

## **Housing Bubbles**

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### **Introduction**

Many places across the globe experienced house price bubbles during the first seven years of this century. A May 2003 article in **The Economist** titled *Castles in Hot Air* identified “six countries where houses appear to be overvalued (America, Britain, Australia, Ireland, the Netherlands and Spain).” Four years later, **The Economist’s** depiction of house price bubbles proved to be true in a number of cities across the globe. This article first defines house price bubbles. It then illustrates house price bubbles using price indices for selected cities in the United States over the 2000 through 2010 period. The article then examines some literature that attempts to identify bubbles and finally explores some of the underlying causes of these house price fluctuations.

### **House Price Bubbles**

A bubble in the price of an asset occurs when the market price of the asset is substantially higher than the fundamental economic value of the asset. Stiglitz [1990] defines asset bubbles as follows: “if the reason that the price is high today is *only* because investors believe that the selling price will be high tomorrow—when ‘fundamental’ factors do not seem to justify such a high price—then a bubble exists” (p. 13). Owner-occupied housing is fundamentally a consumption good with an uncertain cost. The cost is uncertain because future house prices are unknown. If the price of a house increases between the time a homebuyer purchases a residence and the time the homeowner sells the residence, then the cost of owning the home is lower than it would have been if house prices were constant over the holding period. Similarly, if the price of a home decreases between the purchase and subsequent sale, then the cost of homeownership is higher compared to a holding period with constant house prices. When a potential homebuyer decides to purchase a house, the buyer must form some expectation of what future house prices

are likely to be. Case and Shiller [2003] acknowledge the important role that expectations play in the determination of house prices in their definition of house price bubble:

“We believe that in its widespread use the term refers to a situation in which excessive public expectations of future price increase cause prices to be temporarily elevated...the mere fact of rapid price increases is not in itself conclusive evidence of a bubble.” (p. 299).

The most important cause of house price bubbles is homebuyers’ (and mortgage lenders’) unrealistic expectations of future real house price appreciation. But what caused the initial real increase in house prices that eventually results in unrealistic expectations of continued house price appreciation? The most important factor during the recent house price bubble was the dramatic increase in the supply of mortgage credit. According to the Federal Reserve System’s Flow of Funds Account, outstanding residential mortgage debt in the US more than doubled between 2000 and 2007-- from \$4,798.4M to \$10,540.2M (Figure 1).

Along with the increase in the supply of mortgage credit came lax underwriting standards (where borrowers did not have to provide evidence of their income or their assets), zero equity loans, and foolish mortgage instruments like payment option adjustable rate mortgages (where the interest rate used to compute the monthly mortgage payment is substantially below the rate used to accrue interest on the outstanding mortgage balance).

### **US House Prices: 2000-2010**

According to the purchase only house price index reported by the Federal Housing Finance Agency (FHFA, formerly the Office of Federal Housing Enterprise Oversight or OFHEO), between the first quarter of 2000 and the first quarter of 2006 US house prices increased by about 7.9% per year. Adjusting for inflation, which was about 2.6% per year over the same period (as measured by the Bureau of Labor Statistics All Urban Consumers’ All Items Consumer Price Index), the real price of owner-occupied housing in the United States was increasing at about 5.3% per year over this period (Figure 2). The increase in house prices ended during the second quarter of 2007 and then declined 17.7% between 2007:2 and 2010:4.

The 7.9%/year national average increase in house prices masked significant spatial variation in appreciation rates. Again according to the FHFA, house prices increased 16.3% per year in Miami over the 2000:1 through 2006:1 period; 15.0%/year in San Diego; and 13.0%/year in Phoenix. Most of the rapid increases in US house prices occurred in four states: Arizona, California, Florida and Nevada. Miami house prices peaked in 2007:2; San Diego house prices in 2005:3; and Phoenix house prices in 2006:2. Between their respective peaks and 2010:4, nominal house prices declined 45.9% in Miami, 32.4% in San Diego and 52.2% in Phoenix. While some cities in the US experienced rapidly increasing house prices during the first half of the decade followed by rapidly declining house prices, other cities in the US experienced only moderate fluctuations. For example, between the first quarter of 2000 and the first quarter of 2006, nominal house prices in Denver increased 4.8%/year (2.2%/year in real terms); 3.5%/year in Dallas; and 2.9%/year in Cleveland (Figure 2).

