Y_{i,j,b} = \beta_0 + \delta_j + \psi_b + \beta^M * \bar{r}^M_{j,b} + \beta^C * \bar{r}^C_{s(j),b} + \Gamma * \mathbf{W}_{i,j,b} + \Xi * \mathbf{X}_{j,b} + \varepsilon_{i,j,b} \tag{2}$$

where δ_j are city fixed effects and ψ_b are birth cohort fixed effects. Individual-level controls

[31] Our fertility analysis ends at 1950 since the 5% sample of 1960 census has data for a small subsample of our cities. Thus, we are not able to fully distinguish between whether we see a temporal shifting in fertility (households have the same number of children they would have had without the policies, just earlier) or a permanent shift in fertility (households have more children than they would have had without the policies).

[32] A potential concern with this assumption is that women may have migrated to previously capital-constrained cities in response to the lowering of the mortgage rates, thereby biasing the results. Our results are robust to limiting the sample to women whose state of birth matches the state of the city in which they are recorded in 1950.

[33] To construct a complete annual time series of mortgage interest rates from 1890 to 1960 for each city, we linearly interpolate the missing values between the observed or predicted anchor years: 1890, 1920, 1934, 1940, 1950 and 1960. The interpolation is done within each interval by assuming a constant rate of change over time.

Table 3: Effect of Mortgage Interest Rate Exposure on Fertility

	Number of Children				
	(1)	(2)	(3)	(4)	(5)
$\bar{r}^M$	-0.350^{***}	-0.098^{*}	-0.097	-0.127^{**}	-0.131^{**}
	(0.095)	(0.057)	(0.064)	(0.058)	(0.060)
$\bar{r}^C$	-0.107^{*}	-0.051	-0.020	-0.008	-0.002
	(0.059)	(0.041)	(0.031)	(0.027)	(0.030)
Education Group	✓	✓	✓	✓	✓
Income Group	✓	✓	✓	✓	✓
Birthyear FEs	✓	✓	✓	✓	✓
City FEs	✓	✓	✓	✓	✓
Region FEs		✓	✓	✓	✓
1930 Controls			✓	✓	✓
Pre-1930 Controls				✓	✓
GD - WWII					✓
Observations	9767491	9767491	9767491	9767491	9767491
R^2	0.096	0.097	0.097	0.098	0.098

Notes. This table show results from cross-sectional regressions of number of own children in the household for white women recorded in the 1950 census against the average mortgage interest rate and the average commercial lending rate they would have experienced during their fertility window estimated using equation 2. We assume that women lived in the same city in which they are observed in 1950 during their fertility window (ages 15-40). We omit the other variables from the table for ease of exposition. Standard errors are clustered two-way at the city and birth year level.

$\mathbf{W}_{i,j,b}$ include education and income, both interacted with birth cohorts.[34] We also control for city-level characteristics (from our city-level analysis), interacted with birth cohort, $\mathbf{X}_{j,b}$. Standard errors are clustered two-way at the city and birth-year level. Our main analysis focuses on white women, using the number of children in the household as the outcome variable. Table 3 presents regression results as additional city-level controls are included, with column 5 showing results with the full set of controls. We find that women who experienced mortgage interest rates that were 100bps lower during their childbearing years—assuming they remained in their 1950 city throughout them—had, on average, 0.13 (about 13%) more children. Importantly, overall financial conditions during the childbearing years beyond mortgage rates, as captured by the average commercial lending rate, $\bar{r}^C$, have limited to no effects on the number of children in the house-

[34]Education is grouped into three categories: no schooling, some schooling up to grade 12, and at least one year of college. For income, we use the household's maximum occupational score, splitting individuals into quartiles.

hold across specifications. Results on non-white women are indistinguishable from zero for all specifications, in line with the fact that mortgage financing was largely restricted along racial lines.

Our second strategy studies changes before and after the policy among the number of children at home, dividing married households according to the age of the household head. For each age group, we compare the outcomes of households living in cities with high versus low pre-policy mortgage interest rates, before and after the policy change. For example, we compare the difference in the number of own children between young households living in Boston in 1950 and young households who lived in Boston in 1930, relative to the corresponding difference for households in Dallas. This strategy effectively relies on the assumption that without the shock to affordability young households across these cities would have experienced the same growth in number of children. Our empirical strategy relies on the following regression specifications in line with our main specification of equation (1):

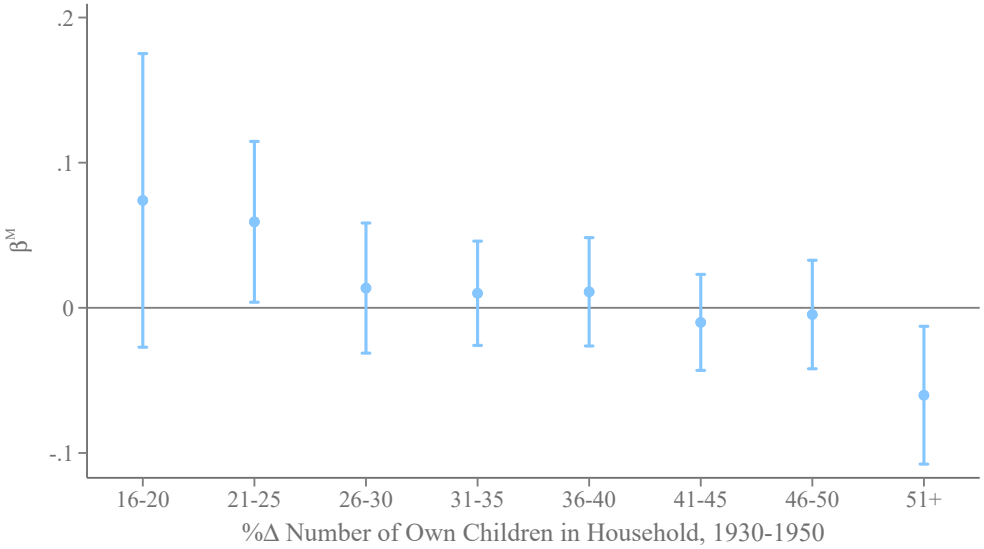
$$Y_{a,j,1950} - Y_{a,j,1930} = \alpha + \beta_a^M \cdot r_{j,1920}^M + \beta_a^C \cdot r_{s(j),1920}^C + \boldsymbol{X}_j \cdot \boldsymbol{\theta_a} + \phi_{l,a} + \varepsilon_{j,a} \tag{3}$$

where the outcome of interest is the log difference in the average number of own children in married households between 1950 and 1930 for different age groups a in city j. $r_{j,1920}^M$ is the mortgage interest rate in 1920, $r_{s(j),1920}^C$ is the state commercial lending rate in 1920, and $\boldsymbol{X}_j$ is a vector of city characteristics in 1930.[35] Region-by-year fixed effects $\phi_{l,a}$ are included throughout. We run the regressions separately for each age group, and we categorize households based on the age of the household head in five-year increments, beginning at age 16. Each regression is weighted by the total number of households in that age group in each city in 1930.

