Rental Prices and the Standard of Living in the United States, 1914–2006*

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Housing is one of the most important elements of consumer expenditure, averaging over one quarter of household spending across the twentieth century. The Bureau of Labor Statistics (BLS) series on housing expenditures are the most important and widely-used source of information on how Americans' spending on shelter has evolved over time. For instance, an adjusted BLS "Rent of Primary Residence" (RoPR) series was used to measure rental prices for the United States in the global housing prices study of Knoll et al. (2017). The BLS series for rental and owner-occupied housing expenditures are also used to construct the consumer price index (CPI), which underpins our understanding of how living standards have improved over time. The accuracy of the BLS series is thus of first-order importance for economists and social scientists interested in housing costs.

The measurement of expenditure by owner-occupiers has become particularly important for understanding how consumer spending on housing has evolved over time. Americans have shifted to owning homes rather than renting them, with the homeownership rate in major cities more than doubling between 1900 and 1970. The treatment of owner-occupied housing in a consumer price index is not trivial, and the BLS has made many adjustments to their methodology to reflect changes in the consumption of housing services

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and advances in how the cost of those services is measured since 1914. Most prominently, the BLS began using a rental equivalence method to measuring costs for homeowners in 1983 ("Owners' Equivalent Rent"), replacing the earlier approach of measuring user costs directly. This change reflected a broad consensus on the desirability of imputing rents for owner-occupiers relative to other methods for measuring shelter expenditures for these households. The measurement of rents thus continues to be very important in spite of the increasing homeownership share.

Despite the many improvements to the underlying methodology, the BLS housing expenditure series pose some measurement puzzles over the long run. The RoPR series suggests that, since its inception in 1914, rents have grown significantly more slowly than other consumer prices. Between 1914 and 2006, consumer prices excluding shelter grew by a factor of 25 (3.6% annual growth rate or AGR), while nominal rents grew by a factor of just over 10 (2.6% AGR). Why did the price of shelter increase by substantially less than the price of everything else over the twentieth century? To make progress on this question, we use the newly constructed Historical Housing Price (HHP) Project rental index, which comes from a dataset of over a million rental listings from 30 mid-size and large U.S. cities over the period 1890–2006.

We begin with a brief review of how housing and shelter have been treated in the CPI basket over time, paying particular attention to the treatment of owner-occupied housing, which has varied considerably.[1] We then describe our dataset, our rolling-window hedonic regression methodology, and the HHP index of market rents for the U.S. Next, we outline our method for compiling an alternate measure of consumer prices, which combines indices that exclude shelter with our new measure of housing costs and housing weights in the existing CPI. With this approach we construct a revised CPI index for the U.S. since 1890.[2] We find significantly greater growth in nominal rents than previously estimated. In

[1]Scholars have argued that "owners' equivalent rent" measures should reflect market rents rather than contract rents (Ozimek, 2013) and have constructed alternate CPIs that use market rents for post-2000 period, for instance the Alternative Inflation Index based on Ambrose et al. (2023). We use market rents for the entire housing component of the CPI both because the BLS treatment of owned housing has varied over time and because the rental component is much smaller than the homeowner component.

[2]We took estimates of housing's share of consumption from various sources. 1890:"Cost of Liv-

particular, we find that nominal rents increased by a factor of almost 25 between 1914 and 2006 rather than a factor of just over 10 (3.54% AGR vs. 2.61%). In other words, shelter prices and other consumer prices increased by the same factor between 1914 and 2006.

The most significant upward revisions occurred in four periods of high inflation, including spikes after both World Wars. Rents more than doubled between 1914 and 1920, compared with an increase of one third in the RoPR series. In the immediate post-World War II period, market rents increased by 75% compared with 11% in the RoPR. In both cases, the RoPR series catches up somewhat in following years but not completely, reflecting methodological issues including the measurement of rents for newly built rental homes and survey non-response bias after tenant departures. These issues led to methodological changes in the CPI, but they were not applied retrospectively (Humes & Schiro, 1948, 1949).