### **Identifying House Price Bubbles**

Is it possible to identify a house price bubble? Saying a house price bubble exists when the observed market price of owner-occupied housing exceeds the fundamental economic value is easy. Unfortunately, fundamental economic values of owner-occupied housing are not observed and must be estimated. It is difficult to identify house price bubbles with any precision. Numerous authors have examined a variety of alternative approaches for estimating the fundamental economic value of owner-occupied housing. Some have developed equilibrium models of housing markets that incorporate specifications for the aggregate demand for and aggregate supply of housing and then compare observed market prices to the estimated equilibrium values. Some of this empirical research has demonstrated that the existence and magnitude of a metropolitan area's house price bubble is related to the local market's elasticity of housing supply.

House price changes are positively serially correlated. Consequently, housing market analysts have modeled the short-run dynamic processes that house prices use to move towards long-run equilibrium. This research has empirically demonstrated that short-run housing market adjustment processes vary substantially across metropolitan areas but are characterized by mean

reversion to long-run equilibrium and by serial correlation in house price changes. Metropolitan housing markets characterized by high real construction costs, rapid population growth and high rates of real income growth tend to overshoot their long-run equilibrium values. This overshooting is not a bubble; just an attribute of the adjustment process.

Other research has employed the demographic determinants of housing demand to identify fundamental economic values. Finally, some analysts have attempted to identify house price bubbles by examining the time series behavior of house price to rent ratios or house price to income ratios. While all these empirical approaches for identifying house price bubbles have merit, there is little agreement among economists regarding how much market prices must exceed fundamental economic values to constitute a bubble.

### **The After Tax User Cost of Owner-Occupied Housing**

How do financing costs and expectations of house price appreciation influence the expected cost of owner-occupied housing? A household should own their home when the expected after tax cost of owning is less than the expected after tax cost of renting. Historically, underwriting standards and substantial down-payment requirements have been significant barriers to homeownership. The significant inflows of mortgage capital into the US housing market between 2000 and 2006 encouraged lenders and mortgage brokers to reduce underwriting standards and offer loans that required little or no down payment. To gain some insight into the effect that the cost (and availability) of mortgage debt has on house prices, it is useful to examine the after tax user cost of owner-occupied housing. Homeowners in the US are allowed to deduct mortgage interest and property taxes from their income prior to paying income taxes. This reduces the after tax cost of homeownership. In addition, the Taxpayer Relief Act of 1997 virtually eliminated the capital gains tax on owner-occupied housing for most US homeowners. If we assume that a homebuyer is able to finance the entire purchase price of their home, the (after-tax) user cost of owner-occupied housing is given by:

$$\text{User Cost} = [(r_d + \text{inf} + t_{\text{prop}})(1 - t_{\text{income}}) + d - (g + \text{inf})] V$$

where  $r_d$  = real rate of interest on the debt

$\text{inf}$	=	rate of inflation
$t_{\text{prop}}$	=	property tax rate
$t_{\text{income}}$	=	tax rate on ordinary income
$d$	=	annual rate of economic appreciation
$g$	=	real rate of house price appreciation
$V$	=	the market value of the home

Reasonable assumptions for these parameters are:  $r_d + \text{inf} = 6\%$  (e.g. rates on 30 year, fixed rate mortgages);  $\text{inf} = 2.6\%$ ;  $t_{\text{prop}} = 2\%$ ;  $t_{\text{income}} = 30\%$ ;  $d = 0.5\%$ ; and historically  $g = 0$ . With these parameters, the annual after tax user cost of owner-occupied housing is about 3.5% of the value of the home. A payment option adjustable rate mortgage with a pay rate of 1% temporarily makes the after tax user cost negative. At a negative user cost, the demand for owner-occupied housing is infinite. Inexpensive and abundantly available mortgage financing lowered user costs, increasing the demand for owner-occupied housing, putting significant upward pressure on house prices. With an inelastic supply of housing, the increase in aggregate demand resulted in higher house prices. Once house prices began increasing in real terms (in some places more than others) households (and lenders) began forming expectations of subsequent (real) house price increases (e.g.  $g > 0$ ). These expectations continued as long as mortgage credit continued to stream into the housing market. It is interesting to note that between 2000:1 and 2005:1, when owner-occupied housing in the US was getting more expensive, the rate of homeownership increased from 67.1% to 69.1%. One might ask ‘How could more American households afford to own their home when house prices were increasing (in real terms)?’ Simple: inexpensive and abundantly available mortgage debt.

