

Using the Price to Income Ratio to Determine the Presence of Housing Price Bubbles By Shelly Dreiman

Given the cyclical nature of house prices, the rapid house price appreciation experienced over the past 3 years has helped to fuel concerns that a downturn in the housing market is forthcoming. The past cyclical pattern in the real housing price index is plotted on the dotted line in Figure 1¹. Simply viewing the time periods between incline and decline and extrapolating is one way to predict the movement of future prices. Like most economic cycles, however, the amplitude and frequency of house price cycles are not so straightforward. Extended periods of rapid appreciation (more than 1 year and faster than the long run trend) are often interpreted as “bubble” behavior and are taken to mean that declines are on the horizon. Bubbles can result when economic stimuli that influence housing prices concurrently stimulate consumer expectations regarding future price growth. Expected future growth further drives up housing prices and can result in housing that is overvalued. Prices must eventually decline to a level that can be supported by fundamental supply and demand determinants. These declines may take place over successive time periods, as the same phenomenon repeats itself in the other direction.

The past 25 years have been characterized by at least 2 housing price cycles. As shown in Figure 1, real housing prices peaked in 1979, followed by a 3-year decline of about 11 percent ending in 1982. Prices increased throughout the remainder of the 1980s, growing 19 percent between 1983 and 1989. The 1990s were characterized by declines in the first half of the decade (about 7.0% between 1989 and 1995) and by substantial appreciation throughout the second half of the decade (16.0% since 1995).

When assessing the possibility of a bubble, it is not sufficient to examine housing appreciation in isolation. Changes in supply and demand determinants may provide a better explanation of price behavior. Consider the role of household income as a determinant of housing demand. At purchase time, a typical household will spend roughly 2 to 3 times their annual income on their home. As real incomes increase, households can afford to purchase more housing, and many will do so, putting upward pressure on housing prices². High housing appreciation rates may assume the appearance of a bubble, but may be explained by rising affordability. If the price to income ratio, a measure of affordability, remains unchanged, it may well indicate that the observed housing appreciation simply reflects changes in the fundamental supply and demand determinants, and a bubble is not present. On the other hand, prolonged and rapid increases in the price to income ratio may be a sign of an overshooting cycle, or a bubble. As the house price to income ratio begins to go up, two market mechanisms begin to occur. First, individuals begin to substitute other goods or investment vehicles for housing, as housing becomes relatively more expensive to consume. Second, housing suppliers build more housing to take advantage of the higher price level. Both economic

¹ The real housing price index used is the annual average OFHEO House Price Index divided by the annual average non-housing component of the CPI (1980=100). The CPI is published by the Bureau of Labor Statistics and is available on www.bls.gov

² Note that not all of the increase in income goes to pay higher prices. Much of it goes to purchase bigger and better housing. However, the analysis that follows was also conducted using median price data collected by the National Association of Realtors (NAR). This data allows for a changing mix of housing; however, this made little difference to the trends in price to income ratios that are discussed below.

forces exert downward pressure on house prices, lowering the price to income ratio back to some plausible range that is consistent with fundamental supply and demand determinants.

The solid line on Figure 1 illustrates the trends in the price to income ratio over the past 25 years³. The cyclicity of house prices in the 1970s and 1980s is reflected in the movement of the price to income ratio during that time. The ratio dropped from its 1979 peak of 2.19 to a decade low of 1.91 in 1984. A more favorable interest rate environment contributed to price growth throughout the late 1980s, and the ratio reached a peak of 2.02 by the end of 1989. Another price downturn in the early 1990s was again accompanied by a declining price to income ratio. Overall, however, the price to income ratio has been drifting downward over the past 2 decades while price levels have been drifting upward. The average price to income ratio was 2.11 in the late seventies, 2.01 in the eighties, and 1.84 in the nineties. While the ratio has begun to rise over the past two years, it remains at only 1.84 in 2000.