The other two periods where the HHP and RoPR series differ most are 1965-1969 and 1977-1980, two periods with some of the highest rates of inflation in the postwar era. While the HHP and RoPR series increased by very similar amounts 1969-1977 (45% vs 44%), this was not the case in the inflation spikes that preceded and followed this period. In the late 1960s, market rents increased by 40% while RoPR increased by just 9%. In the late 1970s, market rents increased by just over half while the increase in the RoPR was just one quarter. Overall, this means that rents tripled in the fifteen years following 1965. In the RoPR series, rental prices only doubled over the same period. It was not until the 1980s that the BLS adopted methodological changes to fully address these issues (Crone et al., 2010), and thereafter the growth in rents implied by the RoPR series more closely aligns

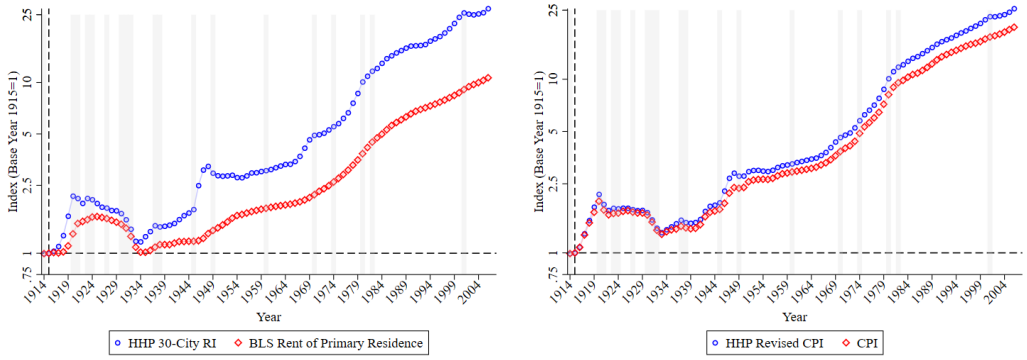
ing of Industrial Workers in the United States and Europe, 1888-1890" (ICPSR 7711) accessed from https://doi.org/10.3886/ICPSR07711.v4. 1901: 18th Annual Report of the Commissioner of Labor (1904), Table III. 1919: "Cost of Living in the United States," Bulletin of the U.S. Bureau of Labor Statistics, #357, May 1924. 1936: "Changes in Cost of Living In Large Cities In the United States, 1913-41," Bulletin of the United States Bureau of Labor Statistics, No. 699. 1944: "Consumer Spending in WWII: The Forgotten Consumer Expenditure Surveys." U.S. Bureau of Labor Statistics, Monthly Review, August 2015. 1950: Bureau of Labor Statistics Bulletin No. 1097 - "Family Income, Expenditure and Savings in 1950." 1961: Table B-9 from the 1962 Consumer Expenditure Supplementary Tables. 1973: Table 1 from the 1972-73 Consumer Expenditure Survey. We interpolated between these years to obtain an estimate of the housing expenditure share in each year prior to 1984. From 1984 to 2006, we used the Consumer Expenditure Survey. These series were accessed from the BLS Data Explorer at https://beta.bls.gov/dataViewer/view/timeseries/CXUHOUSINGLB0201M and https://beta.bls.gov/dataViewer/view/timeseries/CXUTOTALEXPLB0101M.

with that of the HHP series.

To better understand how understated price growth in the BLS series affected the CPI over the long run, we use our HHP rental index to construct an alternative CPI, replacing the housing component with our measure of market rents. Given the importance of shelter in the consumption basket, this has a non-trivial impact on the estimated annual growth rate of the overall price index. With a base year of 1914=1, the current CPI-U reaches a value of 20.1 in 2006, with shelter rising to 10.7 and all other items rising to 24.9. Keeping the excluding-shelter component the same but allowing housing costs to reflect the path of market rents (meaning housing costs track costs elsewhere in the economy over this period), a revised CPI would take a value in 2006 of 24.8, rather than 20.1. In sum, addressing early mismeasurement in the price of housing would change the average AGR of consumer prices in the U.S. economy 1914-2006 from 3.3% to 3.6%.

Our results have implications for the measurement of not just the cost of living but also the standard of living over the long run: if living cost increases have been understated in standard measures, then the real increase in the U.S. standard of living since World War I may have been overestimated. This important revision using new and detailed data allows better measurement of housing costs, providing a new foundation for future work on housing market dynamics and cost-of-living adjustments.

Figure 1: Alternate Indices of Rental and Consumer Prices



(a) Rental price indices

(b) Consumer Price Indices

Note: Panel (a) of this figure plots the baseline HHP rental price series against the BLS RoPR series with base year 1914=1. Panel (b) plots the Consumer Price Index for Urban Consumers from the BLS and an alternate CPI that has the total housing component replaced in every year with HHP rental price series.

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