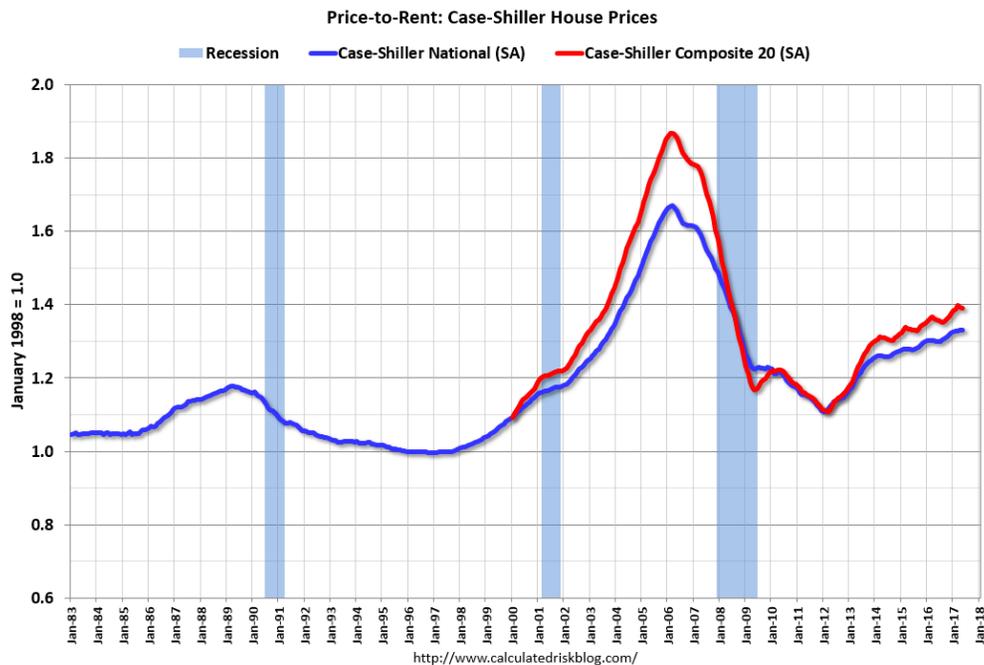


The Basics of the Housing Bubble¹

Most references to the housing bubble of the 2000s refer to the dramatic increase, and subsequent decline, in aggregate U.S. home prices that began around 2001, peaked around 2005, and saw rapidly falling prices by 2007. Not all increases in asset prices constitute bubbles. All assets have a “fundamental value.” The fundamental value of an asset is the worth of that asset to a hypothetical person who lives forever, and holds that asset forever. The fundamental value of stocks, for example, is the eternal stream of dividends (discounted). For real estate, the fundamental value largely depends on:

- i) the utility that people obtain from living in residential real estate.
- ii) the productive value of commercial real estate.

The term “speculative bubble” refers to cases where the price of an asset is inconsistent with its fundamental value. In this case, the worth of an asset to an agent who plans on selling it (hence the speculative nature of bubbles) differs from the worth to someone who plans to hold it. It is now widely accepted that real estate prices during the early-mid 2000s were well above their fundamental values and thus the temporary increase in prices was in fact a bubble. Another way of measuring the fundamental value of real estate is to examine the stream of rents that the owner may obtain from the asset.² The following graph shows the ratio of real estate prices to rents:



