

This PDF is a selection from a published volume from the National Bureau of Economic Research

Volume Title: Housing and Mortgage Markets in Historical Perspective

Volume Author/Editor: Eugene N. White, Kenneth Snowden, and Price Fishback, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-07384-X (cloth); 978-0-226-07384-2 (cloth); 978-0-226-09328-4 (EISBN)

Volume URL: <http://www.nber.org/books/fish12-2>

Conference Date: September 23-24, 2011

Publication Date: July 2014

Chapter Title: New Multicity Estimates of the Changes in Home Values, 1920-1940

Chapter Author(s): Price Fishback, Trevor Kollmann

Chapter URL: <http://www.nber.org/chapters/c12800>

Chapter pages in book: (p. 203 - 244)

New Multicity Estimates of the Changes in Home Values, 1920–1940

Price Fishback and Trevor Kollmann

The boom and bust in housing during the early twenty-first century has led to renewed interest in the boom and bust in housing between 1920 and 1940. Numerous people have been clamoring for comparisons of the booms and bust in the housing markets in the two periods. In this volume Alex Field, Eugene White, and Steve Gjerstad and Vernon Smith have provided careful analyses to meet this call, based on currently available data. Accurate comparisons of housing markets require good measures of home ownership, homebuilding, and housing prices. In this chapter, we provide new estimates of home values that help to better elucidate the trajectory of prices for the critical years of 1920 to 1940.

Unfortunately, current multicity estimates of the changes in nominal housing values for the period are based on series designed for long-run comparisons. Leo Grebler, David Blank, and Louis Winnick (GBW; 1956, 342–356) created two series, one adjusted for depreciation and another unadjusted, that covered twenty-two cities from 1890 through 1934. They created the series as a robustness check for their estimates of building costs over time. Both series have received a great deal of attention because they

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We would like to thank Andra Ghent, Keoka Grayson, Chris Hanes, Shawn Kantor, Jonathan Rose, Ken Snowden, and Eugene White for their advice on the chapter. The research in the chapter was funded by grants SES-1061927, SES-0921732, and SES 0617972 from the National Science Foundation. Any opinions expressed do not represent the attitudes or opinions of the National Science Foundation. For acknowledgments, sources of research support, and disclosure of the authors' material financial relationships, if any, please see <http://www.nber.org/chapters/c12800.ack>.

are reported in the past two *Historical Statistics of the United States*.¹ In *Irrational Exuberance* Robert Shiller (2005) extended the series to 1953 by splicing a time series of average asking prices in five major cities onto the unadjusted GBW series. This Shiller-GBW hybrid series is now widely cited in papers, in the press, and on the Internet because it has been combined with the modern Case-Shiller/S&P Repeat Sales Price Index to provide a continuous series from 1890 to the present.

As the GBW series are meant to both provide annual estimates and to be consistent across long time periods, the scholars creating them did not use a great deal of information that is available from other sources for specific time periods. Currently, the two GBW series suggest conflicting stories about the path of nominal housing values during the 1920s housing boom. The unadjusted series combined into the Shiller-GBW hybrid has housing values in 1920 that were 7.3 percent *higher* than in 1930, while the GBW adjusted series has values that were 6.5 percent *lower*; therefore, they describe drastically different pictures of growth rates in nominal housing prices during the 1920s. During the New Deal period from 1934 to 1940, the only multicity series commonly used is the Shiller-GBW hybrid series. It suggests a very strong recovery by 1940 of housing values to 95 percent of the level seen in 1930. Recent hedonic price indices created for Manhattan by Tom Nicholas and Anna Scherbina (2013) raise some doubt about that figure because they find housing values in 1939 that are roughly 70 percent of the 1930 level and New York City is among the five cities in the Shiller-GBW hybrid.

We investigate the changes in housing values in cities between 1920 and 1940 using a variety of alternative sources: the mortgage census of 1920, the family census of 1930, the housing census of 1940, Home Owners' Loan Corporation (HOLC) surveys of real estate professionals, results of housing inventories performed under New Deal works projects for over one hundred cities, and archival information from the financial housing surveys performed by the Civil Works Administration and used by GBW that allows us to more than double the number of cities in the GBW index. To check for robustness, we compare the new estimates to the Bureau of Labor Statistics (BLS) estimates of the rent Consumer Price Index (CPI) and the values of building permits per family taken care of.

We find that all nominal housing value series show a strong decline between the late 1920s and the early 1930s. However, there are sharp differences between the Shiller-GBW hybrid and the rest of the series circa 1920 and 1940. All of the series except the Shiller-GBW hybrid imply that housing values in 1920 were well below the 1930 value and thus imply much stronger growth rates in housing values during the 1920s housing boom. Only the Shiller-GBW hybrid predicts a strong recovery in housing values

1. See US Bureau of the Census (1975, series 259 and 260, 647) and Snowden (2006, series Dc826 and DC827, 4–515).

to within 5 percent of the 1930 level in 1940. All of the other series suggest that nominal housing values in 1940 remained at least 18 percent below the 1930 values and several series suggest that values lurched downward between 1933 and 1940.

In addition, we compare the boom and bust in housing values in the early twenty-first century with the 1920 to 1940 period, showing changes in nominal housing values, housing values adjusted for CPI inflation, and housing values relative to income. In all comparisons, the rise in housing prices during the early twenty-first century was dramatically more rapid than in the 1920s boom. After 2007 the nominal and inflation-adjusted national median values reported by all home owners fell sharply but not to the year 2000 levels. However, nominal and real sales price indices suggest that actual sale prices have fallen back to the year 2000 level.

The comparisons of the two busts are complicated by the major deflation between 1929 and 1933 and the huge drop in per capita incomes during that period. Both the nominal and inflation-adjusted series show that housing values reported by all home owners had fallen below their 1922 levels by 1940. If the experience in the Depression were repeated over the next few years, which is a big if, home owners face the scary prospect that nominal and real home values might well continue to stay well below the year 2000 level or even fall. On the other hand, the affordability of housing rose sharply in both periods as housing prices fell and incomes grew.

6.1 The Existing Multicity Estimates

Currently there are two multicity time series that are being used to describe how home prices and housing values changed between 1920 and 1940. The coverage is limited and the focus of each series is on developing consistent annual series that run from 1890 to the present. The estimates that have received the most attention come from a time series reported by Robert Shiller (2005) in *Irrational Exuberance*. Between 1920 and 1940 the series splices together two time series: a series of home prices unadjusted for depreciation reported by Grebler, Blank, and Winnick for 1890 through 1934 and a series of median home asking prices for 1934 through 1953.

For the period from 1890 through 1934, Grebler, Blank, and Winnick (1956, 342–356) used information for twenty-two cities from Wickens ([1937, table 3] for each city). This information comes from a series of surveys conducted by the Civil Works Administration in the winter of 1934 in 64 cities.² Each

2. The surveys were conducted in two ways, by visits from personal enumerators and a survey handed out and then returned by mail. "A house-to-house canvas was made of all occupied residential properties within the boundaries of every tenth block in larger cities and every seventh block within smaller cities. Where necessary to insure sampling of all important areas, additional blocks, chosen by informed local agencies, were also covered by the enumerators." Surveys for a separate sample were distributed and to be returned by mail to four out of every

home owner was asked the original cost of the home in the year the home was purchased, as well as the owner's assessment of the current sale price he might anticipate receiving for the home. GBW then used this information to construct a set of home price indices for single-family homes for each of the cities and then aggregated them. They provided a raw set of estimates and then reported a set of estimates that took into account an annual compound depreciation rate of 1 3/8 percent in the homes that they based on a careful analysis of other data (GBW, appendix E). Their discussion suggests that they felt that the adjusted estimates were more accurate. They pointed out that their unadjusted estimates for Cleveland and Seattle showed a much smaller rise in prices in the 1920s than three-year moving averages of prices paid for newly constructed one-family homes developed by Frank Garfield and William Hoad for the same cities.³ This finding was consistent with their expectation that the unadjusted series biased downward the home price rise.

In a sense the GBW indices are similar to a repeat sale price index because the owners reported their estimated 1934 sale value and the price they paid in the year they purchased the home. Shiller likely chose the unadjusted GBW index because it is most like the repeat sales index that he and Karl Case have developed for the modern period. The argument for the repeat sales index is that quality is held constant because the same house is being evaluated in the earlier and later period. However, if the service quality of the home is depreciating with wear and tear over time, the home being evaluated in 1934 is of lower quality relative to the home when it was first purchased. The diminution of quality is greater the longer the gap between the date of purchase and the time of evaluation in 1934. Had the home kept the same quality over time, its value in 1934 would have been higher than a depreciated home in 1934, and therefore, if the price index is not adjusted for depreciation, the growth in prices for homes of the same quality will be underestimated. The reverse holds if home owners made improvements between the date of purchase and 1934. These problems led GBW to create the second index in which they made estimated adjustments for the net effect of improvements and depreciation.⁴

Since the GBW index ended in 1934, Shiller spliced in new information for the years 1935 through 1953. Shiller (2005, 269–70) reports that the home price index for 1934 through 1953 is a simple average over five cities of median home asking prices advertised in newspapers for Chicago, Los

nine remaining blocks. The combined totals of returned surveys covered about 15 percent of all families in the cities included in the survey (Wickens 1937, xv–xvi).

3. Garfield and Hoad (1937) used the underlying information from the CWA surveys of Cleveland and Seattle that allowed them to focus on newly constructed costs of purchase of one-family wood homes with five or six rooms.

4. The indices also suffer from measurement error that likely arises because in many cities the purchase date for roughly half the homes was more than a decade earlier and it relied on the home owner having an accurate impression of the selling price of the home in 1934, a year in which very few homes were selling.

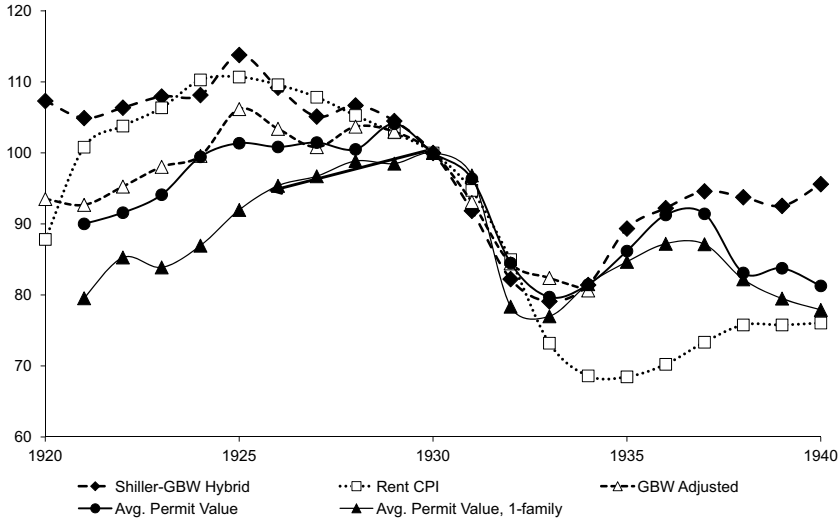


Fig. 6.1 Multicity estimates of housing values, prices, and rents
 Note: 1930 value = 100.

Angeles, New Orleans, New York, and Washington, DC. For all but Washington, DC, students used microfilmed newspapers from the Yale University Library and collected “approximately thirty prices for each city and year.” The information for Washington, DC for 1934 to 1948 data came from a median asking price series collected by E. M. Fisher (1951), which is also reported separately as series Dc828 in the millennial edition of the *Historical Statistics* (Snowden 2006, 4–515). Shiller notes that “the median series does not make any attempt to correct for home quality change,” unlike the modern series that he and Karl Case developed. “Improvements in home size and quality give median home prices an upward bias, and this is why [he] avoided using median prices outside the 1934–53 interval.”

Figure 6.1 shows the paths followed by the Grebler, Blank, and Winnick (GBW) adjusted series and the Shiller-GBW hybrid series. Figure 6.1 also includes three additional series for comparison. The first two are the “average value of residential building permits per family taken care of” for 257 cities: (a) all types of housing and (b) one-family houses. This is a rough estimate of what builders considered a likely value of the new building, but does not include the value of the lot. The third is the rent portion of the Urban Consumer Price Index, representing the rents paid by tenants in thirty-two cities. Rents generally tend to move in the same direction as housing values; of the 394 counties with over 50,000 people in 1930, less than 1 percent experienced a change in median rents between 1930 and 1940 that moved in the opposite direction of the change in median home values, while

the correlation weighted by population was 0.36. All series are indexed so that the 1930 value equals 100.⁵

All the series show a peak in values sometime in the mid to late 1920s. The average permit value series both peak around 1929 and 1930, while the Shiller-GBW hybrid, the GBW adjusted and the rent CPI reach peaks in 1925, ranging from 6.2 to 13.7 percent higher than the 1930 price. One potential reason for the difference in the timing of the peak for permit values and for the remaining series is that the permit values likely do not incorporate the value of the lot on which the building is located. All five series hit troughs between 1933 and 1935 that are about 19.4 to 26.7 percent below the 1930 price.

