

# Brewing Bubbles: How Mortgage Practices Intensify Housing Booms

BY LEONARD NAKAMURA

**T**he infamous housing bubble was composed of two parts: an unprecedented, decade-long surge in U.S. home prices that began in the mid-1990s, followed by an equally unprecedented fall in prices from 2007 to 2011. The bubble was a major factor in the financial crisis associated with the Great Recession. Similar housing booms and busts in the past have repeatedly led to severe financial crises in many parts of the world. Why these booms occur is not yet fully understood, but we have recently made some progress in our understanding. In particular, it appears that changes in mortgage lending practices can contribute to the strength of booms once they get started.

A feedback loop can occur when strong demand for homes creates rising home prices and those rising prices increase demand, rather than reducing it as we would normally expect higher prices to do. This paradox occurs because home price inflation tends to make it easier for more people of varying means to get mortgages, which by boosting demand in turn further increases home prices. The reverse also holds true — falling home prices generally make mortgages harder to obtain, further decreasing demand and worsening the downturn. These phenomena are called procyclical because they tend to intensify both the booms and the busts.

Studying these phenomena — and seeing whether we can moderate them — may help us learn how to promote

not only housing market stability but also general financial stability. While these procyclical movements are the normal workings of free financial markets, they may need to be constrained if we are to limit these cycles in the future.

## ROLE OF PRICE EXPECTATIONS

Asset price movements are generally hard to predict, meaning that one year's price movements usually don't tell us anything useful about what will happen the next year. But home prices are an exception. If home prices go up more than normal this year, they are likely to do the same the following year.<sup>1</sup> Suppose we ask the question: In any given quarter, how much have real stock prices gone up in the past year?<sup>2</sup> In Figure 1, we can see the four-

quarter changes in stock prices quarter by quarter as reflected in the Standard & Poor's 500 stock index and in home prices measured by the Federal Housing Finance Agency house price index, both deflated by the personal consumption expenditure deflator. For example, we can see that stock prices rose 14 percent from the end of the second quarter of 2012 to the end of the second quarter of 2013. It is obvious that U.S. home price changes are much smoother than movements in U.S. stock prices, which are quite volatile. We also see that home price movements tend to be persistently positive for a few years, while the same is rarely true for stock price movements.

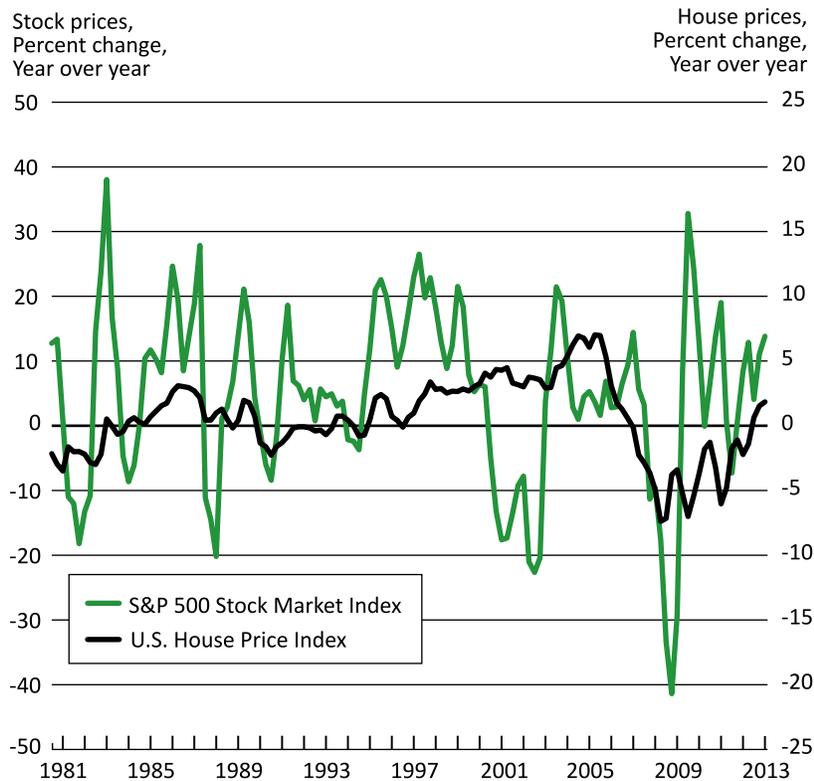
We can formalize this observation by asking what is the correlation between one year's real home price movement and the next year's. Over the past 30 years, if we take the rate of four-quarter change in the real U.S. home price for each quarter, we find that the following year's real home price percent change has a correlation of 69 percent. That is, a higher than average home price growth rate this year means that it is likely that next year there will also be a high growth rate.<sup>3</sup> The same holds true, although with a somewhat lower correlation