Figure 11 displays the β^M coefficients from each regression, providing suggestive evidence that, on average, younger households in cities that faced greater reductions in mortgage rates had more children living at home. In contrast, older households in these cities tended to have fewer children residing in the household. These results are consistent with two forces at play: in cities with greater reductions in mortgage rates, households tended to have children at earlier ages, while

[35]These include initial demographics in 1930 (percent native-born population, percent Black population, the log of total population, the log of total dwellings) and levels of economic development in 1930 (average manufacturing wages, the log of the number of manufacturing establishments, the fraction of state population that is rural) as well as the homeownership rate in 1930. We also control for possible differences in the incidence of the Great Depression: the change in retail sales per capita, initial retail sales per capita in 1929, the log amount of New Deal relief grants and a housing boom index. We control for shocks to amenities via average January temperatures and World War II military spending (see Section 4 for details on these variables).

Figure 11: Changes in Number of Own Children Living in Households in Cities with a Larger Reduction in Mortgage Rates After 1934



Notes. This figure plots the coefficients β^M estimated in the dynamic regressions of Equation 3 with the change in number of own children in the household estimated for households of different age groups. Each household is categorized into an age group based on the age of the household head. Each regression weights by the number of households in each age group and city in 1930.

their older children were more likely to leave the parental home sooner—possibly because greater mortgage affordability made it easier for them to set up their *own* households. To investigate these mechanisms, we separately estimate the effects of mortgage affordability on the number of young children (ages 0–5) and older children (ages 16 and above) in Appendix Figure A.6. Panel A supports the first channel: households in more ex-ante capital constrained cities, with household heads aged 21 to 40, were significantly more likely to have more young children at home. On average households between the ages of 21 and 25 living in 1950 had 9% more young children than households of the same age group in 1930. Households in cities with mortgage rates 100bps higher in 1920 experienced an approximately 7 p.p. greater increase in the number of young children. Panel B documents the second channel: in 1950, households with heads aged 41 or greater in these cities had significantly fewer older children living at home compared to similar households in 1930. The combination of these results suggests that in capital constrained cities mortgage affordability allowed older children to leave the home earlier *and* have more children early on. Lastly, Appendix Figure A.7 shows that changes in the number of own children are

entirely driven by young white households, and we find no statistically significant effects on non-white households.[36]

6 Conclusion

Today, the thirty-year fixed-rate mortgage is one of the hallmarks of American housing markets. We use novel data to describe its birth and transformative effects on the development of American cities. These policies revolutionized mortgage financing by effectively creating a national mortgage market that facilitated capital flows to areas that were constrained in their ability to rely on external capital. By enabling these capital flows, these policies lowered the user cost of homeownership, making cities more attractive to families and unleashing growth. As capital flowed to those cities, homeownership rose and construction boomed. The relatively more muted effect on housing prices suggests that, likely differently from today, housing supply responded strongly to heightened demand. The mortgage affordability shock also affected intra-household decision-making, allowing young households to move out of their parents' households sooner and have larger families.

These policies enabled capital-scarce cities to expand. Yet, they might have increased inequality across people within places. Several accounts describe how many of these policies were slanted towards relatively stable-income white families, potentially marginalizing other demographics and racial groups. By spurring construction, they also might have affected city structure and allowed segregation to increase. In future iterations of this project we want to take up these questions and study these potentially important effects of our policies. Some places won from these policies, but asking who reaped the benefits is essential to our understanding of the multi-faceted consequences of the Federal interventions of the 1930s.

References

Adelino, Manuel, Antoinette Schoar, and Felipe Severino (2012). *Credit Supply and House Prices: Evidence from Mortgage Market Segmentation*. URL: https://www.nber.org/papers/w17832 (visited on 02/26/2024). preprint.

[36] As anticipated, this is consistent with discrimination along racial lines in access to mortgages. We also find no effects on homeownership for non-whites.

Agarwal, Sumit, Efraim Benmelech, Nittai Bergman, and Amit Seru (2012). *Did the Community Reinvestment Act (CRA) Lead to Risky Lending?* URL: https://www.nber.org/papers/w18609 (visited on 04/08/2024). preprint.

Auclert, Adrien, Hannes Malmberg, Frederic Martenet, and Matthew Rognlie (2021). *Demographics, Wealth, and Global Imbalances in the Twenty-First Century*. Working Paper 29161. National Bureau of Economic Research.

Barro, Robert J. (2015). "Convergence and Modernisation". In: *The Economic Journal* 125 (585), pp. 911–942.

Barro, Robert J. and Xavier Sala-i-Martin (1992). "Convergence". In: *Journal of Political Economy* 100 (2), pp. 223–251.

Becker, Bo (2007). "Geographical Segmentation of US Capital Markets". In: *Journal of Financial Economics*.

Behrens, Carl F. (1952). *Commercial Bank Activities in Urban Mortgage Financing*. NBER.

Bernanke, Ben S. (1983). "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression". In: *The American Economic Review* 73 (3), pp. 257–276.

Bodenhorn, Howard (1992). "Capital Mobility and Financial Integration in Antebellum America". In: *The Journal of Economic History* 52 (3), pp. 585–610.

— (1995). "A More Perfect Union: Regional Interest Rates in the United States, 1880-1960". In: *Anglo-American Financial Systems: Institutions and Markets in the Twentieth Century*. Ed. by Michael Bordo and Richard Sylla. New York, NY: Irwin Professional Publishing, pp. 415–453.

Boustan, Leah Platt, Price V. Fishback, and Shawn Kantor (2010). "The Effect of Internal Migration on Local Labor Markets: American Cities during the Great Depression". In: *Journal of Labor Economics* 28 (4), pp. 719–746.

Brunet, Gillian (2024). "Stimulus on the Home Front: The State-Level Effects of WWII Spending". In: *The Review of Economics and Statistics*, pp. 1–46.

Carlson, Mark and Jonathan D. Rose (2015). "Credit Availability and the Collapse of the Banking Sector in the 1930s". In: *Journal of Money, Credit and Banking* 47 (7), pp. 1239–1271.

Chambers, Matthew, Carlos Garriga, and Don E. Schlagenhauf (2014). "Did Housing Policies Cause the Postwar Boom in Home Ownership?" In: *Housing and Mortgage Markets in Historical Perspective*. University of Chicago Press, pp. 351–385.

Collins, William J. and Gregory Niemesh (2023). *Income Gains and the Geography of the US Home Ownership Boom, 1940 to 1960*. Working Paper.

Council of Economic Advisers (2024). "Chapter 4: Increasing the Supply of Affordable Housing: Economic Insights and Federal Policy Solutions". In: *Economic Report of the President*.

Cumming, Fergus and Lisa Dettling (2024). "Monetary Policy and Birth Rates: The Effect of Mortgage Rate Pass-Through on Fertility". In: *Review of Economic Studies* 91 (1), pp. 229–258.

D'Amico, Leonardo and Maxim Alekseev (2025). "Capital Market Integration and Growth Across the United States".

Davis, Lance E. (1965). "The Investment Market, 1870-1914: The Evolution of a National Market". In: *The Journal of Economic History* 25 (3), pp. 355–399.

Dettling, Lisa J. and Melissa Schettini Kearney (2025). *Did the Modern Mortgage Set the Stage for the US Baby Boom?* Tech. rep. National Bureau of Economic Research.