On the other hand, there are distinct differences at the 1920 and 1940 endpoints. By using the unadjusted GBW series, the Shiller-GBW hybrid shows that housing prices in 1920 were 7.3 percent *higher* in 1920 than in 1930 while all of the other series on the graph suggest that housing prices and rents were 6.5 to 20 percent *lower* in 1920 or 1921 than in 1930.

The Shiller-GBW hybrid index also leads to much higher estimates of the recovery to 1940 in home prices than the other series, as it reaches 95 percent of the 1930 value, 21 percent above the trough in 1933. In contrast, the rent CPI and the average values of building permits in 1940 were at most 82 percent of their 1930 value.

6.2 Single-City Indices

As might be expected, the multicity indices disguise a great deal of variance in the experiences across the country. Figure 6.2 plots the Shiller-GBW hybrid and the GBW adjusted indices against the Garfield-Hoad indices for prices of new single-family homes in Cleveland and Seattle, two of the twenty-two cities underlying the GBW indices up to 1934. The Fisher asking price series for Washington, DC, and a new hedonic price index series for Manhattan created by Tom Nicholas and Anna Scherbina are added since Washington, DC, and New York City were two of the five cities used by Shiller to create the hybrid index after 1934.⁶ All of the series peak sometime

5. Both measures of the average value of building permits per family provided for come from US Bureau of Labor (1941b, 16) and then were indexed so that the 1930 value equals 100. Measures were provided for one-family units and for multifamily units. The CPI rent index is from US Bureau of Labor (1941a) and adjusted so that the 1930 value equaled 100.

6. Tom Nicholas and Anna Scherbina (2013) created a price index for real estate transactions for Manhattan between 1920 and 1939. For each month they collected thirty prices from real estate transactions and ran a pooled hedonic regression and employed time dummies to capture the change in price adjusted for the features of the housing over time. Unlike the other series, the Manhattan series includes some commercial buildings and a number of multifamily tenements that included stores on the first floor. They control for these features with their hedonic regressions with dummy variables for the presence of a store on the first floor, although they do not provide separate estimates without these groups. As a contrast, in the estimates of home values used later, home owners were expected to provide values for only the residential part of the

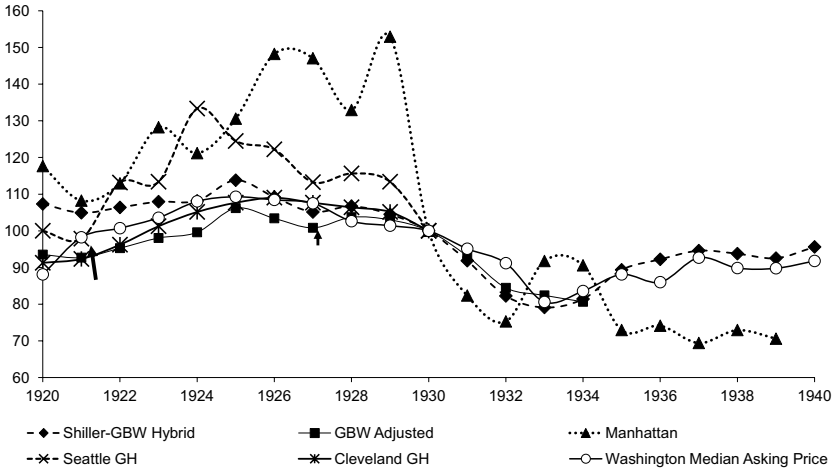


Fig. 6.2 Time series of housing price estimates for different cities

during the 1920s although the timing varies such that Seattle peaks in 1924 and Manhattan in 1929 while the rest peak around 1925. They all hit troughs in the early 1930s, although the Manhattan series bounces upward in 1933 and 1934 before dropping again.

Once again, the series differ sharply at the 1920 and 1940 endpoints. The Shiller-GBW hybrid and Manhattan indices are well above 100 in 1920 even though Manhattan is not among the cities in the Shiller-GBW hybrid until after 1934. The Cleveland, GBW adjusted, and Washington indices are all well below 100, although Washington is not among the cities in the Shiller-GBW hybrid index at that time. In 1939, the Manhattan index is well below the Shiller-GBW hybrid and the Washington, DC, asking price index.

6.3 How Well Does the GBW Series Match a Regular Resale Price Series?

There are flaws in all of the extant methods for calculating the value of homes. The ideal would be to survey all home owners and for them to all fully understand the market and how it responds to quality changes each year. Many studies use prices or reported values as dependent variables in hedonic house price regressions that hold various attributes constant. The modern Case-Shiller resale price index methodology uses comparisons *each year* on

building if there was a store present. The Cleveland and Seattle series were created by Garfield and Hoad (1937) using unpublished information for the CWA survey that Grebler, Blank, and Winnick used. They focused on new one-family homes with six rooms and used the answers to the same questions about cost of homes at the time of purchase used by Grebler, Blank, and Winnick. Fisher (1951) collected asking prices for Washington, DC homes.

the prices of homes sold in that year with the prices of those same homes the previous time they were sold in an attempt to hold quality constant by focusing on the same home. Their methodology description discusses extensively the problems with quality changes between sales of the same home. Arguing that the likelihood of quality change is much greater as the length of time between sales rises, they use econometric methods that typically give less weight to each observation as the gap in time between prior sale and resale rises (S&P Dow Jones Indices 2013).

The information necessary to develop any of these accurate measures is not currently available without devoting several years to examining original sources at the city level. This problem is why Shiller chose to use the price series developed by GBW to extend his series from 1934 backward to 1890. The GBW series is comparable to the modern Case-Shiller index in one way. It is based on value comparisons of the same homes across time. The similarity stops there. The GBW series does not use actual recorded transactions prices. Instead, it calculates an index with value 1 in 1934 from the ratio of the average of the survey respondents' remembered cost of purchase in year $1934-t$ (C_{1934-t}) to the respondent's estimate of the home value in 1934 (V_{1934}). $GBWI_{1934-t} = C_{1934-t}/V_{1934}$. This information is available for homes surveyed *only for the year 1934*.

In contrast, a regular resale price index for this time period would have the same type of current and past price transaction information for homes sold in *every year*, not just 1934. This is important because it provides many more estimates of the relationship across years between prices, and allows a regular price series to pick up changes in prices for homes that are sold multiple times over the period studied. The Case-Shiller methodology also estimates discount factors for resale pairs to control for the time value of money when the time between sales is longer than a period. To control for the likelihood that the quality of homes changes more as the time gap (k) between sale and resale lengthens, the methodology estimates generalized least square weights that ultimately put less weight on resales as the time between sale and resale lengthens.

Note the differences. First, the unadjusted GBW index has no adjustment for changes in quality of the same house over time and cannot use any type of weighting scheme for earlier years because its ratio of the price in year t to the 1934 value is the index value for that year. This is why Grebler, Blank, and Winnick (1956) proposed their index adjusted for depreciation of the quality of the house over time.

Second, because the regular resale price index has information on current sales from every year, it captures price changes for homes that resell multiple times and thus captures many more price comparisons over shorter spans of time when the home quality is more likely to be the same. To show how the absence of information on multiple sales of the same home can skew the GBW index, consider the following example. There are two sets of homes,

each composing half of the sample. The A half of all homes were purchased in 1920 for 100 and then were not sold before 1934 when they were then valued at 100. The B half of homes were purchased in 1920 for 90 and then resold in 1927 for 110. This second group of homes was not resold again until 1934 and then had an average value of 100. Finally, had the A homes been sold in 1927, their price would have been the same 110 as for the B homes that did sell then. In this case the true value price index would rise from 95 in 1920 to 110 in 1927 before declining again to 100. On the other hand, the 1920 GBW index estimate of 100 overstates the true home price in 1920 because it misses the information on the resale of the B homes that were resold in 1927. The bias can go in the opposite direction as well.

The point here is not that the GBW unadjusted index should not be used at all. It provides a first look at the relative prices across time. However, when they created the index, Grebler, Blank, and Winnick (1956) provided an alternative index that they thought more accurately reflected adjustments for quality. So the question becomes which index is more consistent with the patterns seen in other imperfect estimates of housing values over the same period.

We offer a series of estimates based on comparisons of home values between census years and in inventory surveys over the period as robustness checks. Alex Field (chapter 2, this volume) has shown us that comparisons of census survey estimates of home values in 1920 and 1930 will likely overstate the rise in quality-adjusted housing prices because over 30 percent of the 1930 housing stock was composed of new housing units that were likely of higher quality than the existing units. In comparisons of census estimates for 1930 and 1940, the direction of the bias is uncertain. Approximately, 2.5 million new homes were added to the nonfarm housing stock. These were likely to have the new technological amenities, but the low incomes of the 1930s might have led to smaller homes. Alex Field has estimated that roughly 1.8 million housing units that were vacant or abandoned in 1930 were back in the housing stock in 1940, which would have lowered average quality. On the other hand, average quality would have been raised by the funds provided by the Home Owners' Loan Corporation to improve the quality of roughly 400,000 homes and low interest rates on 2.3 million Title I repair and reconstruction loans guaranteed by the Federal Housing Administration (Fishback, Rose, and Snowden 2013; Federal Housing Administration 1940, 3).

6.4 Alternative Estimates of Housing Values

The advantage of each of the series discussed in sections 6.1 and 6.2 is that they have values each year over an extended period of time. However, they generally are very limited in the number of cities covered. To complement and potentially replace these series, we show the results of comparisons at

key points in time during the period 1920 through 1940. We use two sets of data to examine the changes in home values over the period. The first set are based on reports by home owners of the sale value of their homes in the 1920, 1930, and 1940 censuses and in a series of surveys of the housing inventory undertaken by the Civil Works Administration and over 110 other cities during the mid-1930s. The second are based on reports by real estate agents to the Home Owners' Loan Corporation of the minimum and maximum sale values in all of the neighborhoods within over one hundred cities of homes for key years between 1929 and 1939.

6.4.1 An Index for Average Home Values in 1920, 1930, 1933, 1934, and 1940

Constructing a consistent index for housing prices requires information reported on the same basis for the same types of homes and information reported for the same sets of geographic areas. We construct an index for home values for 1920, 1930, 1933, 1934, and 1940 from average values for nonfarm owner-occupied mortgaged homes using information from the 1920 and 1940 censuses and from the reports on housing values in 1930, 1933, and 1934 from a financial survey performed by the Civil Works Administration in 1934.