<sup>1</sup> For a discussion of why asset price movements are generally hard to predict, see Burton Malkiel's 2007 book. For a prescient discussion of bubbles, see Robert Shiller's 2005 book.

<sup>2</sup> By *real* stock prices, we mean prices adjusted for inflation, that is, adjusted for changes in what the stock values can purchase. Throughout this article we will use the U.S. personal consumption expenditure deflator to adjust for inflation.



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**FIGURE 1****U.S. House Prices Less Volatile Than Stock Prices**

Sources: Standard & Poor's, Federal Housing Finance Agency.  
 Note: Quarterly data reflect inflation-adjusted four-quarter change.

of 51 percent, at the state level. By contrast, the correlation for real stock prices from one year to the next is close to zero: -4 percent. Why home prices display this correlation is an important open research question.

This greater predictability of home price movements, as we shall see, tends to feed on itself because of its connection to mortgages. We shall see that a number of practices associated with mortgage lending are procyclical —

<sup>3</sup> For this calculation, we use data from the first quarter of 1980 to the second quarter of 2013. We take the growth rate of annual real house prices quarter by quarter and correlate it with the annual rate of real house prices four quarters later.

that is, they tend to reinforce housing booms and worsen the busts that follow.

Rising prices should discourage purchases because the purchase becomes more expensive. But paradoxically, rising home prices can also partially facilitate increased demand due to these procyclical aspects.

#### PROCYCLICALITY: MAKING BOOMS BIGGER

To illustrate this pattern, suppose home prices go up one year. Housing then becomes less affordable. That should dampen demand. But as we have seen, if home prices went up this year, they are likely to go up again next year. Potential homebuyers therefore may buy this year, fearing that prices

will be even higher next year. Put another way, the homebuyer hopes to gain from the expected post-purchase rise in price. That boost to demand in turn fuels a demand for credit — the homebuyer needs a mortgage, particularly if the home price is already high.<sup>4</sup>

But the fact that house prices are likely to go up next year also makes the mortgage lender more willing to supply credit. Even when the homebuyer will need to stretch to make the mortgage payments, the mortgage lender may be less concerned about the ability of the homebuyer to keep making the payments, because the collateral for the loan — the home itself — is likely to become more valuable and thus help prevent the lender from taking a loss. In a rising market, a homeowner unable to make the payments can sell the house and clear more than enough money to pay off the mortgage.

Thus, lending standards may become weaker, and those weaker standards may increase the number of potential homebuyers. Rising house prices thus help create even more demand, which may increase the tendency of the housing market to create bubbles. We will discuss below some recent empirical work that suggests that this force was at work in the years leading up to the bust, but first we will turn to another factor in mortgage making that can have a procyclical impact: The rapid pace of transactions during booms leads to more accurate and reliable home appraisals.