Di Maggio, Marco, Amir Kermani, Benjamin J. Keys, Tomasz Piskorski, Rodney Ramcharan, Amit Seru, and Vincent Yao (2017). "Interest Rate Pass-Through: Mortgage Rates, Household Consumption, and Voluntary Deleveraging". In: *American Economic Review* 107 (11), pp. 3550–3588.

Favara, Giovanni and Jean Imbs (2015). "Credit Supply and the Price of Housing". In: *American Economic Review* 105 (3), pp. 958–992.

Fazio, Dimas, Tarun Ramadorai, Janis Skrastins, and Bernardus Ferdinandus Nazar Van Doornik (2025). *Housing and Fertility*. SSRN Scholarly Paper. Rochester, NY.

Federal Reserve Bank of Philadelphia (2024). *Historical Housing Prices Project*. https://www.philadelphiafed.org/surveys-and-data/regional-economic-analysis/historical-housing-prices. Accessed Nov 01, 2024.

Fetter, Daniel K. (2013). "How Do Mortgage Subsidies Affect Home Ownership? Evidence from the Mid-Century GI Bills". In: *American Economic Journal: Economic Policy* 5 (2), pp. 111–147.

— (2014). "The Twentieth-Century Increase in U.S. Home Ownership: Facts and Hypotheses". In: *Housing and Mortgage Markets in Historical Perspective*. University of Chicago Press, pp. 329–350.

Fishback, Price (2017). "How Successful Was the New Deal? The Microeconomic Impact of New Deal Spending and Lending Policies in the 1930s". In: *Journal of Economic Literature* 55 (4), pp. 1435–1485.

Fishback, Price, Sebastian Fleitas, Jonathan Rose, and Ken Snowden (2020). "Collateral Damage: The Impact of Foreclosures on New Home Mortgage Lending in the 1930s". In: *The Journal of Economic History* 80 (3), pp. 853–885.

Fishback, Price and Valentina Kachanovskaya (2015). "The Multiplier for Federal Spending in the States during the Great Depression". In: *The Journal of Economic History* 75 (1), pp. 125–162.

Fishback, Price, Jonathan Rose, Kenneth A. Snowden, and Thomas Storrs (2022a). "New Evidence on Redlining by Federal Housing Programs in the 1930s". In: *Journal of Urban Economics*, p. 103462.

Fishback, Price, Jonathan Rose, Kenneth A Snowden, and Thomas Storrs (2022b). "New evidence on redlining by federal housing programs in the 1930s". In: *Journal of Urban Economics*, p. 103462.

Fishback, Price V., Michael R. Haines, and Shawn Kantor (2007). "Births, Deaths, and New Deal Relief during the Great Depression". In: *The Review of Economics and Statistics* 89 (1), pp. 1–14.

Fishback, Price V., William C. Horrace, and Shawn Kantor (2005). "Did New Deal Grant Programs Stimulate Local Economies? A Study of Federal Grants and Retail Sales during the Great Depression". In: *The Journal of Economic History* 65 (1), pp. 36–71.

— (2006). "The Impact of New Deal Expenditures on Mobility during the Great Depression". In: *Explorations in Economic History* 43 (2), pp. 179–222.

Fishback, Price V., Shawn Kantor, and John Joseph Wallis (2003). "Can the New Deal's Three Rs Be Rehabilitated? A Program-by-Program, County-by-County Analysis". In: *Explorations in Economic History* 40 (3), pp. 278–307.

Fishback, Price V., Jonathan Rose, and Kenneth Snowden (2019). *Well Worth Saving: How the New Deal Safeguarded Home Ownership*. University of Chicago Press.

Fisher, Ernest M. (1951). *Urban Real Estate Markets: Characteristics and Financing*. NBER.

Gendreau, Brian C. (1999). "Risk Structure of Postbellum U.S. Deposit Rates". In: *Explorations in Economic History* 36 (4), pp. 409–427.

Ghent, Andra C. (2011). "Securitization and Mortgage Renegotiation: Evidence from the Great Depression". In: *The Review of Financial Studies* 24 (6), pp. 1814–1847.

Glaeser, Edward and Joseph Gyourko (2018). "The Economic Implications of Housing Supply". In: *Journal of Economic Perspectives* 32 (1), pp. 3–30.

Glaeser, Edward L., Joshua D. Gottlieb, and Joseph Gyourko (2012). "Can Cheap Credit Explain the Housing Boom?" In: *Housing and the Financial Crisis*. University of Chicago Press, pp. 301–359.

Glaeser, Edward L. and Joseph Gyourko (2025). *America's Housing Supply Problem: The Closing of the Suburban Frontier?* Working Paper.

Glaeser, Edward L. and Kristina Tobio (2008). "The Rise of the Sunbelt". In: *Southern Economic Journal* 74 (3), pp. 609–643.

Gray, John H. and George W. Terborgh (1929). *First Mortgages in Urban Real Estate Finance*. Tech. rep. Brookings Institution.

Grebler, Leo (1953). *The Role of Federal Credit Aids in Residential Construction*. NBER.

Grebler, Leo, David M. Blank, and Louis Winnick (1956). *Capital Formation in Residential Real Estate: Trends and Prospects*. Princeton University Press.

Gyourko, Joseph and Raven Molloy (2015). "Regulation and Housing Supply". In: *Handbook of Regional and Urban Economics*. Ed. by Gilles Duranton, J. Vernon Henderson, and William C. Strange. Vol. 5. Handbook of Regional and Urban Economics. Elsevier, pp. 1289–1337.

Hacamo, Isaac (2021). "The Babies of Mortgage Market Deregulation". In: *The Review of Financial Studies* 34 (2), pp. 907–948.

Haines, Michael R. and Inter-university Consortium for Political and Social Research (2010). *Historical, Demographic, Economic, and Social Data: The United States, 1790-2002*. Inter-university Consortium for Political and Social Research [distributor].

Harriss, C. Lowell (1951). *History and Policies of the Home Owners' Loan Corporation*. NBER.

Hornbeck, Richard (2012). "The Enduring Impact of the American Dust Bowl: Short- and Long-Run Adjustments to Environmental Catastrophe". In: *American Economic Review* 102 (4), pp. 1477–1507.

Hurst, Erik, Benjamin J. Keys, Amit Seru, and Joseph Vavra (2016). "Regional Redistribution through the US Mortgage Market". In: *American Economic Review* 106 (10), pp. 2982–3028.

James, John A. (1976a). "Banking Market Structure, Risk, and the Pattern of Local Interest Rates in the United States, 1893-1911". In: *The Review of Economics and Statistics* 58 (4), pp. 453–462.

— (1976b). "The Development of the National Money Market, 1893-1911". In: *The Journal of Economic History* 36 (4), pp. 878–897.

— (1978). *Money and Capital Markets in Postbellum America*. Princeton University Press.

Lustig, Hanno N. and Stijn G. Van Nieuwerburgh (2005). "Housing Collateral, Consumption Insurance, and Risk Premia: An Empirical Perspective". In: *The Journal of Finance* 60 (3), pp. 1167–1219.

Lyons, Ronan C, Allison Shertzer, Rowena Gray, and David Agorastos (2026). "The Price of Housing in the United States, 1890–2006*". In: *The Quarterly Journal of Economics* 141 (1), pp. 559–603.