The 1920 census conducted a mail survey of mortgage holders, asking for the “market value of the home on January 1, 1920 (amount for which the home could be sold within a reasonable time)” and reported average values for 273 cities (US Bureau of the Census 1923, 18,173–8).⁷ The 1930 census report on families reported median housing values and the distribution of

7. As seen in the text, the Financial Housing Survey in 1934 and the 1930 and 1940 censuses all explicitly stated in their instructions that the value of the lot (what the census termed as real estate) was included in the value. The mortgage census volume (US Bureau of the Census 1923) never explicitly makes the statements that the value of the lot is included, although statements throughout the text suggest that it is, and E. M. Fisher (1951, 51) later treats estimates of average values for 1920, 1930, and 1940 as comparable except for the fact that the 1920 estimates were for mortgaged homes. Sales of homes and the mortgages for homes, particularly one-family homes, typically included the real estate beneath it, and the question in the survey asked about the value at which the home could be sold within a reasonable time. Statements in the original report suggest that the writers believe the value of the lot (real estate) to be included in the average values. For example, in comparing differences in the rise in average values across cities between 1890 and 1920, the report stated that “the high average values in the rapidly growing cities were partly due to the expected rise in real estate values which has since taken place” (US Bureau of Census 1923, 69). The statement referred to 1890 values, which the census compared directly with 1920 values in several tables without further comment. The census reported that the average value of homes had not risen nearly as fast as the rise in real estate prices, building costs, and interest rate on other securities. They argued that this “seems to indicate that there has been an increase in the ownership of smaller homes,” which would have come about because declines in the size of the home offset the rise in these other factors in determining the value (43). As can be seen, the later censuses and the Financial Housing Surveys were more careful in their wording in the instructions. To the extent that respondents did not include the value of the lot in their sale value of the homes, a rise in values between 1920 and 1930 is overstated.

housing values for owner-occupied homes but did not specify the mortgage status or report average values, so the information is not directly comparable with the 1920 information. Fortunately, the Civil Works Administration (CWA) in 1934 performed a financial housing survey in sixty-four cities spread across the country and reported information on the average value of mortgaged owner-occupied properties for forty cities that overlap with the 273 cities from the 1920 census. The CWA survey asked owners to provide an “estimated market value of the property” on January 1 of the years 1930, 1933, and 1934. Values were “understood as the estimated market values reported by the owners” and “not assessed valuations.” The values also included the cost of the lot or site (Wickens 1937, xxv, xxvi). We located handwritten summary tables for sixty-one of the sixty-four cities surveyed by the CWA at the National Archives Branch in Missouri in a group of boxes under an entry titled “Drugstore Survey, St. Louis, MO 1926–1927.” The summary tables provided average values for owner-occupied properties, owner-occupied properties free of mortgage, and owner-occupied properties that were mortgaged.⁸ Separate averages were reported in each category for single families as well. Wickens (1937) presented most of this information from these handwritten tables for twenty-two of the cities. Grebler, Blank, and Winnick (1956, 344–358) then used information on the cost of the house at the time of purchase for those twenty-two cities to construct the housing price index that Shiller used for his home price series from 1890 through 1934. Wickens (1941) later reported some of the information on values for the original twenty-two and an additional thirty cities, which were used by Michael Broucker and Chris Hanes (chapter 5, this volume) for their analysis of the determinants of the rise and fall in housing values.⁹

The 1940 census surveyed home owners as to their mortgage status and the “value of an owner-occupied home,” which represented “the amount for which the dwelling unit, including the land as belongs with it, would sell under ordinary circumstances—not at forced sale. If the owner-occupied unit is in a structure that contains more than one dwelling unit, or if part of the structure is used for business purposes, only that portion occupied by the owner and his household” is considered (US Bureau of the Census 1943, 4). Volume IV of the housing census on mortgages reported the average value

8. The tables were unnumbered but were titled “Value and Debt Status of Urban Residential Property, by Type of Dwelling: Mortgaged Properties and Properties Free of Mortgage, and Owner Occupied with and without Rental Parts, January 1, 1930, 1933, and 1934.” From that information we collected the information on all owner-occupied properties, owner-occupied properties that were mortgaged, and owner-occupied properties that were free of mortgage for each of the three years. We collected the same information for one-family homes as well.

9. Wickens ([1937], xxvi, and tables 5, 8, 31, 32, 33 for each city) reported values of owner-occupied properties and values of owner-occupied mortgaged properties for each of the twenty-two cities but did not include all of the detail found in the handwritten tables. Wickens (1941, table A10) later reported information on average values of owner-occupied one-family nonfarm homes for fifty cities, which included the twenty-two from the 1937 volume.

of properties for owner-occupied mortgaged one-family properties for 185 cities with more than 100,000 people (US Bureau of the Census 1943, vol. IV, part 1, 80, 88–9). Volume II of the housing census also reported averages for all owner-occupied homes for all cities and towns in tables 21 and 23 for each state (US Bureau of the Census 1943).

From this information we construct a spliced index for the average value of owner-occupied mortgaged homes (AVOOMS) with values of 100 for 1930 for the 40 cities for which information was reported in the sources covering 1920, 1930, 1933, 1934, and 1940. The AVOOMS index is created by splicing together two overlapping series with the 1930 value equal to 100: a series for the average value of owner-occupied mortgaged homes (AVOOM) for 1920, 1930, 1933, and 1934, and a series for the average value of one-family mortgaged owner-occupied (AVOOM1F) for the years 1930, 1933, 1934, and 1940.

To develop the 1920 value of the index, we used city averages for owner-occupied mortgaged homes from the 1920 census and for 1930 from the CWA study. We calculated the ratio of the average value in 1920 (AV_{i20}) to the average value in 1930 (AV_{i30}) for each city i and then calculated a weighted average across cities using the number of families in owner-occupied homes in 1930 (N_{i30}) in each city as the weight.

$$\text{AVOOM Index}_{x_{20}} = (\sum (AV_{i20}/AV_{i30}) * N_{i30}) / \sum N_{i30} * 100.$$

All other indices that were built up from individual cities are constructed with the same procedure. In the 1920 to 1940 period the number of owner-occupied homes in 1930 in each city is used as the weight. For the early twenty-first century we use the number of owner-occupied homes in the year 2000 for each city as the weight.

Since the 1940 census reported average values for owner-occupied mortgaged homes for only one-family dwellings, we created a separate (AVOOM1F) index for 1930, 1933, 1934, and 1940 using the CWA information and the 1940 census information for those types of homes. The AVOOM and AVOOM1F indices in table 6.1 use information from forty cities that have 715,328 owner-occupied homes in 1930. As shown in the bottom of table 6.1, the cities include 1 of the 10 largest cities, 14 of the top 50, 27 of the top 100, and 36 of the top 200. We developed the spliced AVOOMS by calculating the AVOOM/AVOOM1F ratio for 1930, 1933, and 1934 and then calculating the average of the three ratios. The AVOOM and AVOOM1F indices were so close together that the average ratio was 0.99957. We then multiplied the average ratio by the AVOOM1F values for 1933, 1934, and 1940 to get the spliced index for the average value of owner-occupied mortgaged homes (AVOOMS) in table 6.1. The values underneath the index values are standard deviations of the indexes across cities using the number of nonfarm home owners as a frequency weight.

Table 6.1 Housing value indices for the average value of owner-occupied mortgaged properties, 1920, 1930, 1933, 1934, and 1940

Year	Cities used by Grebler, Blank, and Winnick									
	AVOOM	AVOOMIF	AVOOMS	5GBW hybrid	GBW unadjusted	GBW adjusted	AVOOMS	AVOOMIF	AVOO	AVOO
1920	Mean	n.a.	86.1	107.3	107.3	93.5	84.4	n.a.	n.a.	n.a.
	Std. Dev.	12.3					12.6			
1930	Mean	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Std. Dev.									
1933	Mean	82.6	82.6	79.1	79.1	82.4	82.2	82.2	82.2	82.1
	Std. Dev.	3.9	4.1				3.6	3.6	3.7	3.8
1934	Mean	79.2	79.3	81.4	81.4	80.6	78.7	78.7	78.8	78.5
	Std. Dev.	4.4	4.5				3.9	3.9	4.1	4.2
1940	Mean	73.6	73.6	95.6	n.a.	n.a.	71.2	n.a.	n.a.	70.0
	Std. Dev.	10.7					10.0			12.9
Number of cities	40	40	40	22 [1930–1934] or 5 [1934–1940]	22	22	20	22	22	22
Number of families in 1930 in cities	715,328	715,328	715,328	497,329 [1930–1934] or 807,944 [1934–1940]	497,329	497,329	491,552	497,329	497,329	497,329
Top 10	1	1	1	3	1	1	1	1	1	1
Top 50	14	14	14	5	12	12	12	12	12	12
Top 100	27	27	27		18	18	18	18	18	18
Top 200	36	36	36		20	20	20	20	20	20

Sources: AVOOM stands for average value of mortgaged owner-occupied homes. The IF refers to one-family homes. The index uses only cities with information in all three sources. The average values of mortgaged owner-occupied homes were reported for 1920 by the US Bureau of the Census (1923, 18, 173–78) and for 1930 in handwritten tables from the US Bureau of Foreign and Domestic Commerce (undated). The average values of mortgaged one-family owner-occupied homes were reported for 1930, 1933, and 1934 by the US Bureau of Foreign and Domestic Commerce (undated) and for 1940 by the US Bureau of the Census (1943, vol. IV, part 1, 88–89). The Shiller-GBW hybrid adjusted for inflation is graphed by Shiller (2005, 36) and was downloaded from <http://www.econ.yale.edu/~shiller/data.htm> on April 24, 2012. From 1920 through 1934, it is the same as the Grebler, Blank, and Winnick (GBW) unadjusted index. The GBW adjusted and unadjusted indices are from Grebler, Blank, and Winnick (1956, 342–356) and are reported as series Dc826 and Dc827 by Snowden (2006, 4–515).

Note: 1930 value = 100.

6.4.2 Comparisons of Indices for 1920 through 1934

The AVOOMS index in 1920 contrasts sharply with the Shiller-GBW hybrid index, while resembling more closely the rent CPI and the GBW adjusted index. The AVOOMS index in table 6.1 rises from 86.1 in 1920 to 100 in 1930. This rise differs quite a bit from the decline from 107.3 to 100 in the Shiller-GBW index, which is the unadjusted GBW index until 1934. Meanwhile, the rise is more consistent with the rises seen in figure 6.1 from 87.8 to 100 by the CPI rent index, from 93.5 to 100 in the GBW adjusted index, from 90 to 100 in the average value of all residential permits, and from 79 to 100 in the average value of single-family building permits. The rise in the AVOOMS may have been greater than for the GBW adjusted index in part due to a rise in the average quality of the housing stock, which would have occurred if the rise in quality of newly built housing from improvements like running water and electricity was not offset by a decline in size because the new home owners had on average lower incomes than existing home owners.

Between 1930 and 1934 all of the indexes show sharp drops in prices in the first four columns of table 6.1. The AVOOMS index falls to 82.5 in 1933 and then 79.3 in 1934. Meanwhile, both the Shiller-GBW hybrid and the GBW unadjusted index fall to 79.1 and 81.4, because they are identical from 1920 through 1934. Note that the GBW index adjusted for depreciation falls to similar levels of 82.4 in 1933 and 80.6 in 1934 because the adjustments for depreciation diminish markedly as the series comes to an end in 1934. The CPI rent index falls even more than the other series to a low of 68.6 in 1934.

The relationships between the GBW adjusted and unadjusted indices and the AVOOMS index can be investigated further because the indices share twenty of the twenty-two cities used by the GBW indices. Casper, Wyoming, and Reno, Nevada, are the missing cities. We can also construct AVOOM1F and an index for the average value of owner-occupied homes (AVOO) using all twenty-two cities from the GBW index for the years 1930, 1933, and 1934. Grebler, Blank, and Winnick (1956, 344–358) developed their series as a check on the estimates of construction costs that stretched back to 1890. With the information from the CWA surveys, the only way to achieve this goal was to use the information that owners reported on the prices they paid for the homes at the time of purchase, which included homes that had been purchased in the 1890s. As a result, they ignored the information in the CWA surveys in which home owners separately reported their own estimates of value as of 1930 and 1933.

In the right portion of table 6.1, the 1920 value for the AVOOMS index is 84.4 for the shared twenty cities. This value looks more like the GBW adjusted index of 93.5 than the unadjusted GBW index of 107.3. In 1933 and 1934 all of the indices are more similar ranging from 79.1 to 82.1 for 1933 and 78.5 to 81.4 in 1934. The AVOOMS, AVOOM1F, and AVOO are no

farther apart than 0.3 index points from each other in either year, while the GBW unadjusted and adjusted indices are within 3 index points. The underlying information in each series has flaws. The GBW series rely on memories of purchase prices paid at the time of purchase over an extended period of time and needs to be adjusted for depreciation, while the AVOOMS relies on owners' perceptions of the market price of their homes in 1934, 1933, and 1930.

6.4.3 Comparisons of Indices for 1940

The AVOOMS in table 6.1 also contrasts sharply with the Shiller-GBW hybrid in 1940. The AVOOMS suggests that home prices fell by 7.2 percent from 1934 to 1940 to a level that was only 73.6 percent of the 1940 level. The Shiller-GBW hybrid index suggests a strong rise that brought housing prices back within 5 percent of the 1930 values. Given that the 1934 to 1940 portion of the Shiller-GBW hybrid was composed of asking prices, it might be that sellers were far more optimistic than most home owners as to the rise in prices over time. It should be noted, however, that the Manhattan hedonic sale price index constructed by Nicholas and Scherbina (2013) also shows a drop from the 1933 and 1934 prices that left the actual 1939 sale prices approximately 30 percent lower than in 1930.