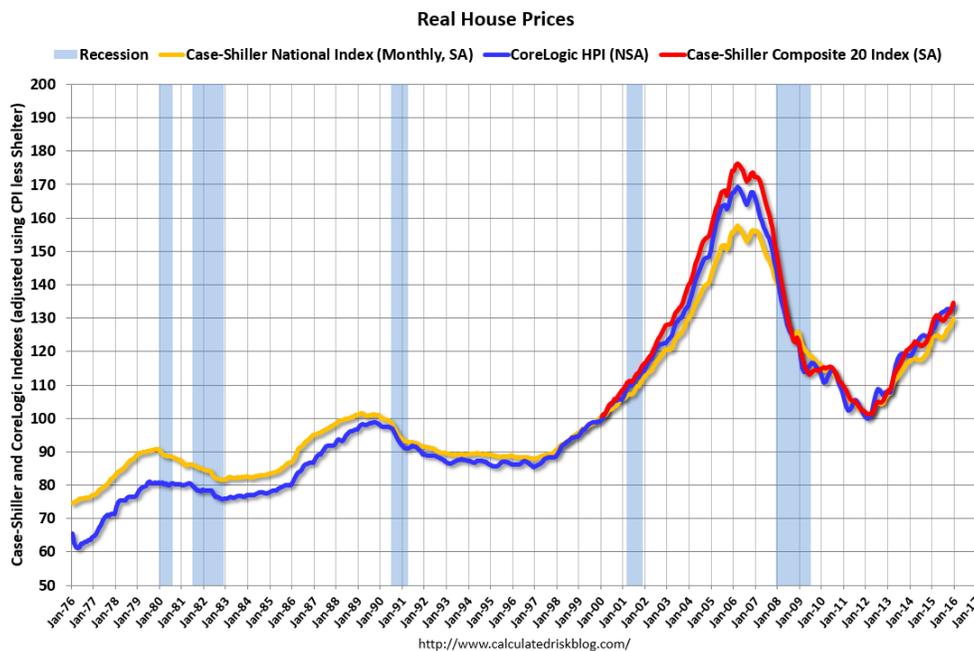
¹These are undergraduate lecture notes. They do not represent academic work. Expect typos, sloppy formatting, and occasional (possibly stupefying) errors.

²Because *i* and *ii* determine the rents for real estate, these two ways of stating the fundamental value are identical.

The January 1998 price to rent ratio is normalized to one. During the 2000's, rents were increasing moderately. The approximately 80% increase in this ratio is therefore the result of an extraordinary increase in real estate prices. The data prior to 1983 show that the price to rent ratio is usually near one going back several more decades. While periodic increases above one did occur, they never approached the magnitude of the spike that peaked in 2006. Coupled with the subsequent decline in real estate prices, these data make a compelling case that it was a bubble and not a change in fundamentals that caused the increase in prices.

Note that this ratio has gain started to rise since 2012. It is currently again at high values, although still much lower than in 2007.

The next chart shows the change in real housing prices (adjusted for inflation) as measured by several indexes:

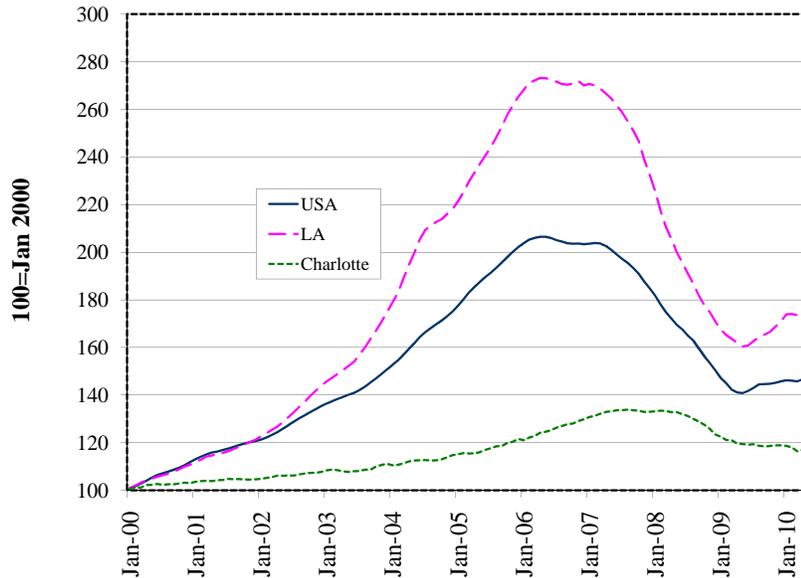


Housing prices have been rising rapidly since 2012. They remain, however, below their 2007 levels.