Lyons, Ronan C, Allison Shertzer, Rowena Gray, and David N Agorastos (2024). *The Price of Housing in the United States, 1890-2006*. Working Paper 32593. National Bureau of Economic Research.

Mayer, Christopher, Karen Pence, and Shane M. Sherlund (2009). "The Rise in Mortgage Defaults". In: *Journal of Economic Perspectives* 23 (1), pp. 27–50.

Mian, Atif, Kamalesh Rao, and Amir Sufi (2013). "Household Balance Sheets, Consumption, and the Economic Slump*". In: *The Quarterly Journal of Economics* 128 (4), pp. 1687–1726.

Mian, Atif and Amir Sufi (2022). "Credit Supply and Housing Speculation". In: *The Review of Financial Studies* 35 (2), pp. 680–719.

Molloy, Raven (2020). "The Effect of Housing Supply Regulation on Housing Affordability: A Review". In: *Regional Science and Urban Economics*. Special Issue on Housing Affordability 80, p. 103350.

Morton, J.E. (1956). *Urban Mortgage Lending: Comparative Markets and Experience*. Princeton: Princeton University Press.

Neumann, Todd C., Price V. Fishback, and Shawn Kantor (2010). "The Dynamics of Relief Spending and the Private Urban Labor Market during the New Deal". In: *The Journal of Economic History* 70 (1), pp. 195–220.

Ostas, James R. (1977). "Regional Differences in Mortgage Financing Costs: A Reexamination". In: *The Journal of Finance* 32 (5), pp. 1774–1778.

Piazzesi, Monika, Martin Schneider, and Selale Tuzel (2007). "Housing, Consumption and Asset Pricing". In: *Journal of Financial Economics* 83 (3), pp. 531–569.

Price, David A. and John R. Walter (2019). "It's a Wonderful Loan: A Short History of Building and Loan Associations". Economic Brief of the Federal Reserve Bank of Richmond.

Quincy, Sarah (2022). "Income Shocks and Housing Spillovers: Evidence from the World War I Veterans' Bonus". In: *Journal of Urban Economics* 132, p. 103494.

— (2024). "Loans for the "Little Fellow": Credit, Crisis, and Recovery in the Great Depression". In: *American Economic Review* 114 (12), pp. 3905–3943.

Redenius, Scott A. (2006). "New National Bank Loan Rate Estimates, 1887–1975". In: *Research in Economic History*. Ed. by Alexander J. Field, Gregory Clark, and William A. Sundstrom. Vol. 24. Research in Economic History. Emerald Group Publishing Limited, pp. 55–104.

Rockoff, Hugh (1977). "Regional Interest Rates and Bank Failures, 1870–1914". In: *Explorations in Economic History* 14 (1), pp. 90–95.

Rose, Jonathan D. (2010). "Hoover's Truce: Wage Rigidity in the Onset of the Great Depression". In: *The Journal of Economic History* 70 (4), pp. 843–870.

— (2011). "The Incredible HOLC? Mortgage Relief during the Great Depression". In: *Journal of Money, Credit and Banking* 43 (6), pp. 1073–1107.

— (2014). "The Prolonged Resolution of Troubled Real Estate Lenders during the 1930s". In: *Housing and Mortgage Markets in Historical Perspective*. University of Chicago Press, pp. 245–284.

Rose, Jonathan D. and Kenneth A. Snowden (2013). "The New Deal and the Origins of the Modern American Real Estate Loan Contract". In: *Explorations in Economic History* 50 (4), pp. 548–566.

Saulnier, Raymond J. (1950). *Urban Mortgage Lending by Life Insurance Companies*. NBER.

Schaaf, A. H. (1966). "Regional Differences in Mortgage Financing Costs". In: *The Journal of Finance* 21 (1), pp. 85–94.

Scharfstein, David S. and Adi Sunderam (2013). *Concentration in Mortgage Lending, Refinancing Activity and Mortgage Rates*. URL: https://www.nber.org/papers/w19156 (visited on 04/08/2024). preprint.

Smiley, Gene (1975). "Interest Rate Movement in the United States, 1888–1913". In: *The Journal of Economic History* 35 (3), pp. 591–620.

— (1981). "Regional Variation in Bank Loan Rates in the Interwar Years". In: *The Journal of Economic History* 41 (4), pp. 889–901.

— (1985). "Banking Structure and the National Capital Market, 1869-1914: A Comment". In: *The Journal of Economic History* 45 (3), pp. 653–659.

Snowden, Kenneth (1995). "The Evolution of Interregional Mortgage Lending Channels, 1870-1940: The Life Insurance-Mortgage Company Connection". In: *Coordination and Information: Historical Perspectives on the Organization of Enterprise*. University of Chicago Press, pp. 209–256.

Snowden, Kenneth A. (1987). "Mortgage Rates and American Capital Market Development in the Late Nineteenth Century". In: *The Journal of Economic History* 47 (3), pp. 671–691.

— (2010). *The Anatomy of a Residential Mortgage Crisis: A Look Back to the 1930s*. URL: https://www.nber.org/papers/w16244 (visited on 02/13/2024). preprint.

Stuckler, David, Christopher Meissner, Price Fishback, Sanjay Basu, and Martin McKee (2012). "Banking Crises and Mortality during the Great Depression: Evidence from US Urban Populations, 1929–1937". In: *J Epidemiol Community Health* 66 (5), pp. 410–419.

Sushka, Marie Elizabeth and W. Brian Barrett (1984). "Banking Structure and the National Capital Market, 1869-1914". In: *The Journal of Economic History* 44 (2), pp. 463–477.

— (1985). "Banking Structure and the National Capital Market, 1869-1914: A Reply". In: *The Journal of Economic History* 45 (3), pp. 661–665.

Sylla, Richard Eugene (1969). "Federal Policy, Banking Market Structure, and Capital Mobilization in the United States, 1863–1913". In: *The Journal of Economic History* 29 (4), pp. 657–686.

— (1972). "The United States, 1863-1913". In: *Banking and Economic Development: Some Lessons of History*. Ed. by Cameron. New York: Oxford University Press.

U.S. Census Bureau (1923). *1920 Census Monograph 2. Mortgages on Homes*. Tech. rep. U.S. Census Bureau.

— (1943). *1940 Census of Housing: Volume 4*. Tech. rep. U.S. Census Bureau.

— (1952). *1950 Census of Housing: Volume 4*. Tech. rep. U.S. Census Bureau.

— (1963). *1960 Census of Housing*. Tech. rep. U.S. Census Bureau.

White, Eugene N., Kenneth Snowden, and Price Fishback (2014). *Housing and Mortgage Markets in Historical Perspective*. University of Chicago Press.
Wickens, David L. (1935). "The Financial Survey for Urban Housing". In: *Journal of the American Statistical Association* 30 (189), pp. 295–300.