6.5 Expanding the Coverage of Cities Using Medians for the Period 1930 to 1940

One limitation of all of the indices discussed so far is their limited coverage of cities. The AVOOMS index has the broadest coverage but it covers only forty cities. The coverage can be expanded a great deal for the period 1930 to 1940 using the 1930 and 1940 census reported values and a greatly expanded set of cities in 1934, 1935, and 1936 for which housing inventory surveys were conducted. This requires a shift from average to median values because the census did not report averages for cities in 1930 but did report medians. The housing inventory surveys generally did not report averages or medians but did report distributions of values by value categories. We used a formula for calculating medians using the distributions of values that led to estimated medians that were very close to the 1930 and 1940 reported medians and thus appears to be useful for calculating medians for the 1934, 1935, and 1936 housing inventory surveys. See appendix A for the method used and a discussion of the comparability of the housing value categories.

One advantage of following this median approach with the data from the census and housing inventories in the 1930s is that we can use similar methods to estimate median values for the period 2000 to 2010 for reports of housing values in the 2000 census, and in the American Community Survey from 2003 through 2010 and thus make comparisons between the earlier and later periods using the same type of data (see figure 6.3). The 2000 census

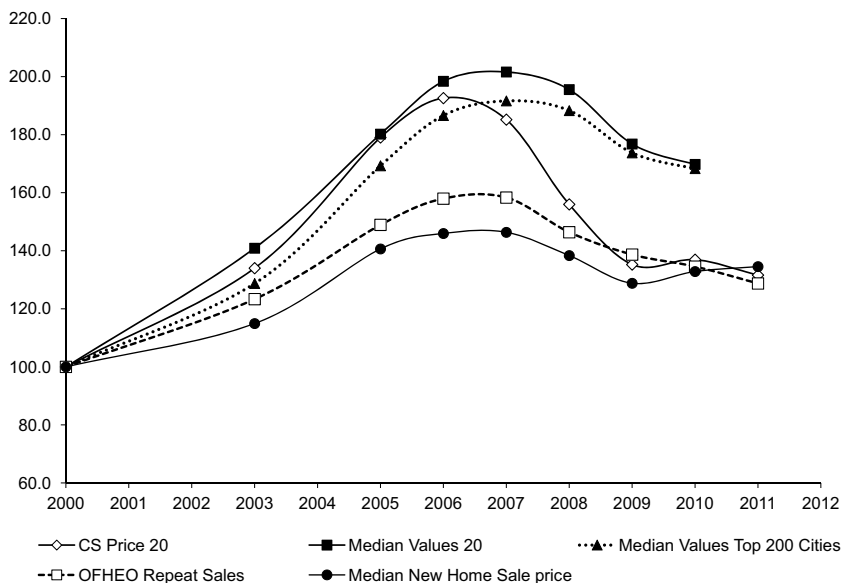


Fig. 6.3 Median values and various sale price indices from 2000 to 2011

Note: 2000 value = 100.

and ACS asked home owners to report values in categories and not as a continuous measure, so we use the same methods for estimating medians in the modern era as in the 1930s. Even though there are other modern measures of housing value in the form of resale prices of the same homes and median sale prices of new homes, such measures are not currently readily available for the 1930s. The use of median values for the reported sale values of all owner-occupied homes including those not for sale can be used in both time periods. The disadvantage is that we are relying on self-reported estimates and not actual transaction prices in both periods. The estimates of changes over time should therefore be consistent as long as the biases from such self-reported estimates are consistent over the time frame examined.

The resulting means of the cities for which there are median values for owner-occupied (MVOO) homes are reported in table 6.2. The goal is to show differences across time within the same sets of cities. Comparisons are also included using median for the AVOOMS index and the Shiller-GBW hybrid indices. All of the indices in table 6.2 indicate a sharp drop in home prices between 1930 and the mid-1930s. For the 181 cities with median values in 1930, sometime in the mid-1930s, and 1940 the MVOO index is 76.0 for the mid-1930s and then drops further to 62.8 by 1940. For the 94 cities reporting in 1934 the index fell to 79.7 in 1934 and further to 62.8 in 1940. The 47 small cities that performed inventory surveys for 1935 experienced an even larger drop to 64 by 1935 and then fell to 63.5 by 1940. Forty more

Table 6.2 Indexes based on median values of owner-occupied homes in 1930, 1934, 1935, 1936, and 1940 for different samples of cities

Year	Median index for cities reporting in										Other indexes		
	1930 & 1940	Mid- 1930s	1934	1935	1936	Shiller (1934–1940)	AVOOMS	Used by GBW	Shiller-GBW	AVOOMS			
1930	100	100	100	100	100	100	100	100	100	100	100		
1934–1936	Mean std. dev.	76.0 14.9											
1934	Mean std. dev.		79.7 14.7				80 14.6	77.8 13.5	81.4	79.3			
1935	Mean std. dev.			64.0 11.6					89.3				
1936	Mean std. dev.				67.9 9.5				92.2				
1940	Mean std. dev.	62.2 10.2	63.5 9.0	62.8 9.5	63.5 8.2	54.6	64.5 8.2	63.5 8.1	95.6	73.6			
Coverage of cities													
Number of cities	978	181	94	47	40	5	40	22	5	40			
Number of families	5,871,658	1,824,940	1,326,971	196,742	301,227	807,944	715,328	497,329	807,944	715,328			
Number of cities in													
Top 10	10	3	3	0	0	3	1	1	3	1			
Top 50	50	25	20	0	5	5	14	12	5	14			
Top 100	100	50	37	4	9	9	27	18	27	27			
Top 200	200	80	56	12	12	12	36	20	36	36			

Sources: Information on median values for each city in 1930 and 1940 comes from the US Bureau of Census (1943, vol. II, parts 1–5, table 24 for each state). Information on median values was calculated from distributional information reported by Wickens (1937), the US Bureau of Foreign and Domestic Commerce (undated), and Stapp (1938). Weighted means and standard deviations use as weights the number of families owning and occupying nonfarm homes who reported home values in the city in 1930 from the US Bureau of the Census (1933, 60, 73–81, tables 7, 21, and 23 for each state).

Note: 1930 value = 100.

cities that did inventories in 1936 reported a drop to 67.9 by 1936 and then to 66.9 by 1940. The AVOOMS index follows a similar path, dropping to 79.3 percent of the 1930 level in 1934. After 1934 it continues to drop but only to 73.6 percent by 1940. When the median index is used for the forty AVOOMS cities, the drop to 80 in 1934 is almost the same as for the medians for more cities. The median index for the forty AVOOMS cities drops to 64.5 in 1940, which is similar to the drops seen for the other median indexes. The difference in the drops for the averages and the medians suggests that the prices for higher-valued homes were recovering better in the late 1930s than for the lower valued homes.

As was the case for comparisons of the AVOOMS with the Shiller-GBW hybrid, there is a sharp contrast between the picture drawn by the Shiller-GBW hybrid and the median indices in the late 1930s. The Shiller-GBW hybrid index shows that asking prices in 1940 were 95 percent of the 1930 level. An index of median home values based on the 1930 and 1940 censuses for the same five cities shows a value of 58.9 when it is not weighted by the number of home owners, and 54.5 when it is weighted. In essence, these cities fared much worse than the vast majority of cities because the median index for 1940 relative to 1930 values ranged from 62 to 67 percent for the largest 978 cities, including these five. The median value reported for Washington, DC, in the census in 1940 was 81.9 percent of the 1930 value, roughly 9 percent lower than the 91.2 percent value for asking prices reported in the *Historical Statistics*. This implies that the gap between the changes in asking prices and census-reported values was much larger for New York, Chicago, New Orleans, and Los Angeles, the other four cities in Shiller's index. The 1940 values in those cities in the bottom of table 6.3 ranged from 45 to 58 percent of the 1930 value. The twenty-two cities examined by Grebler, Blank, and Winnick fared somewhat better than the five cities examined by Shiller. Their 1940 median values were 63.5 percent of the 1930 values.

The coverage is largest for the census years 1930 and 1940. Information on medians and value distributions for 978 cities includes all of the cities with more than 2,500 population in the United States and many smaller towns and cities. For each of the cities in 1930 and 1940 the census either directly reported the median value or the distribution of values across categories from which we could calculate a median value. For each city we calculated the ratio of the median value in 1940 to the median value in 1930 to create an index with 1930 = 100. Then we calculated means and standard deviations, unweighted and weighted by the number of families owning homes and reporting values in 1930, for different combinations of cities. For all 978 cities with 5.9 million families reporting values in 1930, the weighted median value in 1940 was 62.2 percent of the 1930 value. Table 6.3 also contains comparisons of the averages across different rankings of cities in terms of families reporting. Home values fell the most in the largest ten cities in the country. The weighted index shows that the 1940 values were 54.7 percent of the 1930 values in the top ten cities, which accounted for roughly one-fourth

Table 6.3 1940 Median index values of owner-occupied homes, averaged across cities

		Unweighted	Weighted by the number of families owning homes in 1930	Number of families in 1930 covered
All	Mean	65.5	62.2	5,871,143
	std. dev.	11.4	10.2	
Top 10	Mean	56.0	54.7	1,476,142
	std. dev.	5.8	5.7	
Top 20	Mean	61.8	58.0	1,960,161
	std. dev.	9.9	8.8	
Top 30	Mean	63.7	59.4	2,300,426
	std. dev.	9.6	9.3	
Top 40	Mean	62.9	59.5	2,543,589
	std. dev.	8.8	9.0	
Top 50	Mean	62.8	59.7	2,732,899
	std. dev.	9.0	9.0	
Top 100	Mean	62.9	60.3	3,345,022
	std. dev.	9.7	9.4	
Top 200	Mean	62.7	60.6	4,043,384
	std. dev.	9.7	9.4	
Top 300	Mean	63.2	61.0	4,487,624
	std. dev.	9.8	9.5	
Shiller 5 cities	Mean	58.9	54.6	807,944
	std. dev.	13.7	8.7	
GBW cities	Mean	65.7	63.5	497,329
	std. dev.	9.0	8.2	
Specific cities				
Washington, DC		81.9		46,208
Cleveland		53.1		80,047
Seattle		72.8		49,874
New York		57.1		341,491
Chicago		45.2		257,923
New Orleans		53.0		30,264
Los Angeles		57.7		132,058

Sources: US Bureau of the Census (1943, vol. II, parts 1–5, table 24 for each state). Weighted means and standard deviations use the number of families owning and occupying nonfarm homes who reported home values in the city in 1930 from the US Bureau of the Census (1933, 60, 73–81, tables 7, 21, and 23 for each state).

Note: 1930 value = 100.

of the households among the 978 cities. The standard deviation across this group of cities was also low at 5.57. As more and more cities are included in the index, the 1940 value rises relative to the 1930 value so that with all cities included the weighted average shows that 1940 values were 62.2 percent of the 1930 values with a standard deviation of 10.2.

The situation looks the same whether using averages or medians for the values reported in 1930 and 1940. The focus has been on medians because

the family census of 1930 did not report averages.¹⁰ From the Integrated Public Use Microdata Series (IPUMS) data sets downloaded from Ruggles et. al. (2010) we calculate averages and medians for eighty-nine cities in both 1930 and 1940. The eighty-nine cities account for about 2.9 million families in 1930. The number of cities is limited to eighty-nine due to limits on local geographic coding of cities in the 1940 IPUMS sample. Using the medians, the weighted averages across cities showed that housing values in 1940 were 59.5 percent of the 1930 value, while using averages for the cities, the values in 1940 were at 55 percent of the 1930 value.

In sum, comparisons of housing values using census data for 1930 and 1940 show a dramatic decline in housing values of over 40 percent for the decade. This is a sharp contrast to the limited data on median housing asking prices for the five large cities used by Shiller in his housing index.

6.6 HOLC Values from 1929 through 1938 Reported by Real Estate Professionals

An alternative set of information on housing prices is available from surveys of neighborhoods performed by the Home Owners' Loan Corporation between 1935 and 1939. The surveys asked local real estate professionals with working knowledge of the neighborhoods to provide information on a variety of features of the neighborhoods, including estimates of the range of housing values and the changes in those values over time within the neighborhoods for up to three kinds of housing. In establishing the range the real estate experts gave a "low-end" and "high-end" price for the typical homes in the neighborhood. We have compiled information for eighty-three cities that allow comparisons between prices circa 1929 and the early 1930s (1932 through 1936). For eighty-eight cities comparisons can be made between 1929 and 1937 to 1938. Table 6.4 shows the comparisons when values for multiple years are grouped and for each specific year with the number of cities and coverage of home owner households in each comparison. In all cases the index is set such that the 1929 value is equal to 100.