The bubble did not affect all parts of the country equally, prices were generally far more inflated on the coasts than in the interior of the country.³ The final chart shows how the bubble affected several cities unequally. It uses the popular Case-Shiller 20 city average:

³There are exceptions. Nevada, for example, experienced among the largest increases in housing prices.

Case-Shiller 20 City Index of Home Prices



In most cases, the decline in housing prices since 2007 is roughly proportional to the initial increase in home prices. Besides Los Angeles, other cities that saw a greater than 100% increase between 2000 and 2006 include New York, Miami, San Francisco, and Washington D.C. Cities such as Atlanta, Charlotte, Denver, and Cleveland, however, saw increases of about 20-30%. Boston and Portland, ME were in between, experiencing increases of about 70-80%.

While it is important to keep in mind that few major events have a single cause, the housing bubble seems to be, by far, the largest single cause of the financial panic that began in 2008, and the ensuing recession.

To understand the origins of the bubble, we introduce a few factors that have been suggested as having helped cause the housing bubble.

#1: Low Interest rates

In 2001, the United States endured a short and mild recession. This recession is often linked to the bursting of the dot.com bubble. Unemployment remained high for several quarters after the recession's end. To stimulate economic growth, the Federal Reserve lowered its target Federal Funds Rate to below 2% in 2002, a very low rate, and this rate remained low until 2005. Even though the Fed does not target mortgage rates, which are much longer term loans than those affected by the Federal

Funds rate, lower short term rates are typically passed on to lower long term rates. Recall from ECO 270, the standard motivations for lowering interest rates.

i) The interest rate represents the cost of borrowing. By lowering interest rates, the Fed hopes to encourage firms to borrow to finance additional capital purchases.

ii) Lower interest rates decrease the likelihood of default and thus encourage additional lending through the credit channel.

These low interest rates were arguably a catalyst for the housing bubble. The “user cost of housing” refers to the payment associated with a given mortgage and depends on both a home’s purchase price and the corresponding interest rate. Lower interest rates reduced the user cost, driving up demand, and real estate prices.

Mortgage rates would remain at very low levels throughout the decade:



Note that current mortgage rates are even lower than at the height of the bubble. This, as we will discuss later in the class, is due to the Federal Reserve’s extraordinary policy response to the economic downturn. This response lowered both short and long term interest rates.

Another factor behind low interest rates is the *Global Savings Glut*. In the 2000s many developing economies such as China sought to increase their holdings of U.S. assets and thus demanded U.S. debt. This put downward pressure on U.S. interest rates and allowed the Federal Reserve to keep interest rates low without triggering inflation.

#2: *Financial Innovation*: Another factor that is often cited as contributing to the bubble is financial innovation in the mortgage industry. Over time, more types of mortgages have evolved.

i) Before the Second World War, most mortgages i) required a large downpayment, sometimes as high as 50%, ii) were short-term, often five years, iii) were interest only during the life of the mortgage, followed by a large payment for the real estate's principal. These mortgages were often rolled over.

ii) Over time, downpayments decreased and mortgage length increased. By the 1970's 20% downpayments were common. 15 or 30 year mortgages also offered either fixed or adjustable rates.

iii) By 2002, there were many other innovations. These include: i) low downpayments, often 5%, ii) ARM mortgages, fixed interest rate for a set amount of time and then adjusting automatically based on a market interest rate, iii) high risk (subprime) loans (e.g. no document mortgages which didn't verify assets, income, etc.)