Appendix

A Appendix for Section 3

A.1 Data Construction of City-Level Leverage

We define city-level owner-occupied leverage ratio (OOL) as total outstanding mortgage debt on owner-occupied homes divided by the total value of all owner-occupied homes in the city.[37] For city j this is:

$$\text{OOL}_j = \frac{\text{Total Mortgage Debt}_j}{\text{Total Value of Owner-Occupied Homes}_j} \tag{4}$$

A key challenge is that census data do not report the value of homes that are free from mortgage debt. We observe the number of all owner-occupied homes and how many of those carry a mortgage, as well as the aggregate value of mortgaged homes and outstanding debt, but not the value of unmortgaged homes. We therefore construct OOL as:

$$\text{OOL}_j = \underbrace{\frac{\text{Mortgage Debt on Mortgaged Homes}_j}{\text{Value of Mortgaged Homes}_j}}_{\text{Debt-to-Value of Mortgaged Homes}} \times \underbrace{\frac{\text{Number of Mortgaged Homes}_j}{\text{Number of Owner-Occupied Homes}_j}}_{\text{Fraction Mortgaged}} \tag{5}$$

This expression equals total leverage under the assumption that the average value of mortgaged and unmortgaged homes is the same. While this assumption is unlikely to hold exactly, it is the best available approximation.

1920. For the 1920 Census, we obtain city-level data on the value of all mortgaged homes, the total amount of outstanding mortgage debt, and the number of owned homes that are mortgaged from Tables 31 and 33 of the 1920 Census special report on mortgages (U.S. Census Bureau, 1923). As anticipated in the main text, these tables cover all cities with more than 25,000 inhabitants, yielding data for all 237 cities in our sample.

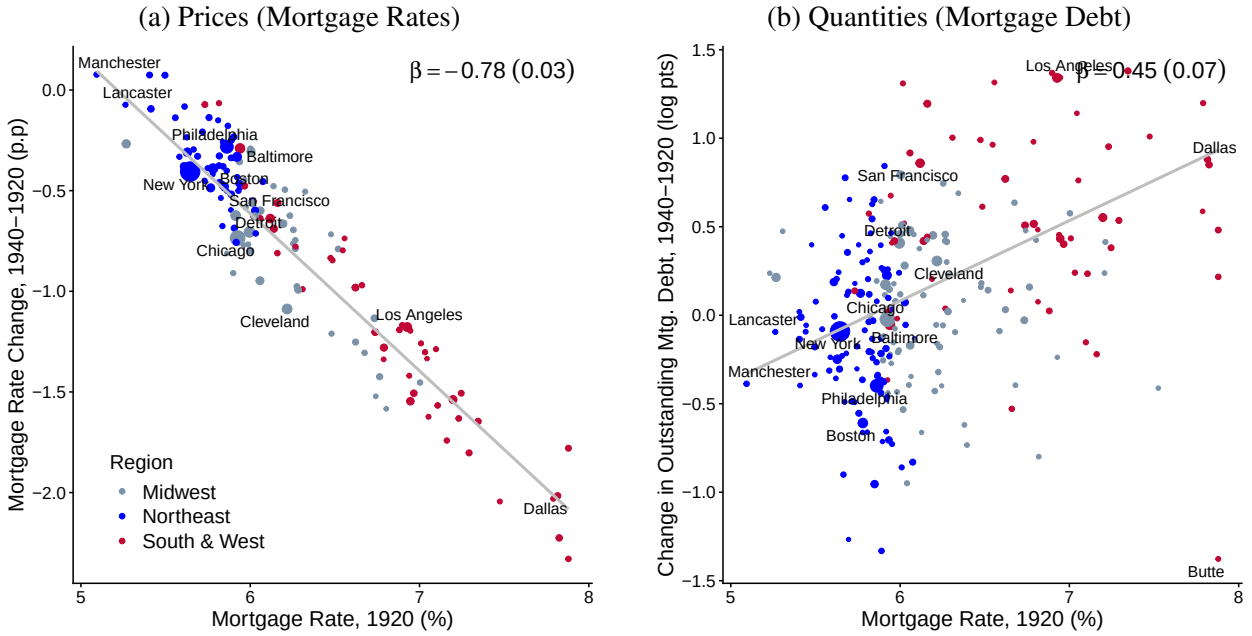
1940. For the 1940 Census, the main county-level table we digitized (Table 8 of the 1940 Housing Census) reports total outstanding debt and total value for 1-family mortgaged owner-occupied properties, but does not report the number of mortgaged homes separately from total owner-occupied homes—a variable needed to construct the fraction of homes that are mortgaged. To obtain this variable, we digitize two additional tables from Volume 4, Part 1 of the 1940 Housing Census: Table 31, which covers cities with more than 100,000 inhabitants, and Table 39, which covers cities with 50,000 to 100,000 inhabitants. These tables report the number of 1-family owner-occupied mortgaged homes, their total value, and their outstanding debt. We combine these with data on the total number of owner-occupied dwelling units from the City and County Data Book (Haines and Inter-university Consortium for Political and Social Research, 2010). Since Tables 31 and 39 are available only for cities above 50,000 inhabitants, our leverage measure can be constructed for 149 of the 237 cities in our sample.

[37] Data for non owner-occupied homes is unavailable.

Comparability across years. We note two differences in the construction of OOL across the 1920 and 1940 Census data. First, the 1920 data cover all owner-occupied mortgaged homes, whereas the 1940 data are restricted to 1-family owner-occupied mortgaged properties in 1-to-4 family dwelling structures without business. As noted in footnote 10, census documents argue that "the difference is not large enough to invalidate comparisons of the figures with those obtained in earlier censuses." Second, the 1920 data cover all cities with more than 25,000 inhabitants, whereas the 1940 data from Tables 31 and 39 cover only cities above 50,000 inhabitants. For the change in total mortgage debt—which does not require the fraction-mortgaged component—we can use Table 8 of the 1940 Census and extend coverage to all 237 cities. Figure A.1 shows that results hold in the full sample, using mortgage debt as a measure of quantity.

A.2 Changes in Prices and Quantities for the Full Sample of Cities

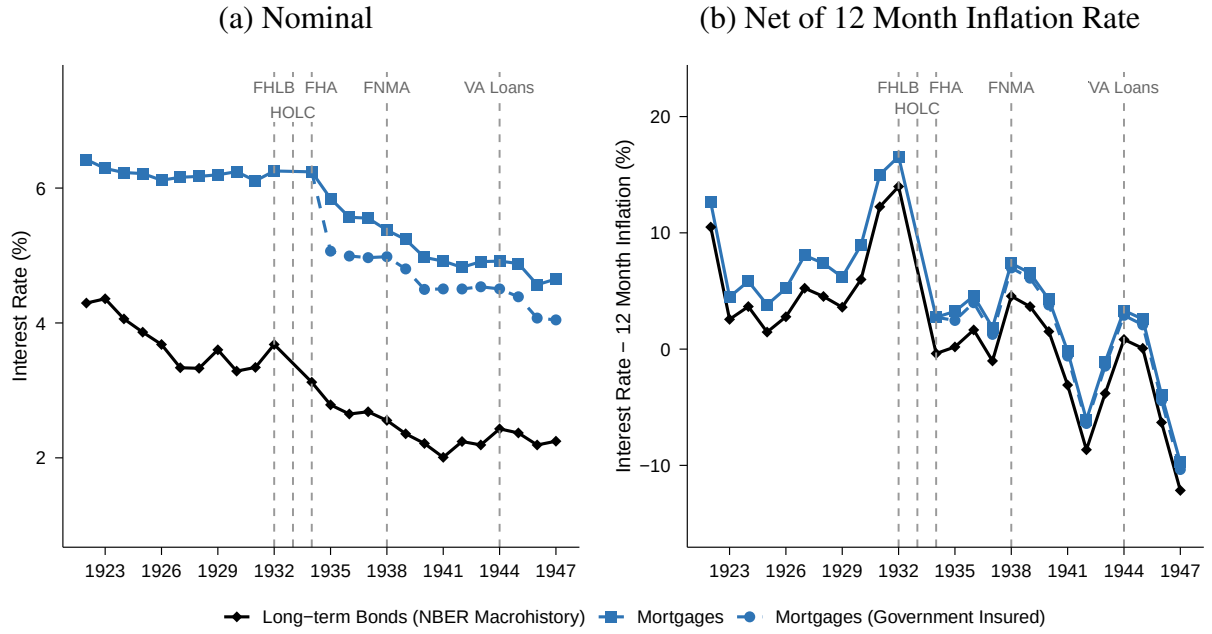
Figure A.1: Changes in Prices and Quantities on Initial Mortgage Rates, 237 Cities