(Expectations of) Positive real rates of house price appreciation will also generate low (or negative) after-tax user costs for owner-occupied housing. Using a nominal mortgage interest rate of 6% in the user cost expression above, a real rate of house price appreciation exceeding 3.5%/year will generate a negative after-tax user cost of homeownership. Between 2000:1 and 2006:1, house prices in the US were increasing 5.3% per year in real terms.

## References

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Stiglitz, Joseph E. 1990. Symposium on Bubbles. *Journal of Economic Perspectives* 4(2):13-18.

Figure 1

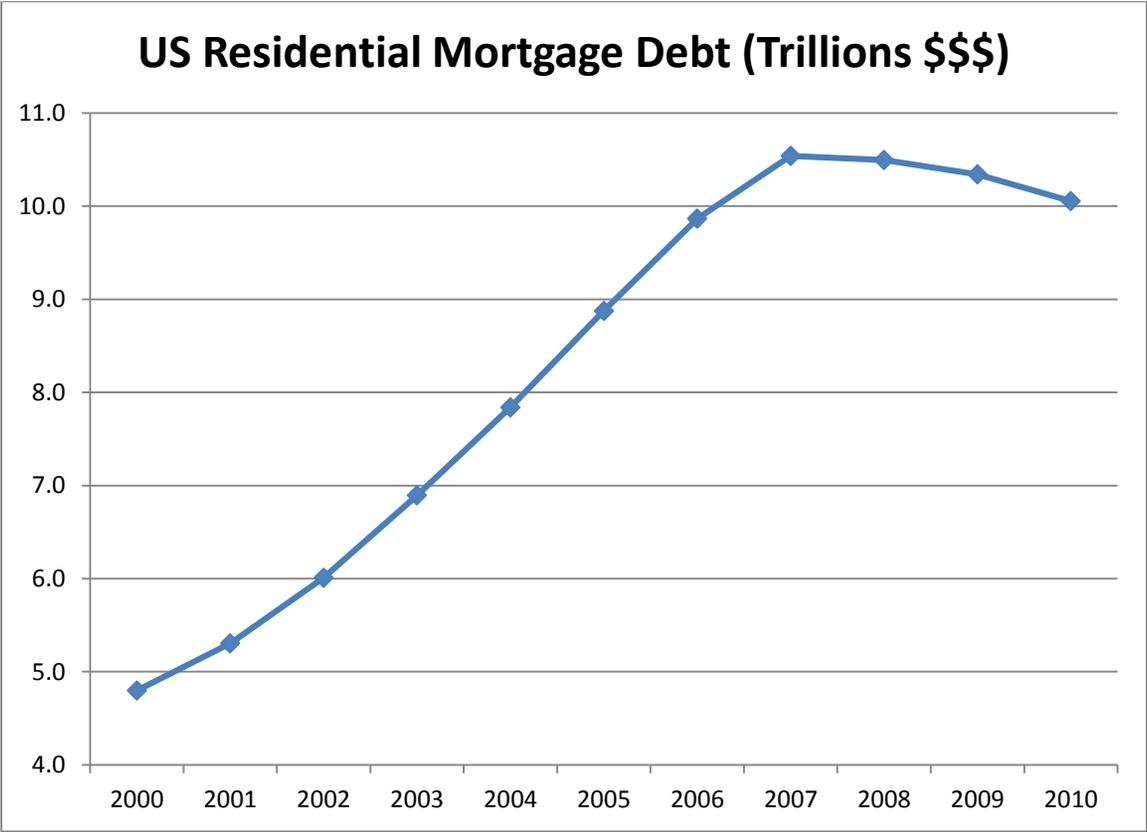


Figure 2

FHFA House Price Indices for the US and Six US Cities: 2000:1-2010:4

Price Index (2000:1 = 100.0) by Quarter