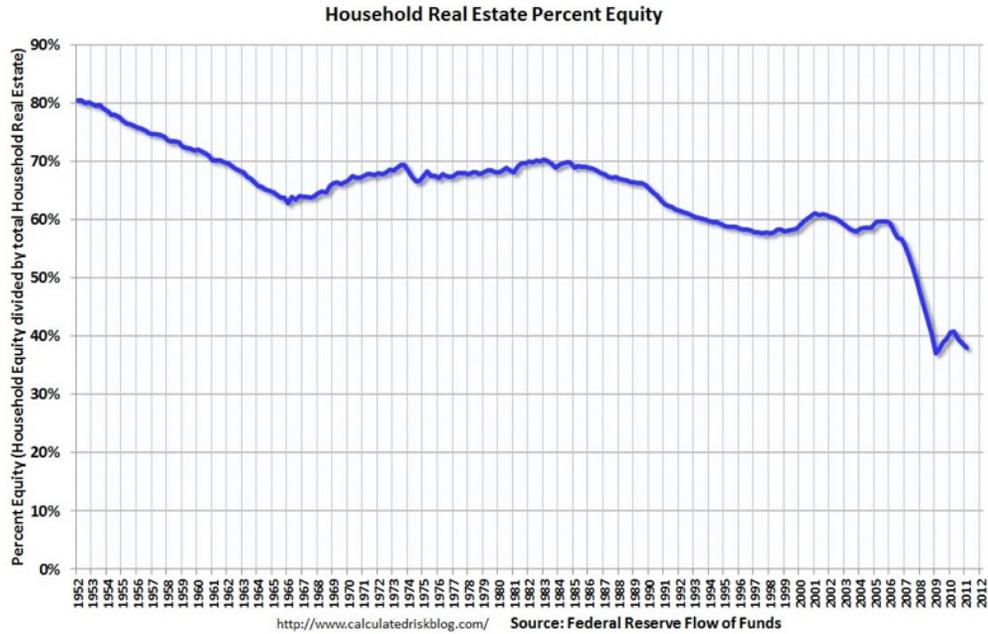
These innovations brought benefits. Notably, they allowed many younger people to buy homes. This increased demand for housing, contributing to rising housing prices. The downside of these innovations is the increased riskiness of mortgages. In most states, if a lender forecloses on a home, they can only recover the home and not the borrowers other assets:

i) Suppose that you buy a home and then its value quickly falls by 10%. If you paid 20% as a downpayment, then the value of the home is greater than the balance of the loan and there is no incentive to walk away from the debt. If the downpayment was only 5%, however, then the loan is worth more than the value of the house, and you may be tempted to walk away (this simplified example assumes that you do not care about the detrimental effects on your credit worthiness). A homeowner who owes more than the value of the home is said to be "underwater" on their loan. This type of default is known as *strategic default*. It contrasts with default which occurs when households simply lack the means to make their debt payments (as often happens when a member of the household becomes unemployed). It does appear that strategic default was a significant factor in the subsequent increase in foreclosures.

ii) If interest rates increase, then so does the payment associated with an adjustable rate mortgage. More households will be unable to make their payments and foreclosures will increase.

iii) One type of mortgage that become notorious was the NINJA loan. (No Income, No Job or Assets) The riskiness of these loans is self evident. [Note: Why some banks would ever make such loans will be discussed later in the course].