The HOLC data show an even sharper drop in home values between 1929 and the early 1930s than the Shiller-GBW hybrid index or the census housing inventory information. In table 6.4, the lowest that the Shiller-GBW hybrid dropped was to 75.7 percent of the 1929 level in 1933, while the low-end price home values reported to the HOLC dropped to an average of 65.8 percent of the 1929 level across the years 1932 to 1936. The drop was greatest at almost 40 percent for the five cities reporting information for 1929 and 1934. Table 6.5 shows that the drop from 1929 to the early to mid-1930s was even greater for the high-end price homes. The average across cities for the

10. Wickens (1941) calculated averages for 1930 from census figures on the housing distribution data by making assumptions about the distributions within each category.

Table 6.4 Home value indices for low-range homes based on reports by real estate experts for neighborhoods, 1929–1938

Year	Both	1932	1933	1934	1935	1936	1937	1938
1932–1936	Mean std. dev.	69.7 20.4						
1937–1938	Mean std. dev.	79.5 19.0						
1932	Mean std. dev.	65.5 10.3						
1933	Mean std. dev.		65.8 9.4					
1934	Mean std. dev.			62.8 5.7				
1935	Mean std. dev.				73.3 34.7			
1936	Mean std. dev.					71.6 8.7		
1937	Mean std. dev.						76.6 8.8	
1938	Mean std. dev.							70.3 19.4
Number of cities		82	18	13	5	19	66	23
Number of families		1,335,384	1,714,443	1,765,443	3,848,011	1,644,871	8,695,641	6,413,261
Top 10		3	0	0	1	1	2	1
Top 50		15	1	1	2	2	10	8
Top 100		33	5	5	2	8	22	14
Top 200		62	13	8	5	13	48	20

Source: Home Owners' Loan Corporation (no date). All means and standard deviations are weighted by the number of home owners reporting values of homes in the city in the 1930 census.

Note: 1929 value = 100.

Table 6.5 Home value indices for high-range homes based on reports by real estate experts for neighborhoods, 1929–1938

Year	Both	1932	1933	1934	1935	1936	1937	1938
1932–1936	Mean	62.6						
	std. dev.	13.1						
1937–1938	Mean	75.0						
	std. dev.	29.0						
1932	Mean	65.1						
	std. dev.	14.3						
1933	Mean		58.5					
	std. dev.		10.3					
1934	Mean			58.2				
	std. dev.			1.8				
1935	Mean				66.7			
	std. dev.				26.2			
1936	Mean					67.0		
	std. dev.					11.9		
1937	Mean						78.8	
	std. dev.						80.4	
1938	Mean							77.7
	std. dev.							40.5
Number of cities		82	18	13	5	19	19	23
Number of families		1,335,384	1,714,443	1,765,443	3,848,011	1,644,877	2,807,611	8,695,642
Top 10		3	0	0	1	0	1	1
Top 50		15	1	1	2	2	6	8
Top 100		33	5	5	2	8	9	14
Top 200		62	13	8	5	13	16	48

Source: Home Owners' Loan Corporation (no date). All means and standard deviations are weighted by the number of home owners reporting values of homes in the city in the 1930 census.

Note: 1929 value = 100.

high value homes over the period 1932 to 1936 was 62.1 percent of the 1929 values with lows around 58 percent in 1933 and 1934.

Later in the decade the HOLC data suggests that housing prices recovered somewhat but nowhere nearly as much as the Shiller-GBW hybrid index suggests. The HOLC data in tables 6.4 and 6.5 show that housing values in 1937 and 1938 had recovered to around 75 to 79 percent of the 1929 level for the high-end homes and 70 to 79 percent of the 1929 level for the low-end homes. In contrast, the Shiller-GBW hybrid suggests a recovery to around 90 percent of the 1929 level. However, this contrasts with the continued drop in housing prices shown by the census housing inventory indices, which had fallen to less than 67 percent of the 1930 value, which likely was lower than the 1929 value.

6.7 Adding an Estimate for a 1920 Median

Thus far, we have not included a measure of medians that includes 1920 because the 1920 census did not report the medians for all owner-occupied homes. The AVOOMS index for average values of mortgaged owner-occupied homes is useful but it only covers forty cities when comparing 1920 to 1930 and 1940. As a robustness check on the AVOOMS index, we have developed an alternative estimate based on comparing the average prices of mortgaged homes for the 273 cities reported in 1920 to the median price of all homes in 1930. This comparison has the advantage in that it includes all of the top eighty cities in terms of number of home owners in 1930 and 183 of the top 200, and covers 4.8 million homes in 1930. It has the disadvantage that the ideal comparison would be between the median value of owner-occupied homes in 1920 and the median value of owner-occupied homes in 1930. We can estimate a median value of owner-occupied homes in 1920 by assuming that the ratio of the median value of owner-occupied homes to the average value of mortgaged owner-occupied homes in 1930 is the same as in 1920 and then multiplying the 1930 ratio by the 1920 average value of mortgaged owner-occupied home.¹¹

Using data for fifty-two cities covering 758,000 homes in the CWA 1934 survey, we calculated a 1930 ratio for the median value of all owner-occupied homes to the average value of mortgaged owner-occupied homes of 0.9235 with a standard deviation of 0.09. The unweighted average was 0.922. We then multiplied the 0.9235 ratio by the average value of owner-occupied mortgaged homes in 1920 to obtain an estimate of the median value of all owner-occupied homes in 1920 in each city.

Table 6.6 shows the estimated indices for median values for 1920, 1930,

11. If the distribution of housing values became more skewed toward high value homes between 1920 and 1930, then the ratio of median to mean values in 1930 might have been lower than in 1920. This would lead to an underestimate of the true median in 1920 after multiplying the 1930 median/mean ratio by the 1920 mean.

Table 6.6 Indices of the mean of city median estimates for different city groupings, 1920–1940

	Median Estimates for cities with values in						
	AVOOMS	Shiller-GBW hybrid	GBW adjusted	1920 Census	1920 census and 1934 inventories	Cities for AVOOMS	Rent CPI
1920	Mean	107.3	93.5	81.5	83	86	88.8
	std. dev.			14.1	11.4	11	12.12
1930	Mean	100.0	100.0	100.0	100.0	100.0	100.0
	std. dev.						
1933	Mean	79.1	82.4				72.1
	std. dev.						9.5
1934	Mean	81.4	80.6		79.3	80.0	67.9
	std. dev.				13.4	14.6	9.2
1940	Mean	95.6		60.9	62.6	64.5	76.3
	std. dev.			9.6	9.1	8.3	5.4
Number of cities		5*	22	273	75	40	32
Number of 1930 families		8,079,44*	4,973,29	4,282,297	1,270,107	7,153,28	2,123,992
Top 10		3*	1	10	3	1	9
Top 50		5*	12	49	19	14	25
Top 100			18	97	32	27	29
Top 200			20	184	56	36	31

Sources: See text and notes to tables 6.1–6.5. All means and standard deviations are weighted by the number of home owners reporting values of homes in the city in the 1930 census.

Note: 1930 value = 100.

*These numbers reflect the coverage of the Shiller asking price index for five cities from 1934 through 1940. The period 1920 through 1934 covers the same cities as the GBW adjusted index.

1934, and 1940 using different groupings of cities and offers comparisons with the AVOOMS and Shiller-GBW hybrid and GBW adjusted indices. When all 273 cities from the 1920 census reports are included, the estimated median home value in 1920 is 81.5 percent of the 1930 value, rises to 100 in 1930, and then drops to 60.9 percent in 1940. We can add a 1934 median estimate for seventy-five cities for which information was reported in 1920, 1930, 1934, and 1940. For just those seventy-five cities the median index rises from 83 in 1920 to 100 in 1930, falls to 79.3 in 1934, and then 62.6 in 1940. For the forty cities included in the AVOOMS index, the median index and AVOOMS indices track pretty closely. They both move from 86 in 1920 to 100 in 1930, to around 79 or 80 in 1934, and then fall off further by 1940. The median index drops substantially more by 1940 than does the AVOOMS. Given how well the AVOOMS tracks the median measure for the forty cities, it seems reasonable to think that the differences between the median indices for the forty cities and the 273 cities are based on the selection of the cities. Since the median index covers nearly all of the largest cities and a much larger share of the population base, the median index might well give a more accurate picture of the nationwide change in housing values over time.

The indices based on home prices reported by home owners in the censuses of 1920, 1930, and 1940 look quite different from the Shiller-GBW hybrid index. The census reports suggest that home values rose between 1920 and 1930 rather than the fall described by the Shiller-GBW index. The GBW adjusted index more closely matches the census information. In the 1930s all measures agree that there was a significant drop in housing prices between 1929 and 1930 and the middle 1930s. But the measures diverge again thereafter. The Shiller-GBW asking price measures suggest a rise in prices that almost reached the 1930 level, while the remaining measures all suggest that home values in the late 1930s remained 26 to 40 percent below the 1930 values.

6.8 When and How High Was the Peak Home Value in the 1920s?

Currently, there are five multicounty indices that describe or might proxy the path of housing values during the 1920s: the GBW adjusted and unadjusted series, the rent CPI, the average value of all building permits per family taken care of, and the average value of one-family building permits. The two most closely aligned with our AVOOMS are the unadjusted and adjusted series created by Grebler, Blank, and Winnick (1956) with home owners reporting values at various points in time. We can improve on the GBW series by adding an additional thirty-one cities to the twenty-two cities that they used. The information for the additional cities comes from the handwritten tables derived from the CWA financial survey of 1934 and found in the US Bureau of Foreign and Domestic Commerce Record Group at the National Archives. We follow Grebler, Blank, and Winnick's methods in constructing

the index. For example, to create the unadjusted index for the year 1920 for each city, we divided the average “cost of purchase of homes” bought in 1920 from the survey and divided by the average “value of the homes” the home owner reported for January 1, 1934 for that same group of homes. To match all of our other comparisons, we then indexed the series so that the 1930 value in the city was equal to 100.¹² We then aggregated across cities in two ways: an unweighted average across cities and a weighted average using the number of families in owner-occupied homes reporting values in the 1930 census. To create a series adjusted for depreciation, we followed Grebler, Blank, and Winnick by using a 1 3/8 percent compounded annual depreciation rate.

The original GBW series and the new GBW-style series using different weighting schemes are reported in table 6.7 along with the number of cities covered and the number of families in those cities reporting values for owner-occupied homes in the 1930 census. In comparisons of the unadjusted series, the new weighted series starts 1.6 points lower than the original GBW unadjusted series, hits a peak that is 0.5 points higher in 1925, and then falls to a trough in 1933 that is 2.3 points higher. For the series adjusted for depreciation, the new weighted series starts 1.5 points lower than the original GBW series in 1920, hits a peak in 1926 that is 4 points higher, and then hits a trough in 1933 that is 4.2 points higher than the trough in 1934 for the original GBW adjusted series.

Another way to use the new series is to use the information to interpolate between the benchmark estimates for the AVOOMS for forty cities for the years 1920, 1930, 1933, 1934 and the benchmarks for forty-six cities using the median estimates for 1920, 1930, and 1934.¹³ We interpolate for each city individually and then aggregate across cities. Consider the interpolations for the AVOOMS using the new adjusted series as an example. We start with the benchmark values for 1920, 1930, 1933, and 1934. We then create ratios of the AVOOMS to the new GBW-style adjusted series in each of those years. For the period between 1920 and 1930 we used a straight-line interpolation to create interpolated ratios for each year. To get the value for 1921 we then multiply the interpolated ratio by the new adjusted GBW-style value in 1921; similar calculations were made for 1922 through 1939. A similar process was used to obtain values for 1931 and 1932.¹⁴ This method was used for all other

12. Our calculations for Seattle and Cleveland exactly matched those reported by Grebler, Blank, and Winnick (1956).

13. We can create the AVOOMS interpolated series for up to forty-five cities if we stop in 1934. The requirement to have a value for 1940 from the census drops five cities that are all outside the top one hundred cities in terms of population. The number of families in 1930 lost is 21,536. The difference in the index is at most 0.4 in any one of the years. We reported the AVOOMS for forty cities only to save space.

14. The following was the formula used, with the number referring to the year, the ratio is R, AV is the AVOOMS index and AS is the adjusted series. We calculated $R_{20} = AV_{20}/AS_{20}$ and $R_{30} = AV_{30}/AS_{30}$. For 1921 the ratio is $R_{21} = R_{20} * 0.9 + R_{30} * 0.1$, and the 1921 interpolated value (IAV21) is $IAV_{21} = R_{21} * AS_{21}$.

interpolations. We then aggregated across cities using weighted averages with the number of families in owner-occupied homes reporting values in the 1930 census as the weights.