Notes. This figure replicates Figure 4 for a larger sample. Panel (a) plots the change in average mortgage interest rates between 1940 and 1920 against the 1920 rate for 237 cities (identical to Panel (a) of Figure 4). Panel (b) plots the change in total mortgage debt (in logs) between 1940 and 1920 against the 1920 rate. Using total mortgage debt from Table 8 of the 1940 Housing Census, rather than mortgage debt relative to home values, allows us to extend coverage to all 237 cities (compared to 149 in Figure 4, where the fraction-mortgaged component limits coverage to cities above 50,000 inhabitants; see Appendix Section A.1). Each panel reports the coefficient from a bivariate regression weighted by city population in 1920. The size of each dot is proportional to population in 1920. Colors indicate census regions. Robust standard errors are in parentheses.

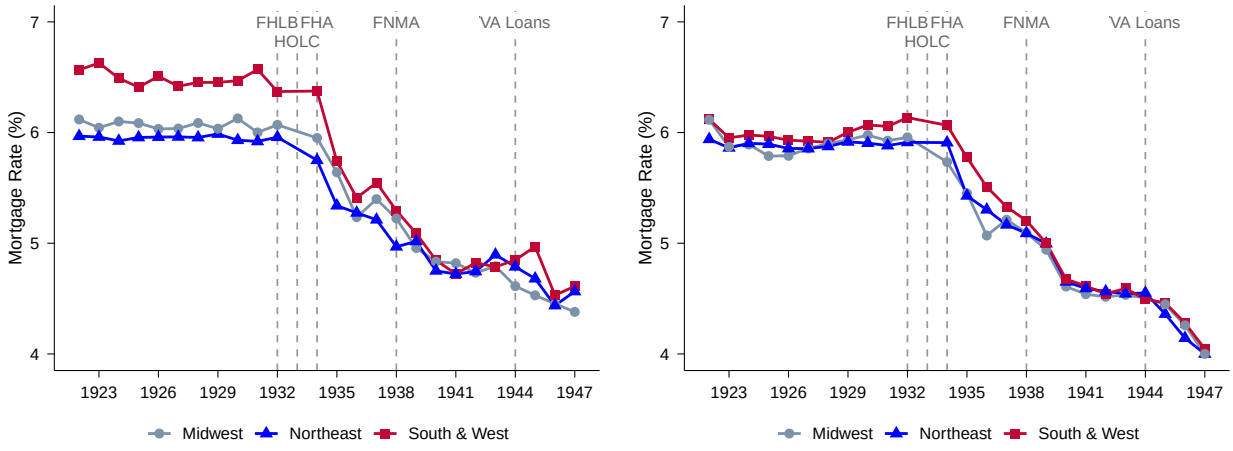
A.3 Additional Figures

Figure A.2: Comparison Between Mortgage Rates and Long-term Bond Rates



Notes. This figure compares average mortgage interest rates from our NBER loan card sample with long-term corporate bond rates (Moody's Aaa) over time. Panel (a) plots nominal rates. Panel (b) plots rates net of the trailing 12-month CPI inflation rate. The mortgage rate series is the average across all newly originated mortgages in our sample in each year.

Figure A.4: Rates on New Mortgages, Commercial Banks and Life Insurance Corporations



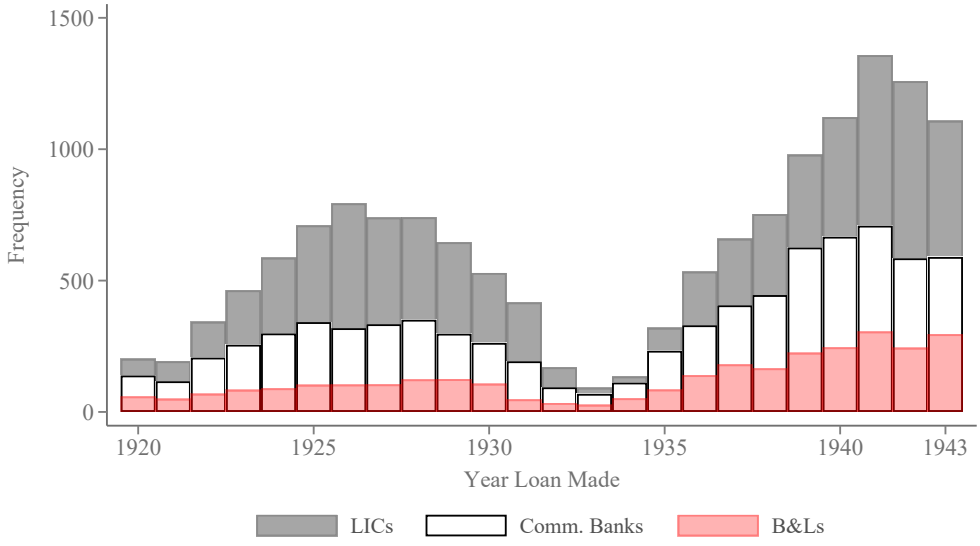
Notes. This figure plots average interest rates on newly originated mortgages by region, separately for commercial banks (Panel a) and life insurance corporations (Panel b), from our digitization of the NBER's survey of individual mortgage loans.