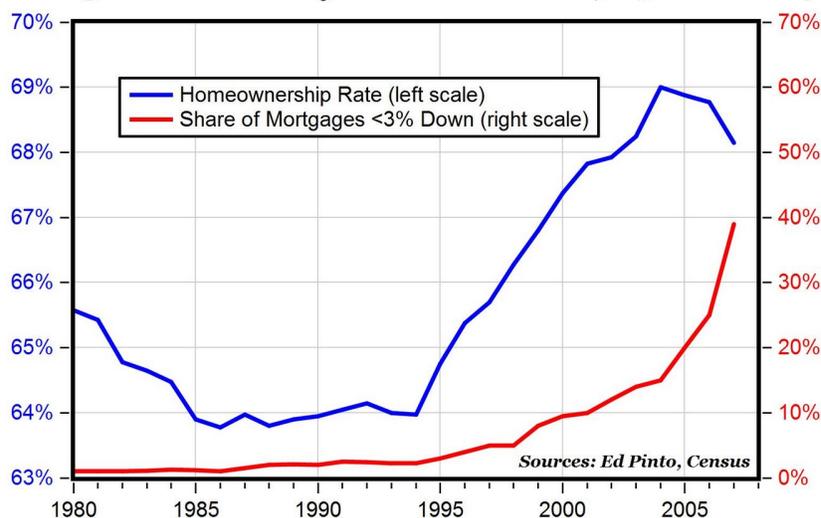
A striking feature of the housing bubble is the decline in the level of equity held by homeowners.



As downpayments became much smaller, equity declined from about 60% to near 40%. Note that increasing homeprices, all else equal, increase the equity held by homeowners. The fact that equity instead declined suggests two things. One, downpayments continued to decline. And two, many homeowners took out home equity loans, essentially borrowing against their newfound wealth, in order to buy other things such as cars, second homes, and Margarita makers.

The following graph shows two other interesting features of the bubble. First, home ownership hits an all time high of 69.2% of American adults in 2004. Second, the share of mortgages with less than 3% down rises from about 5% in 1998 to nearly 40% by 2007. In 2006, the median downpayment in the U.S. was actually 0.

Homeownership Rate vs. Share of Mortgages with 3% Down Payment or Less, 1980-2007



#3: Increasing Productivity:

Through the last part of the 1990s and the first half of the 2000s, U.S. productivity growth was high. Since this time, however, productivity growth has been largely stagnant. One possibility is that U.S. households expected strong productivity growth to continue into the future. As predicted by theory (see the Life Cycle Model from ECO 270), households sought to smooth their consumption by borrowing against future income. This led to an increase in credit and may have contributed to the housing bubble.

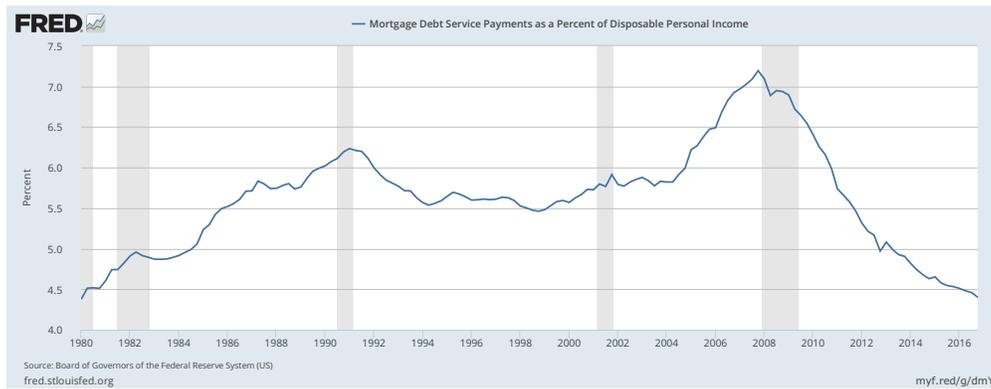
Macroeconomic Effects of the Rise in Housing Prices: Rising housing prices as part of the bubble had major macroeconomic implications. As long as prices were rising, many of these boosted consumption and output. They also, however, exposed the economy to systematic risk, setting the stage for the ensuing financial crisis and recession.

- i) The value of a home is usually a major component of household wealth. Recall that the Life-Cycle Hypothesis predicts that as real wealth increases, so does consumption and aggregate demand.
- ii) Higher home prices and real wealth also increase access to credit. During the bubble, this often took the form of households cashing out equity through a re-finance of their mortgage. Suppose, for example, that a household initially owes \$80,000 on a house worth \$100,000. The value of the home then doubles to \$200,000. A homeowner may now be able to re-finance. Instead of borrowing

\$80,000, however, they may borrow \$150,000, more than the original value of the home but less than the doubled value. The additional debt may then be used to finance consumption.