We have interpolated the AVOOMS and the median series using both the new unadjusted series and the new adjusted series. The two AVOOMS series in table 6.7 show that there is not much difference in the values that are interpolated by the adjusted and those interpolated by the unadjusted series for the 1920s, as they are never more than 0.4 points apart. When the time series are forced to match the benchmarks in 1920 and 1930, the main differences come in the timing and the size of the peaks and both the unadjusted and adjusted time series have peaks at roughly the same time.

In addition to the AVOOMS and median series, we have included the Shiller-GBW hybrid, the rent CPI, and the average values of building permit series in table 6.7 so that it is easy to compare all rises and falls in housing values. Many of the series also appear in figure 6.4. Table 6.7 also includes 1940 values for the series that have values in that year. All of the series show a peak in housing values in 1925 or 1926 with the exception of the average values for building permits, which peak in 1929 and 1930. The largest growth rate in value between 1920 and the peak is 26 percent for the rent CPI, followed by the AVOOMS and median indices at around 21 or 22 percent. The smallest growth is 3.6 percent for the unweighted new series and only 6 percent for the original GBW unadjusted series and the Shiller-GBW hybrid.

The largest decline in value between the peak in the 1920s and the trough after 1930 is a 38.6 percent decline for the median series from a peak of 104.9 in 1926 to a low of 64.4 in 1940. This is rivaled by the drops for the rent CPI of 38 percent from the peak of 110.7 in 1925 to the bottom of 68.6 in 1934. Both AVOOMS series fall roughly 30 percent from peaks above 105 in 1926 to a low of 73.6 in 1940. The Shiller-GBW hybrid also falls about 30 percent from a peak of 113.8 in 1925 to a bottom of 79.1 in 1933. The smallest declines are the falls of around 21 percent for the new adjusted series for fifty-three cities from peaks in 1925 to troughs in 1933.

The bottom line for all of the series is that they all peak sometime between 1925 and 1930, and they all fall sharply by 20 to 30 percent by around 1933 or 1934. The differences lie in the estimates of the rise from 1920 to the peak and the changes in prices after 1934. The indices based on the unadjusted GBW methods, including the Shiller-GBW hybrid all start in 1920 at a level above the value in 1930 and thus end up with a relatively small rise to the peak of 3 to 8 percent between 1920 and the mid-1920s. All of the remaining indices start at least 6.5 percent *below* the 1930 level and thus show rises to from 1920 to the 1920s peak of 13.5 to 26 percent. After 1940, the Shiller-GBW hybrid suggests a rise in home values to 95 percent of the 1930 value, while all other series show 1940 values that are 18 to 36 percent below the 1930 values.

Table 6.7 Old and new GBW-style housing value series, interpolated AVOOMS and median series, and existing series, 1920–1934, and 1940

Year	Original GBW unadjusted	New GBW-style		Original GBW adjusted	New GBW-style		New GBW-style adjusted, unweighted	New GBW-style adjusted, weighted	AVOOMS		Median interpolated with new GBW-style adjusted	Shiller-GBW hybrid	Rent CPI	Average value of residential building permits	Average value of one-family building permits
		unadjusted, unweighted	unadjusted, weighted		interpolated with new GBW-style, unadjusted	interpolated with new GBW-style, adjusted, weighted									
1920	107.3	107.7	105.7	93.5	93.8	92.0	86.1	86.1	86.4	107.3	87.8				
1921	104.9	110.2	107.2	92.7	97.3	94.7	89.9	89.7	89.8	104.9	100.8		90.0	79.5	
1922	106.4	109.4	107.8	95.3	98.0	96.5	92.5	92.2	92.2	106.4	103.8		91.6	85.3	
1923	107.9	111.4	111.1	98.0	101.1	100.9	97.7	97.4	96.8	107.9	106.4		94.1	83.9	
1924	108.2	111.4	112.5	99.6	104.5	103.5	100.7	100.3	99.9	108.2	110.3		99.5	86.9	
1925	113.8	111.6	114.3	106.2	108.0	106.6	103.7	103.3	103.0	113.8	110.7		101.4	92.0	
1926	109.2	111.3	113.5	103.4	107.1	107.4	105.5	105.1	104.9	109.2	109.6		100.8	95.4	
1927	105.1	110.3	110.3	100.8	105.8	105.8	104.1	104.1	104.1	105.1	107.8		101.5	96.7	
1928	106.7	109.5	109.1	103.7	106.5	106.1	104.9	104.6	104.7	106.7	105.3		100.5	98.9	
1929	104.5	107.0	105.5	103.0	105.7	104.1	103.4	103.2	103.2	104.5	102.8		104.1	98.5	
1930	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		100.0	100.0	
1931	91.8	92.9	92.4	93.1	94.2	93.7	92.9	92.9	91.8	91.8	94.7		96.4	96.8	
1932	82.2	83.3	83.0	84.4	85.7	85.3	84.6	84.6	82.3	82.2	85.0		84.5	78.4	
1933	79.1	81.0	81.4	82.4	84.4	84.8	82.6	82.6	80.5	79.1	73.2		79.7	77.0	
1934	81.4	83.7	81.9	80.6	88.5	86.6	79.2	79.2	80.4	81.4	68.6		81.5	81.5	
1940							73.6	73.6	64.4	95.6	76.0		81.3	77.9	
Maximum	113.8	111.6	114.3	106.2	108.0	107.4	105.5	105.1	104.9	113.8	110.7		104.1	100.0	
Year of max.	1926	1925	1925	1926	1925	1926	1926	1926	1926	1925	1925		1927	1930	
Minimum	79.1	81.0	81.4	80.6	84.4	84.8	73.6	73.6	64.4	79.1	68.6		79.7	77.0	

Year of min. Growth rate 1920 to max. Growth rate max. to min. Growth rate 1930 to 1933	1933	1933	1933	1934	1933	1933	1933	1940	1940	1933	1933	1934	1933	1933
22	53	53	22	53	53	40	40	46	22	22	257	32	257	257
Number of cities														
Families in														
1930 in cities														
covered	4,973,29	7,612,04	7,612,04	4,973,29	7,612,04	7,612,04	7,153,28	7,397,53	4,973,29	4,973,29	2123992	2123992	10	10
Top 10	1	1	1	1	1	1	1	1	1	1	9	9	10	10
Top 50	12	14	14	12	14	14	14	14	12	12	25	25	50	50
Top 100	13	27	27	13	27	27	27	27	13	13	29	29	100	100
Top 200	20	37	37	20	37	37	36	37	20	20	31	31	200	200

Note: 1930 value = 100.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

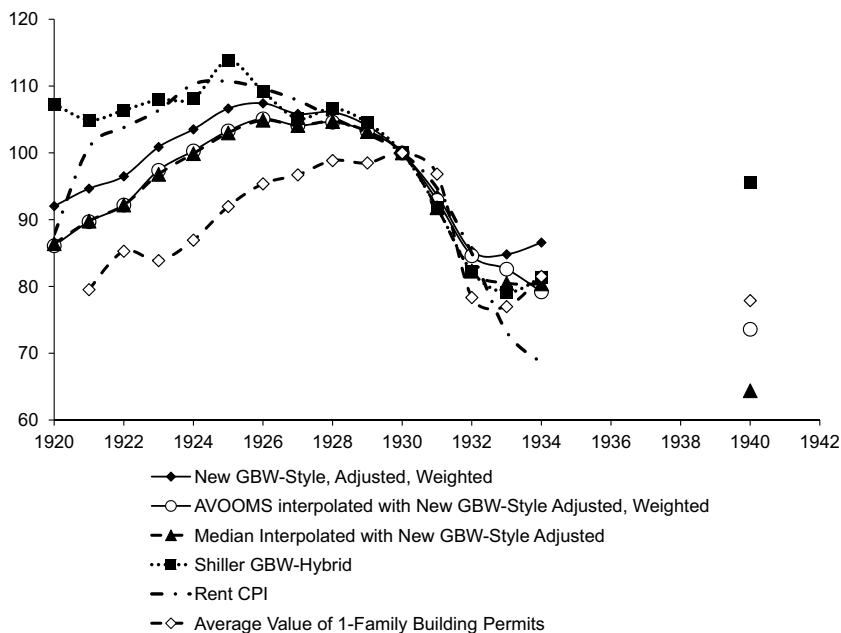


Fig. 6.4 Home value indices, 1920–1940

Note: 1930 = 100.

6.9 Comparisons to Modern Series

To make the comparisons of housing price trends across periods, we sought to use similar data and the same methods in the early twenty-first century as we used in the 1920s and 1930s. There are a number of home price and value series available in the early twenty-first century. We focus on the surveys that followed the lead of surveys in the 1920s and 1930s by asking all home owners to report the sale value of their home, whether the home was for sale or not. The census of 2000 and the American Community Surveys between 2003 and 2010 asked home owners “to estimate the full current market value of the property, including both house and land, even if the respondents owned only part of the property.” “Apart from group quarters, all owner-occupied or vacant-for-sale units were covered, including mobile homes, condominiums, units with offices or businesses attached, and houses on lots of any size. For mobile homes in pre-2008 ACS and PRCS data, the value of the land was included in the value; in the 2008 ACS . . . , land value was included only if the owner of the mobile home also owned the land.”

The 2000 survey and the ACS surveys asked people to report their home

sale values by marking the value category for the home. As a result, the reporting of the information looks very much like the summary tables in the 1930 and 1940 censuses and in the inventory surveys in the mid-1930s. Therefore, we used the method for calculating medians that we used for the inventory surveys in the mid-1930s.

Table 6.8 shows medians indexed so that the 2000 value is equal to 100 for a variety of groupings of cities. Indexes across time were calculated for each city using the medians in that city and then were aggregated as a weighted average with the number of owner-occupied homes reporting values in 2000 as the weight. The Case-Shiller repeat sales price index for ten cities and for twenty cities receives a great deal of attention; therefore, we show the median home values for the Case-Shiller ten-city and twenty-city groupings, as well as information for the top 50, 100, 400, and all cities. Table 6.8 also contains the Case-Shiller and Office of Federal Housing Enterprise Oversight (OFHEO) Repeat Sales Indices and the Median New Home Sale Price Index for comparisons.

The rise in nominal house prices in the 2000 to 2007 housing boom far outstrips the rise in prices during the housing boom of the 1920s. All of the median values in table 6.8 peaked in 2007. The increases between 2000 and 2007 ranged from a high of 125 percent for the ten cities used in the Case-Shiller index to a low of 91.6 percent for the 400 cities with the most home owners in 2000. These growth rates are four to five times greater than the growth rates of 21 to 22 percent between 1920 and the peak in the mid-1920s shown by the AVOOMS and median indices in table 6.7. The housing value growth in the 1920s is also substantially lower than housing price growth rates shown by the sale price indices in table 6.8, which range from 46.4 percent for new home prices to 109.1 percent for the Case-Shiller ten-city index.

Arguably, the fall in nominal housing prices between 1930 and 1933 was worse than the fall in prices between 2007 and 2010. Here is a case where percentage drops do not tell the whole story. The AVOOMS and median indices in table 6.7 fell by roughly 17 to 20 percent between 1930 and 1933. The median home values in 2000 fell by 12 to 17 percent from 2007 to 2010, depending on the group of homes examined. A better comparison to the damage done to housing values is how the housing values compared to the start of the periods in 1920 and 2000. In 2010 all the housing indices show prices that are 32 to 86.8 percent *higher* than they were in 2000. In contrast, by 1933 the home values were *lower* than they were in 1920. Whereas in the Great Recession people saw part of the rise in housing values fall away, during the Great Depression, the entire rise was eliminated and housing prices fell still more. The AVOOMS and the median estimates in tables 6.6 and 6.7 show that the situation had worsened by 1940, such that home values were 14.5 to 25.5 percent lower than in 1920.