Figure A.3: NBER Loan Cards Histograms

A. Number of Loans by Government Insurance

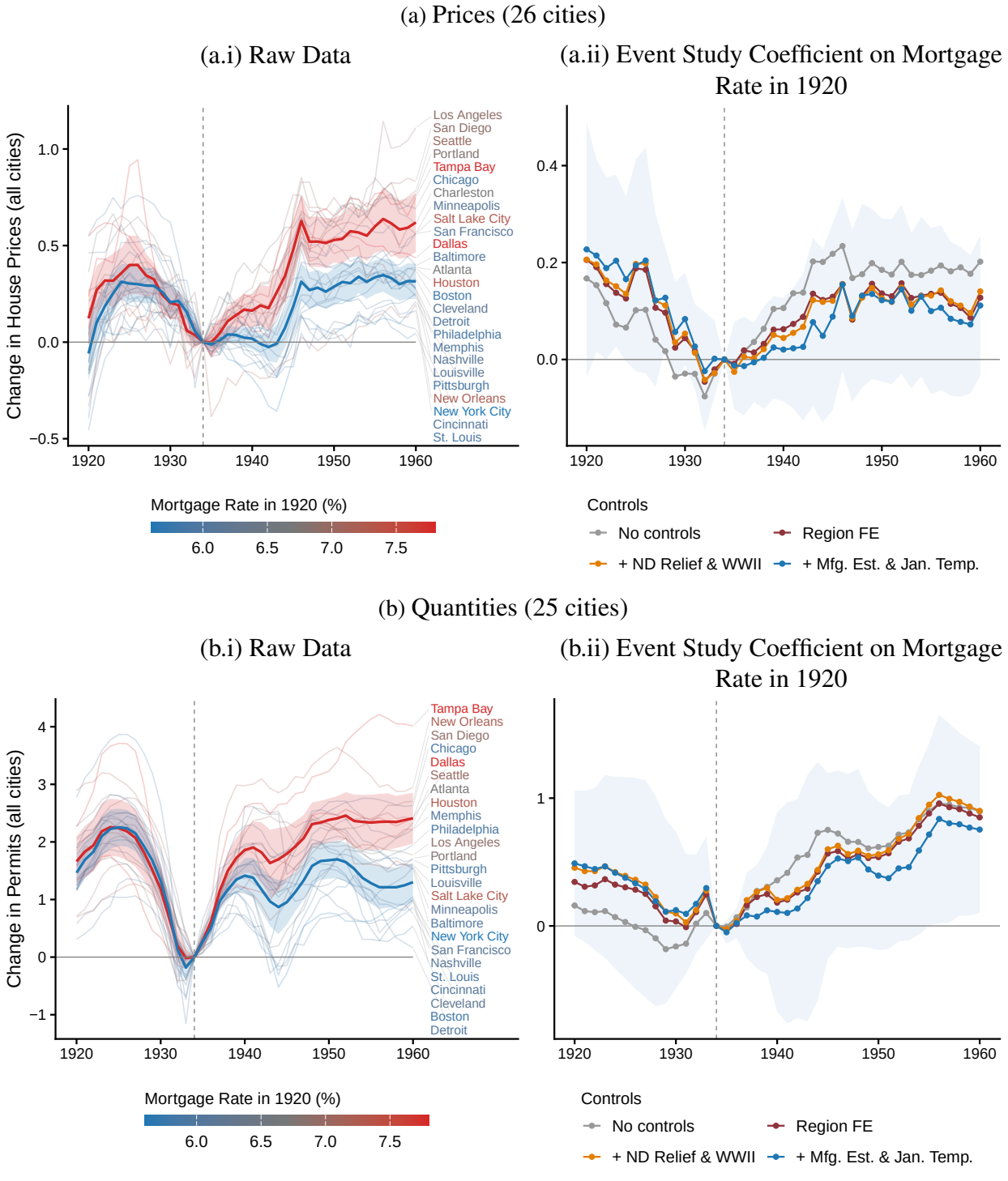


B. Number of Loans by Holder



Notes. This figure plots histograms of the number of individual mortgage loans from the NBER's survey by the year in which they were made. Panel A shows results separately by whether or not the loans were government insured, and Panel B shows results separately by holder (Life Insurance Companies, Commercial Banks or B&Ls). See Morton (1956) for additional information on the purpose of the survey.

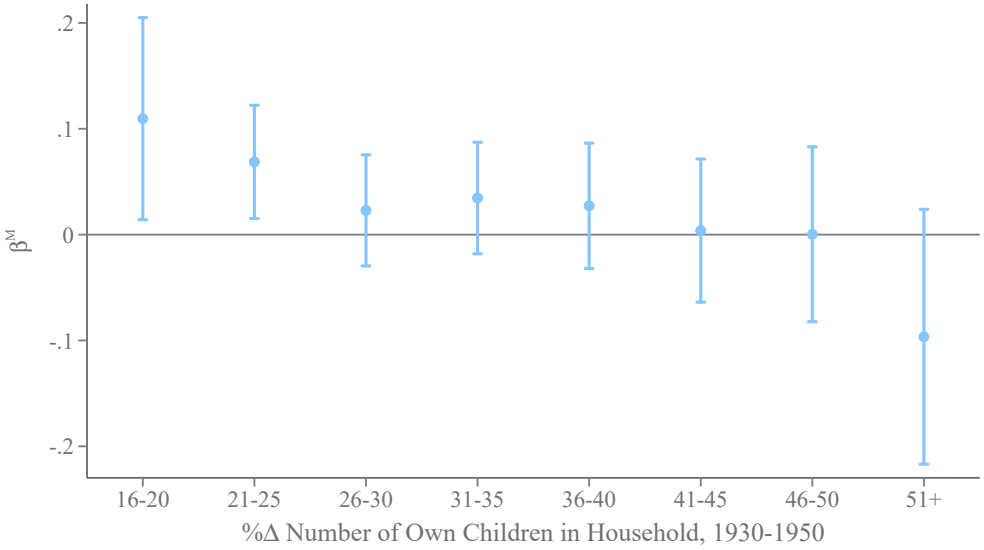
Figure A.5: Changes in House Prices and Building Permits in All Available Cities, by Mortgage Rate in 1920



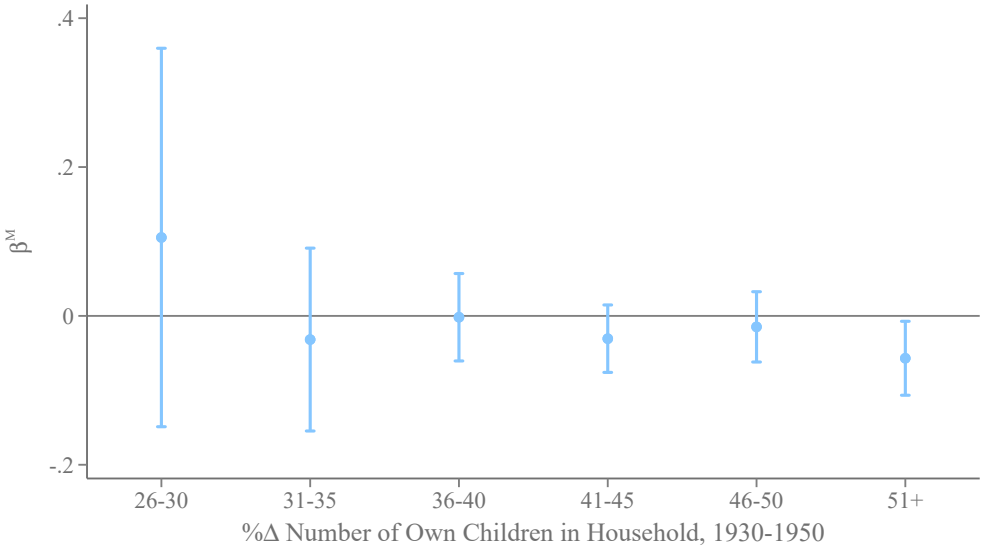
Notes. This figure replicates Figure 10 including all available cities. Panel (a) includes all 26 cities in the Lyons et al. (2026). Panel (b) includes 25 cities, excluding Charleston, S.C., which has incomplete data in 1956-60. Controls and weighting are identical to Figure 10.