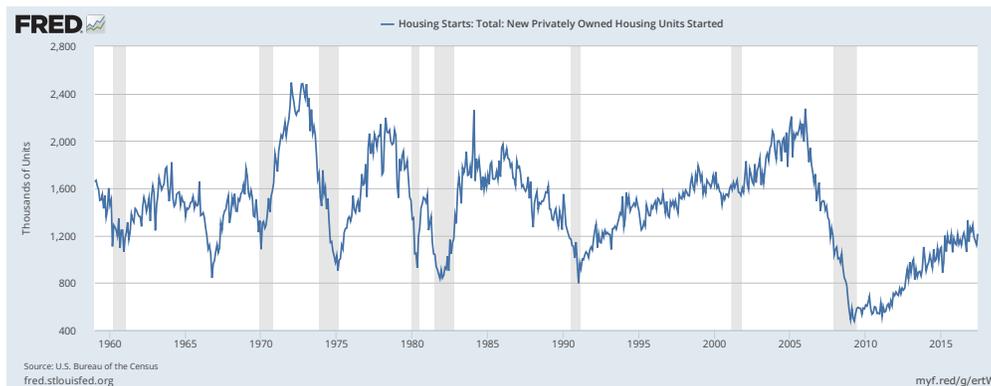
iii) If lenders come to expect additional increases in home prices, then they may increase access to credit. Suppose that the loan from ii) was a NINJA loan. If the bank expects the home to appreciate, then they may make the loan with the expectation that the household will use this type of re-financing to make their monthly payments. This is our first, and incomplete, explanation of why such high risk loans existed.

iv) The housing bubble had the effects of making households more indebted and housing more overbuilt. By 2007, household's were spending 7% of their disposable just to service (pay interest) on mortgage debt.



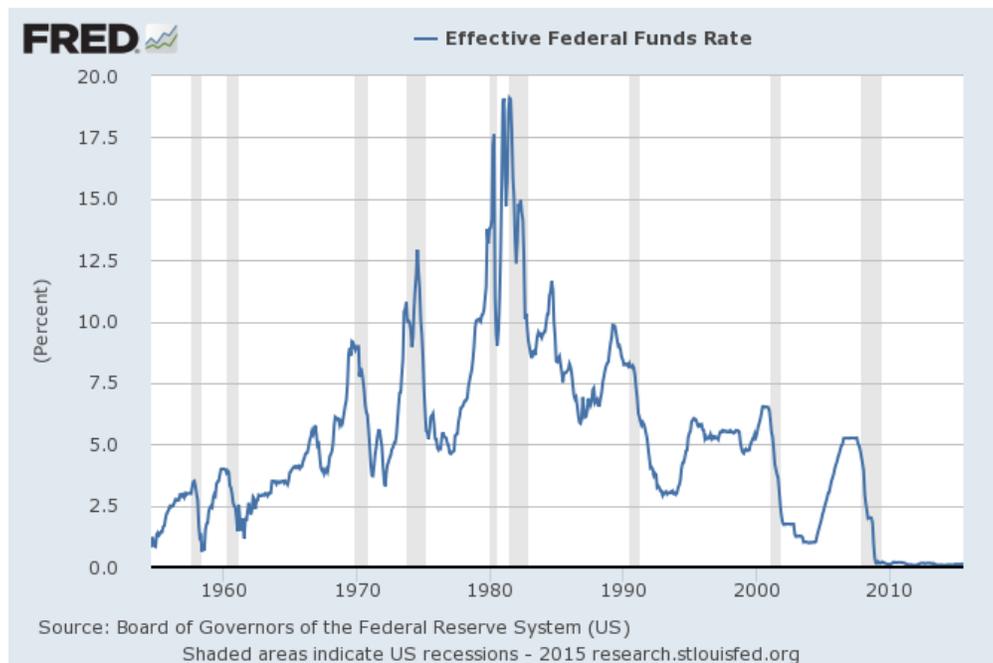
This debt increased risk throughout the economy. Households were more exposed to declines in housing prices and less able to absorb unexpected declines in income. The holders of this debt (including the Federal government and investment banks) were at risk of large scale default.

v) Rising housing prices incentivized homebuilders to build more housing.