Table 6.8 Housing price indices, 2000–2011

Year	Median indices all home owners in census and American Community Surveys										Repeat sales price indices			New homes sale price	CPI housing	
	All	Top 50	Top 100	Top 400	Case-Schiller		Case-Schiller		Case-Schiller 10 cities	Case-Schiller 20 cities	Case-Schiller 10 cities	Case-Schiller 20 cities	OFHEO			Median
					10 cities	20 cities	10 cities	20 cities								
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
2003	128.0	134.2	128.6	128.0	172.7	140.9	140.8	140.8	134.0	140.8	134.0	123.3	114.9	109.0	109.0	
2005	169.2	174.6	170.0	169.2	201.9	180.2	194.7	194.7	179.0	194.7	179.0	148.9	140.6	115.4	115.4	
2006	186.5	193.1	187.7	186.5	222.4	198.4	209.1	209.1	192.6	209.1	192.6	158.0	145.9	119.8	119.8	
2007	191.6	197.3	192.5	191.6	225.0	201.6	199.8	199.8	185.2	199.8	185.2	158.3	146.4	123.6	123.6	
2008	188.2	193.1	189.3	188.2	214.9	195.6	166.4	166.4	156.0	166.4	156.0	146.4	138.3	127.5	127.5	
2009	173.7	176.5	174.4	173.7	193.0	176.8	144.9	144.9	135.3	144.9	135.3	138.7	128.8	128.0	128.0	
2010	168.3	170.3	168.9	168.3	186.8	169.8	147.9	147.9	136.9	147.9	136.9	134.5	132.8	127.5	127.5	
2011							142.8	142.8	131.6	142.8	131.6	128.7	134.5	129.2	129.2	
Peak year	2007	2007	2007	2007	2007	2007	2006	2006	2006	2006	2006	2007	2007	2007	2011	
Growth rate 2000 to peak	91.6	97.3	92.5	91.6	125.0	101.6	109.1	109.1	92.6	109.1	92.6	58.3	46.4	29.2	29.2	
Growth rate peak to 2010	-12.1	-13.7	-12.3	-12.1	-17.0	-15.8	-29.3	-29.3	-28.9	-29.3	-28.9	-15.0	-9.2	n.a.	n.a.	

Sources: Median sale values reported by all home owners created indices for medians within each city over the years with year 2000 values equaling 100 and then aggregated across cities with averages weighted by the number of home owners reporting values in the year 2000. The data come from microdata samples from the 2000 census and 2003–2010 American Community Surveys downloaded from Ruggles et al. (2010) at www.ipums.org. The S&P/Case-Schiller Repeat Sales Price was downloaded from <http://www.standardandpoors.com/indices/sp-case-schiller-home-price-indices/en/us/?indexId=spusa-cashpidff—p-us—> on April 24, 2012, and the monthly data were averaged for each year. The OFHEO (Office of Federal Housing Enterprises Oversight) indices were downloaded from <http://www.fhfa.gov/Default.aspx?Page=14> on April 30, 2012. The Median New Home Sales Price Index was downloaded from <http://www.census.gov/const/uspricecon.pdf> on May 1, 2012.

Note: Year 2000 value = 100.

6.10 Deflating the Home Price Series by the CPI and Nominal Per Capita Income

The focus has been on nominal price changes because of the difficulty in measuring nominal prices accurately; yet other prices and incomes were not standing still during these periods. Therefore, it is important to show changes in housing prices relative to all prices by deflating by the CPI. In addition, we examine the affordability of housing by dividing the indices by an index for nominal GDP per capita in the two periods.

The behavior of prices and nominal incomes were quite different during the 1920–1940 period and the early twenty-first century. The early twenty-first century was a period of mild CPI price inflation of 2.5 percent per year while nominal Gross Domestic Product (GDP) per capita grew fast enough that real per capita incomes grew through 2007 before a decline during the recession. Real per capita incomes nearly caught up to the 2007 level again in 2011. In contrast, the 1920s followed the end of a dramatic inflation during World War I. The CPI fell 20 percent between 1920 and 1922 and then fluctuated around a flat trend through 1929. The Great Depression was associated with a 25 percent drop in the CPI from 1929 to 1933. During the rest of the 1930s, there was a mild inflation of 2.7 percent per year from 1933 to 1937, followed by mild deflation from 1937 to 1939. Meanwhile, per real capita incomes fell sharply in the recession at the beginning of the 1920s, grew relatively quickly until 1929, and then fell by 30 percent between 1929 and 1933. Real income per capita did not reach its 1929 level again until 1940.

6.10.1 Adjusting for the CPI

The adjustment for CPI inflation does not change the story of housing prices in the early twenty-first century much. The rise in real housing prices from 2000 to 2006 and 2007 is dampened relative to the rise in nominal housing prices. For example, real median housing values for the top 400 cities rose only 46.9 percent in table 6.9 compared with the nominal price rise of 91.6 percent shown in table 6.7. The decline in real housing prices from 2006 and 2007 to 2010 looks worse. The median index for the top 400 cities fell 16.6 percent to 132.9. Meanwhile, the resale price indices adjusted for CPI inflation and new home sales price indices fell to roughly the same levels they had reached in 2000.

The wild gyrations in the price level in the 1920s and 1930s caused the housing prices adjusted for inflation to follow a substantially different path from nominal housing prices. Instead of rising to a peak in the mid-1920s and then declining until 1940, as the nominal housing prices did, the AVOOMS and median indices adjusted for inflation in table 6.10 and figure 6.5 rose roughly 41 percent to a peak in 1928, fell slightly to 1930, and then rose to a new higher peak in 1933. The real housing prices then declined

Table 6.9 Home value indices relative to Consumer Price Index and per capita GDP

Year	Home values adjusted for CPI inflation				Home prices relative to per capita GDP					
	Case-Shiller repeat sales, 20 cities	Median home values 20 CS cities	Median home values top 400	OFHEO repeat sales	Median new home sale price	Case-Shiller repeat sales, 20 cities	Median home values 20 CS cities	Median home values top 400	OFHEO repeat sales	Median new home sale price
2000	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2003	125.4	131.8	119.7	115.4	107.5	123.3	129.6	117.7	113.4	105.7
2005	157.9	158.9	149.2	131.3	124.0	148.1	149.0	140.0	123.2	116.3
2006	164.5	169.5	159.3	134.9	124.7	151.7	156.3	146.9	124.4	115.0
2007	153.8	167.4	159.1	131.5	121.5	140.5	152.9	145.3	120.1	111.0
2008	124.8	156.4	150.6	117.1	110.7	117.2	147.0	141.5	110.0	104.0
2009	108.6	141.9	139.4	111.3	103.4	105.1	137.4	135.0	107.8	100.1
2010	108.1	134.1	132.9	106.3	104.9	103.0	127.7	126.6	101.2	99.9
2011	100.8			98.6	103.0	95.9			93.8	98.0
Year of peak	2006	2006	2006	2006	2006	2006	2006	2006	2006	2006
Growth rate 2000 to peak	64.5	69.5	59.3	34.9	24.7	51.7	56.3	46.9	24.4	16.3
Growth rate peak to 2010	-34.3	-20.9	-16.6	-21.3	-15.8	-32.1	-18.3	-13.8	-18.7	-14.1

Sources: See table 6.8. The Consumer Price Index was downloaded from the BLS website (www.bls.gov). Per capita GDP was downloaded from the Measuring Worth website (<http://www.measuringworth.com/uscompare/>).

Note: 2000 value = 2000.

Table 6.10 Housing values relative to CPI and GDP per capita, 1920–1940

Year	Housing values adjusted for CPI inflation				Housing values relative to GDP per capita					
	New GBW-style, adjusted, weighted	AVOOMS interpolated with new GBW-style adjusted, weighted	Median interpolated with new GBW-style adjusted	Shiller GBW-hybrid	Average value of one-family building permits	New GBW-style, adjusted, weighted	AVOOMS interpolated with new GBW-style adjusted, weighted	Median interpolated with new GBW-style adjusted	Shiller GBW-hybrid	Average value of one-family building permits
1920	76.9	71.9	72.1	89.6		83.5	78.1	78.4	97.3	
1921	88.5	83.9	84.0	98.1	74.4	103.1	97.7	97.8	114.3	86.7
1922	96.3	92.0	92.0	106.1	85.1	108.2	103.3	103.3	119.2	95.6
1923	98.8	95.4	94.8	105.7	82.2	98.8	95.3	94.8	105.7	82.1
1924	101.2	98.0	97.6	105.7	85.0	100.7	97.5	97.2	105.2	84.6
1925	101.5	98.4	98.1	108.3	87.6	100.3	97.1	96.9	107.0	86.5
1926	101.5	99.3	99.1	103.1	90.1	96.0	94.0	93.8	97.6	85.3
1927	101.9	100.2	100.2	101.2	93.1	96.6	95.0	95.0	95.9	88.3
1928	103.3	101.9	102.0	103.9	96.3	98.0	96.7	96.7	98.6	91.3
1929	101.4	100.6	100.6	101.8	96.0	90.6	89.9	89.9	91.0	85.8
1930	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1931	102.9	102.0	100.8	100.9	106.4	112.5	111.5	110.2	110.3	116.3
1932	104.4	103.5	100.7	100.6	95.9	134.4	133.3	129.7	129.6	123.4
1933	109.6	106.7	104.0	102.2	99.5	140.2	136.5	133.0	130.7	127.2
1934	108.0	98.8	100.3	101.6	101.7	123.1	112.6	114.3	115.7	115.9
1940		87.7	76.7	113.9	92.8		71.5	62.5	92.8	75.7
Max	109.6	106.7	104.0	108.3	106.4	140.2	136.5	133.0	130.7	127.2
Maximum year	1933	1933	1933	1925	1931	1933	1933	1933	1933	1933
Growth rate 1920 to max	42.6	48.5	44.2	20.9	43.0*	67.9	74.8	69.7	34.3	46.8
Growth rate 1920 to 1920s peak	34.5	41.7	41.3	20.9	34.5	29.5	32.3	31.8	22.5	

Sources: See table 6.7 for nominal values. CPI is based on 1935–1939 budgets and then adjusted so that the 1930 value equals 100. It comes from the US Bureau of Labor Statistics (1941a, 36, 44). Gross domestic product per capita (GDP per capita) is series Ca12 reported by Stutch (2006, 3–25).

Note: 1930 value = 100.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

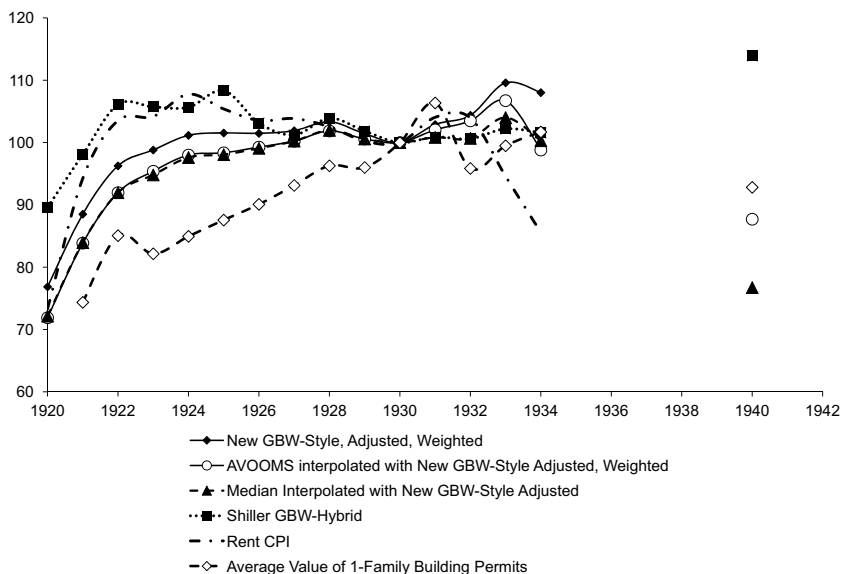


Fig. 6.5 Home values adjusted for CPI inflation, 1920–1940

Note: 1930 = 100.

to a level in 1940 that lay somewhere between the 1920 and 1922 levels.¹⁵ Whatever home owners gained in real value after 1920, they had largely lost by 1940. The other series all follow a similar pattern of a temporary peak in the 1920s and then a higher peak around 1931, 1932, or 1933. All but the Shiller-GBW hybrid series also then experience a decline in real value. In contrast, the Shiller-GBW hybrid series rises to a new peak in 1940 that is more than 27 percent higher than the 1920 value.

15. Most studies adjust for inflation by dividing by a measure of the price level, either the Consumer Price Index or the implicit price deflator used to deflate gross domestic product. This makes perfect sense with a neutral inflation or deflation where most prices are moving in the same direction. It becomes trickier when relative prices are changing dramatically, as they did in the 1920s and 1930s and again in the early twenty-first century. Rents rose rapidly until 1925 while the prices of the rest of the goods had fallen sharply between 1920 and 1922. Between 1925 and 1933 rents fell more than the prices of the rest of the goods and rents stayed substantially lower than prices for the remaining goods for the rest of the 1930s. However, it turns out that it does not make too much difference to the index when it is deflated by either the overall CPI or by the nonrent CPI. The magnitudes are different but the same story is told. The AVOOMS home value index relative to the overall CPI rises from 71.9 in 1920 to 100 in 1930. It then rises to 106.6 because there was severe deflation during the early 1930s before falling to 98.9 and then 87.7. When the adjustment is relative to the price index for nonrent goods, the rise is from 67.9 in 1920 to 100 in 1930 to 105.5 in 1933 then a decline to 95.9 and 85.9. The median housing value estimates follow a similar path from 68 in 1920 to 100 in 1933 to 72.6 in 1940 relative to the full CPI, and from 64.3 to 100 to 71.1 relative to the nonhousing CPI.