Figure A.6: Changes in Number of Own Children Living in Households in Cities with a Larger Reduction in Mortgage Rates After 1934 by Age

Panel A. Children 0-5

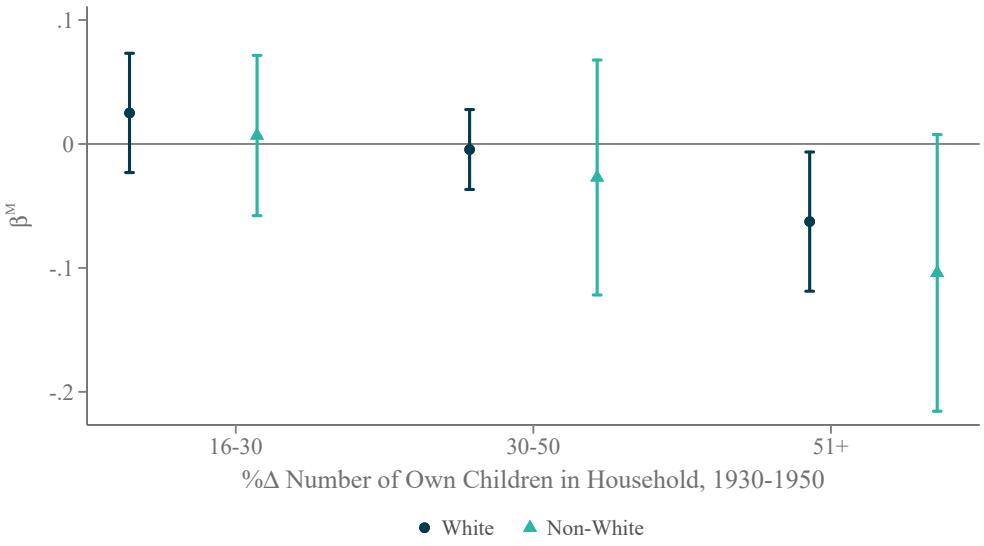


Panel B. Children 16+



Notes. This figure plots the coefficients β^M estimated in the dynamic regressions of Equation 3 with the change in number of own children in the household between the ages of 0 and 5 (Panel A) or 16 and above (panel B) estimated for households of different age groups as the outcomes. Each household is categorized into an age group based on the age of the household head. Each regression weights by the number of households in each age group and city in 1930.

Figure A.7: Changes in Number of Own Children Living in Households in Cities with a Larger Reduction in Mortgage Rates After 1934 by Race



Notes. This figure plots the coefficients β^M estimated in the dynamic regressions of Equation 3 with the change in number of own children in the household estimated for households of different age groups and races as the outcome. Each household is categorized into an age group and race category based on the age and race of the household head. Each regression weights by the number of households in each age and race group and city in 1930. Results based on 155 cities with at least 20 non-white households in any city-age-year cell.

Table A.1: Determinants of Initial Interest Rates

	(1)	(2)	(3)	(4)	(5)
Demographics, 1920					
Frac 21-30	7.94				5.61
	(3.53)				(2.64)
Frac 31-50	5.44				5.01
	(2.66)				(2.53)
Frac 51+	2.61				-0.53
	(3.06)				(2.26)
Industry Composition, 1920					
Frac. Agriculture		12.94			9.25
		(3.96)			(4.23)
Frac Mining		3.59			3.46
		(1.95)			(2.32)
Frac Construction		8.20			6.12
		(3.52)			(3.17)
Frac Manufacturing		1.28			1.89
		(1.56)			(2.30)
Frac Transport., Telecomm. & Utlt.		3.13			2.27
		(1.53)			(2.28)
Frac Trade		-3.39			1.81
		(2.26)			(3.14)
Frac Finance & Business		6.09			1.55
		(3.02)			(4.69)
Economic Chars., 1920					
Avg. Mfg. Wage (log)			0.22		0.37
			(0.36)		(0.36)
Mfg. Estab. (log)			-0.57		-0.23
			(0.16)		(0.14)
Farms (log)			0.05		0.02
			(0.04)		(0.03)
Average Occ. Score			-0.17		-0.06
			(0.07)		(0.06)
Fraction Top 10%			8.69		2.92
			(2.36)		(1.67)
Population (log)			0.51		0.17
			(0.18)		(0.16)
Financial Chars.					
Frac. Deposits/Assets, 1904				0.442	0.051
				(0.254)	(0.306)
Frac. B&L Members/Popln., 1893				-0.003	0.001
				(0.006)	(0.004)
Frac. B&L Debtors/Members, 1893				0.016	0.009
				(0.004)	(0.004)
CBs RE Holdings Limited, 1910				-0.271	-0.085
				(0.102)	(0.098)
CBs RE Loans Restricted, 1910				0.083	-0.019
				(0.065)	(0.083)
SBs RE Holdings Limited, 1910				-0.474	-0.268
				(0.212)	(0.196)
SBs RE Loans Restricted, 1910				-0.093	0.037
				(0.105)	(0.100)
R^2	0.14	0.41	0.38	0.39	0.62
Cities	205	205	205	205	205

Notes. This table shows results from OLS regressions of city-level interest rates in 1920 on demographic, economic and financial characteristics for 205 cities in our sample. All regressions weight by the city population in 1920.

Table A.2: Mortgage Interest Rate vs. City Net Asset Position, fixed Covariates to 1920

	Segmented Markets (1920)				Integrated Markets (1940)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
City-Level Net Asset Position, 1920	-8.90	-7.62	-10.77	-10.52	3.75	4.47	3.14	-0.87
	(4.41)	(3.31)	(3.36)	(2.96)	(1.71)	(1.74)	(1.75)	(1.56)
Avg. Manufacturing Wage, 1920			-0.18	-0.40			-0.14	-0.21
			(0.27)	(0.29)			(0.16)	(0.12)
Fraction Rural, 1920			1.14	-2.80			0.19	-3.04
			(0.29)	(1.17)			(0.23)	(0.54)
Region FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
All Controls	No	No	No	Yes	No	No	No	Yes
R^2	0.04	0.55	0.61	0.83	0.04	0.32	0.34	0.75
Cities	237	237	237	237	237	237	237	237
Average Value	6.16	6.16	6.16	6.16	5.49	5.49	5.49	5.49

Table A.3: Mortgage Interest Rate vs. Share of Households 50+

	Segmented Markets (1920)				Integrated Markets (1940)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
City-Level Fraction Households 50+	-1.78	-1.70	-2.53	-2.40	0.25	1.42	0.92	-0.45
	(1.30)	(0.85)	(0.92)	(0.75)	(0.56)	(0.66)	(0.59)	(0.54)
Avg. Manufacturing Wage			-0.13	-0.39			-0.19	0.05
			(0.28)	(0.29)			(0.11)	(0.15)
Fraction Rural			1.17	-2.89			0.19	-0.06
			(0.30)	(1.19)			(0.21)	(0.19)
Region FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
All Controls	No	No	No	Yes	No	No	No	Yes
R^2	0.02	0.55	0.60	0.83	0.00	0.31	0.34	0.82
Cities	237	237	237	237	237	237	237	237
Average Value	6.16	6.16	6.16	6.16	5.49	5.49	5.49	5.49