The price increases of recent years diminish significantly when prices are divided by income. This would suggest that prices are not currently near the peak of a bubble. However, the above discussion focuses only on income as a housing demand determinant. Perhaps equally important in assessing the price to income ratio in the context of aggregate data are changes in population. The demographic profile of the U.S. has changed over the past 25 years. Mankiw and Weil (1989) suggest that a likely cause of high appreciation in the 1970s was a high percentage of Baby Boomers entering home buying age during this time⁴. This research suggests that individuals between the ages of 20 and 30 have a dramatic affect on housing demand when they form new households. Mankiw and Weil speculated that the Baby Bust (dramatic decline in births) of the early 1970s would result in large declines in demand and commensurate price depreciation in the 1990s. However, they did not consider economic growth apart from demographic considerations. With rapidly rising incomes in the 1990s, housing price appreciation has been substantial.

The declines in the price to income ratio, however, may be consistent with this theory. Housing is likely to represent a large portion of the investment portfolio of individuals between 20 and 30 years old. This age group is just starting to accumulate wealth, and is liquidity constrained as they purchase a home for the first time. As individuals age and their incomes rise, they will accumulate wealth that can be invested in other productive assets. These shifts in the age distribution of the population compounded by strong stock market performance in the mid-to-late nineties may be contributing to the declining price to income ratio.

Figure 2 indicates that approximately 17 to 18 percent of the population in the late 1970s and 1980s were between the ages of 20 and 29. This share has declined to about 13 percent as of the end of 2000. In fact, the house price to income ratio has drifted similarly to this population share over the past decade. This offers support to the idea that the demographic profile plays a role in determining the prevailing price to income ratio. And the demographic profile that existed during past cycles is not

³ Household income is calculated by dividing total personal income by number of households. The personal income data is obtained directly from Census on www.census.gov, and the number of households is obtained from Woods and Poole, MSA Profile, 2000. Prices are set to the NAR median in 1980, then change at the same rate as the HPI.

comparable to the one characterizing the present. So while the low price to income ratio may be interpreted as “good news” that future declines are not on the horizon, we should exercise caution in drawing such a firm conclusion without taking into account changes in demographics that have simultaneously occurred.

⁴ Mankiw, N. Gregory and David Weil, 1989, The Baby Boom, the Baby Bust, and the Housing Market, *Regional Science and Urban Economics* 19.

Figure 1: Price to Income Ratios and the OFHEO HPI Since 1975

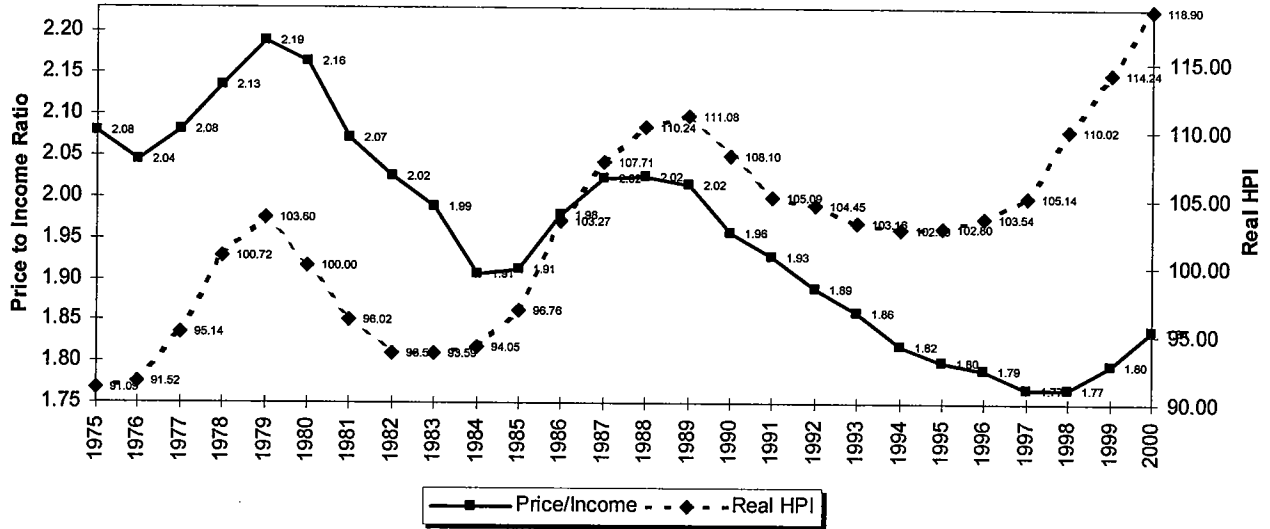


Figure 2: Price to Income Ratios and the Age Distribution Since 1975