6.10.2 Affordability: Housing Prices Relative to Income

The affordability indices show the ratio of the indices for home prices to indices for nominal GDP per capita. When the index rises, houses become more expensive relative to people’s incomes. As with the adjustments for the CPI, scaling housing prices relative to incomes dampens the growth rate in relative housing prices relative to the growth rate in nominal housing prices. In the early twenty-first century, nominal median housing values for the top 400 cities rose 91.6 percent, but they rose only 47 percent faster than incomes rose during the period, as seen in table 6.9. Housing prices than fell relative to incomes afterward so that housing values relative to incomes were somewhere between the values in 2003 and 2005.

In the earlier period every series in the right side of table 9.10 and in figure 6.6 shows that housing prices rose much faster than incomes between 1920 and 1922. The houses became 23 to 33 percent less affordable in that two-year span. Incomes grew faster than housing prices until 1929 when nearly all of the indices bottom out around 89 to 93. Then, there was a large swing: housing prices fell, but incomes fell much faster. By 1933 the index had risen to over 130 in every housing value index. From the peak affordability level reached in 1929, houses had become 44 to 50 percent less affordable. For the rest of the decade every series except the Shiller-GBW hybrid shows a large drop in the index to levels that made housing 11.8 to 30.4 percent more

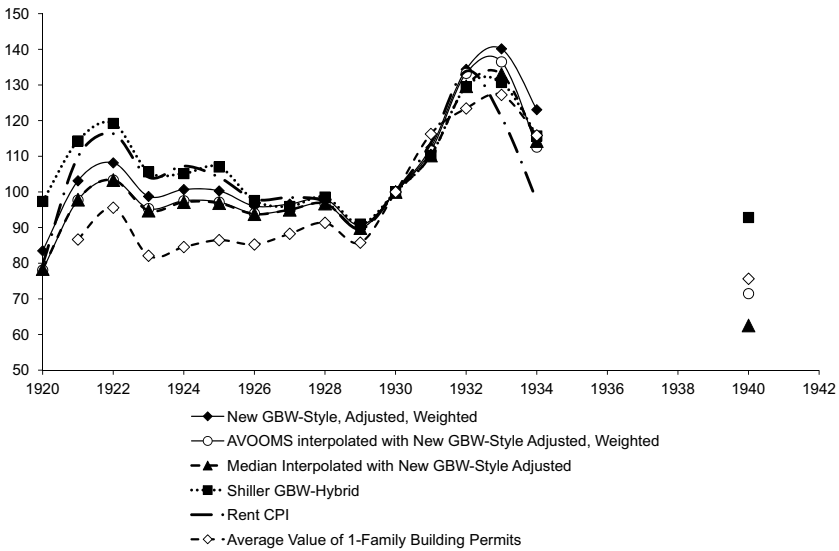


Fig. 6.6 Home values relative to GDP per capita, 1920–1940

Note: 1930 = 100.

affordable relative to income than in 1929 and 7 to 20 percent more affordable than in 1920. In all cases incomes rose much faster than housing prices over the rest of the decade.

6.11 Conclusion

The most commonly cited time series for nonfarm home values and prices between 1920 and 1940 was created by Robert Shiller with a goal of showing long-run changes in housing prices from 1890 to the present. Shiller relied on a series developed by Grebler, Blank, and Winnick (1956) for 1890 to 1934 and then spliced in a new series based on thirty asking prices per year in five major cities to extend the series from 1934 to 1953. The emphasis on obtaining annual series that are consistent over the long run caused the scholars to avoid using information from the US censuses and other sources that would have allowed them to perform a more careful examination of the period from 1920 to 1940. In this chapter we develop a new version of the Grebler, Blank, and Winnick series for 1920 to 1934 that includes more than twice as many cities, as well as several alternative measures for changes in housing prices between 1920 and 1940 that are based on information collected from other government publications and archival sources. We then use the information to compare and contrast the changes in housing prices during the boom and bust in housing prices between 1920 and 1940 and the modern day boom and bust in the early twenty-first century.

The new indices and the Shiller-GBW hybrid indices all show that nominal housing prices fell by somewhere between 20 and 30 percent from a peak between 1925 and 1930 to a low level around 1933 and 1934. However, there is substantial disagreement about the values circa 1920 and 1940. For 1920 the Shiller-GBW hybrid suggests that housing values were 4.9 to 7.3 percent *higher* than they were in 1930, while the series based on 1920 mortgage census information, the rent CPI, average values of residential building permits and Grebler, Blank, and Winnick's preferred series adjusted for depreciation show that housing values circa 1920 were anywhere from 6.5 to 20 percent *lower* than in 1930.

For 1940 the Shiller-GBW hybrid index shows that housing prices had returned to *within 5 percent* of the 1930 value. In contrast, all of the other series have 1940 values that are *18.7 to 35.6 percent lower* than in 1930. In summary, the most commonly cited current series suggests much lower growth rates in nominal housing prices between 1920 and the mid-1920s peak than all of the other series show and a much stronger recovery after 1933 than any other series. In fact, several of the series suggest declines from 1933 to 1940 rather than recovery.

Comparisons of the booms and busts in nominal home values show that the growth in nominal home values between 2000 and 2006 to 2007 was much more rapid than in the 1920s boom. Home values fell significantly

between 2007 and 2010, but nominal values remained substantially higher than in 2000. For every housing measure except the current Shiller-GBW hybrid, the situation in the 1930s will shock people in the modern era. After housing prices fell sharply between 1930 and 1933, nominal housing values failed to rebound by 1940 to anywhere near their 1930 level, nor did they reach their 1920 level. In fact, several series suggest that housing prices continued to fall until 1940.

When housing values are adjusted for CPI inflation, the growth rate in housing values is dampened between 2000 and 2006 to 2007, but it is still substantially larger than the growth in the 1920s boom. The median values reported by all home owners for the top 200 cities grew 59.4 percent between 2000 and 2006, compared with growth rates of 35 to 42 percent for similar indices in the boom period between 1920 and 1928. The bust from 2007 to 2010 shows strong declines in median real home values reported by all home owners but leave people with values at least 30 percent above the values in 2000. The changes in inflation-adjusted home values from 1928 to 1933 look quite different from the sharp declines in nominal home values because of the 30 percent deflation in all prices between 1929 and 1933. Between 1928 and 1933, inflation-adjusted home values declined for a couple of years and then rose to a new peak that was higher than the peak in the 1920s. Between 1933 and 1940 real home prices fell for every series except the extant GBW-Shiller hybrid series to levels that were between the levels seen between 1920 and 1922. If by some chance the modern era were to repeat the pattern in the 1930s, home values would continue to decline or stagnate over the next several years.

The affordability of housing was examined by comparing the ratio of home values to per capita income over time. In the early twenty-first-century boom, median housing values reported by all home owners rose 47 percent faster than income before the index fell back to a level 27 percent above the 2000 ratio. In the 1920s the sharp recession in 1921 to 1922 caused incomes to fall while housing prices were rising, leading to an early peak in 1922 in the ratio. By 1929 home price affordability had risen sharply, as nominal housing prices started declining after 1925 and per capita incomes rose. The Great Contraction caused per capita incomes to fall much more quickly than housing prices fell between 1929 and 1933, and housing became much less affordable. The situation reversed itself by 1940, causing the ratio of housing prices to incomes to fall below the ratios in 1920, so that relative to income housing was more affordable than at any time in the intervening period.

While more clearly defining the movements in housing values, the results in this chapter should not be considered the final word on the prices in the period from 1920 to 1940. Each of the series we have discussed has its own set of flaws and biases. We hope that the questions raised by the differences across series leads to additional work to collect more data from local newspapers, archives, and government records to develop additional estimates of housing prices.

Appendix A

Calculating Medians from the Reported Distributions of Housing Values

The 1940 census of housing reported median values for homes in each city for both 1930 and 1940. They also reported distributions of housing values for 1940, and the 1930 census of housing reported both medians and distributions of housing values for 1930. We also calculated medians for housing values from the distribution in the following way. The most commonly reported categories for cities in the 1930 and 1940 census and in the housing inventories were values from \$1–\$999, \$1,000–\$1,499, \$1,500–\$1,999, \$2,000–\$2,499, \$2,500–\$2,999, \$3,000–\$3,999, \$4,000–\$4,999, \$5,000–\$7,499, \$7,500–\$9,999, and \$10,000 and over. The 1930 census also included categories for \$10,000–\$14,999, \$15,000–\$19,999, and \$20,000 and over. Sixty-seven of 960 cities with information in 1930 had medians higher than \$10,000, but the census reported those medians. By 1940 only 13 of 956 cities had median housing values higher than \$10,000. When we calculated the medians from the distribution information, we followed a procedure similar to the following: create the cumulative distribution for the categories, pick the category in which the cumulative percentage (CPH) is higher than 50 with a top income of YH and the cumulative percentage of the next lower category (CPL) is less than 50 with a top income of YL. The formula used to calculate the median is $(50 - \text{CPL}) / (\text{CPH} - \text{CPL}) * (\text{YH} - \text{YL})$. For example, if 46 percent of the homes were valued at \$2,999 or less and 53 percent were values at \$3,999 or less, the median is calculated as $(50 - 46) / (53 - 46) * (3,999 - 2,999)$.

The housing inventories for 1934, 1935, and 1936 from the property inventories and the financial survey of housing in 1934 did not report median or average values, although they did report distributional information. We used the same formula for the median as described earlier. The categories used in the 1934 Financial Survey of Housing for 65 cities were \$1–\$999, \$1,000–\$1,499, \$1,500–\$1,999, \$2,000–\$2,999, \$3,000–\$3,999, \$4,000–\$4,999, \$5,000–\$7,499, \$7,500–\$9,999, \$10,000–\$14,999, \$15,000–\$19,999, and \$20,000 and over. The only difference was the lack of a split at \$2,500 within the \$2,000–\$2,999 category. Another 31 city inventories in 1934 reported information for \$1–\$999, \$1,000–\$1,499, \$1,500–\$1,999, \$2,000–\$4,999, \$5,000–\$9,999, \$10,000–\$19,999, and \$20,000 and over. The estimates of the medians for these cities are therefore subject to more measurement error.

The categories for the 1935 inventories were the same as for 1930 for eleven of the forty-nine cities except the category for \$1,000–\$2,000 was not split at the \$1,500 value. The remaining thirty-eight cities had the same categories as in 1930 except that the values from \$5,000 to \$10,000 were split into \$5,000–\$5,999, \$6,000–\$7,999, and \$8,000–\$9,999. These same categories were also used in city inventories for forty-one cities in 1936.

Appendix B

Comparability of the Surveys in 1930, 1940, and the Early Twenty-First Century

The IPUMS description of how housing values were reported in the original census manuscripts for 1930 and 1940 say that “enumerators consulted with the owners to estimate the sale value of the housing unit. For single-family, non-farm houses, the estimate included the value of the house and land. . . . For owner-occupied units that were part of a building containing other households or businesses (except a small room used by the owner for an office), the estimate included only the value of the part of the house in which the owner’s household lived. For example, if the owning household of a two-family house rented half of the house to another household, only half of the house’s value would have been reported. . . .” This information was downloaded from the IPUMS USA website (http://usa.ipums.org/usa-action/variables/VALUEH#comparability_tab) on April 17, 2012.

For the 2000 census and the American Community Surveys of 2003 and 2005–2010, “respondents estimated the full current market value of the property, including both house and land, even if the respondents owned only part of the property.” “Apart from group quarters, all owner-occupied or vacant-for-sale units were covered, including mobile homes, condominiums, units with offices or businesses attached, and houses on lots of any size. For mobile homes in pre-2008 ACS . . . data, the value of the land was included in the value; in the 2008 ACS . . . land value was included only if the owner of the mobile home also owned the land.” This information was downloaded from the IPUMS USA (website http://usa.ipums.org/usa-action/variables/VALUEH#comparability_tab) on April 17, 2012.

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