When housing prices collapsed, there was an unprecedented drop in housing starts. This badly damaged the construction industry. As we will discuss later, declines in housing starts are possibly the best predictor of impending macroeconomic downturns.

The End of The Bubble: All speculative bubbles eventually burst. It is not entirely clear, however, why the housing bubble ended when it did. One popular explanation is that the Fed finally raised interest rates which acted as a catalyst for the inevitable decline in housing prices. Worried about inflation, the target Federal Funds Rate rose to 5.25% by 2006.



This increased the user cost of housing, driving down real estate prices. During the bubble, it was hotly debated whether higher home prices were a bubble or if they were in fact in line with their fundamental values. Another simple explanation for the bursting is that the public finally realized that it was a bubble. [Note: We will consider this issue in more detail when we look at the theory behind speculative bubbles].

Many loans offer borrowers an initial low interest rate for a fixed period (often 1, 3, or 5 years), followed by an interest rate that automatically adjusts based on market rates. In 2006 and 2007, the fixed rate on many of these loans reset to much higher rates as a result of increasing interest rates since their origination. This greatly increased mortgage payments for many borrowers and triggered an early increase in foreclosures. By 2009, interest rates had again returned to very low levels. As a result, interest rate resets were not a major cause of later foreclosures which were more because of deteriorating macroeconomic conditions and falling housing prices.

The end of the bubble reversed much of the effects resulting from higher housing prices. According to the Case-Shiller Index, housing prices bottomed out in April 2009 at around their 2003 levels. We will discuss how this led to severe recession. If the problems in the housing sector did not propagate into other areas of the economy, however, it is unlikely that the Great Recession would have been so severe. We will thus need to examine how the crisis in housing spread to the rest of the economy.

To Reinflate?

In response to the bursting of the bubble, policy makers had to decide whether or not to attempt to prop up housing prices:

i) As we will see later in the course, declines in housing construction are a major component of most business cycles. In the immediate aftermath of the bursting of the housing bubble, many policy makers felt compelled to try to reverse its effects by propping up housing prices. Most notably, the government enacted an \$8000 tax credit for first time homebuyers, a credit which expired in September 2010. This tax credit did temporarily increase the demand for housing, although existing home sales then declined sharply after its expiration. The main effect seems to be the shifting of home sales from late in 2010 (after the credit expired) to earlier in the year (when it was in effect). Economists have largely judged this policy to be a failure.

ii) Most macroeconomists believe that bubbles are temporary and that real estate prices must eventually return to their fundamental values (as suggested by the price to rent ratio). Attempts to boost real estate prices will therefore only be successful temporarily. By temporarily propping up home prices, policy makers may further distort the housing market. Many economists thus view past attempts to boost home prices as counterproductive.

Over the next few weeks, we will try to understand several deeper questions about the housing bubble:

1. In a model with reasonably rational actors, how can asset prices become significantly detached from fundamentals? It turns out that this is a very difficult question for theoretical models to answer well.
2. What fiscal, regulatory, and monetary policies share in the blame for the housing bubble?
3. How did the crisis in housing spread to the rest of the economy, resulting in a severe macroeconomic downturn?

4. Why did lenders make such risky loans when, in hindsight, it seems obvious that many borrowers would eventually default?
5. What is the empirical connection between slumps in housing and recessions?