#### RISING PRICES, FAVORABLE APPRAISALS

Whenever money is loaned on collateral, the lender has two potential sources from which to obtain a return on the loan: repayment with inter-

<sup>4</sup> See Ronel Elul's 2006 *Business Review* article.

est from the borrower or the proceeds from the sale of the collateral if the borrower defaults. For a collateralized loan, a key question is what the collateral will sell for. If the collateral is gold jewelry at a pawn shop, the gold content of the jewelry and the current market price of gold might determine the value of the collateral. For an auto loan, the sale price or the book value of a used car might determine the value of the collateral. While for some goods the resale value may be relatively transparent, determining the value of a particular home typically requires some due diligence. A home's location and individual characteristics such as its size and condition are key determinants of its value, and thus recent sale prices for comparable homes nearby are important evidence in determining the resale value of a particular home. For a home, the value of the collateral is thus determined by the sale price of the home and by sales of similar homes nearby. In the U.S., mortgage lenders use home appraisals to determine the value of the collateral.

A home appraisal is an estimate, made by a home appraiser, of the resale value of a home for which a potential homebuyer is seeking a mortgage. The appraiser bases the estimate partly on the prices of similar homes that have been recently sold in the same area. Using recent nearby sales helps protect the lender against lending too much to a homebuyer who has overpaid for a home, which could make it harder for the lender to recoup its loss in case of default.

When many nearby homes are being sold, as occurs during a housing boom, then the appraisal will be more accurate and the resale value more certain, as it is easier for the appraiser to find recently sold homes that closely resemble the home being appraised. This abundance of recent sales will make it less likely that the appraisal will be enough out of line with the

contract price to scuttle the deal, and more likely that the mortgage lender will approve the loan. On the other hand, when the boom comes to an end, typically the number of sales slows down. As demand slips, the dearth of buyers may force sellers to lower their prices. But if cutting the price would mean losing money on their homes,

homebuyers and to ensure that mortgages were highly likely to be repaid. Indeed, delinquencies and foreclosures on such mortgages were rare. For example, according to the Mortgage Bankers Association survey, during the housing boom years of 1998 to 2006, prime fixed-rate mortgages had a severe distress rate — defined as the

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would-be sellers may instead pull their homes off the market or decide not to list them. When sales become less frequent, appraisals become less accurate, making it more likely that the mortgage lender will deny the loan. And if the sale falls through, then the next attempted sale in the neighborhood becomes more difficult, as it will have been even longer since a nearby house has been sold. Thus, appraisal accuracy facilitates a boom but worsens a slowdown.<sup>5</sup>

### CHANGING CREDIT STANDARDS

The typical mortgage loan was, for many years, the prime loan, with a fixed rate of interest and a fixed monthly payment. The borrower typically was an owner-occupier who made a 20 percent down payment and had an excellent credit score, demonstrating a history of paying debts on time. The basic requirements of this prime mortgage loan were established during the Great Depression as part of the New Deal to restore access to credit to

share of mortgages that are more than 90 days delinquent or in foreclosure — of 0.6 percent, versus 3.7 percent during the bust years of 2008 to 2012.

As we now know only too well, mortgage standards became far more relaxed during the housing boom from 1995 to 2006. Subprime mortgage loans were made to borrowers who lacked strong credit scores, fueling sales in less well-off communities, and alternative mortgage products were offered to better-off borrowers who were stretching to buy into the more expensive communities. And the result was that far too many mortgages have been foreclosed on over the past few years.

But why did lenders make these riskier loans? In large part, of course, it was because they could charge these borrowers higher rates of interest and so could make more money on them. One narrative has it that mortgage lenders didn't care about credit quality because they were able to securitize mortgages — bundling loans of varying credit quality into single securities and selling them to unwitting investors.<sup>6</sup> Another narrative is that securitization allowed institutions to earn money off instruments whose risk of default

<sup>5</sup> See my 1993 article with William Lang for the underlying economic theory and the 2007 article by McKinley Blackburn and Todd Vermilyea for empirical evidence. Home appraisals are discussed more fully in my *Business Review* article from 2010.

<sup>6</sup> See, for example, the 2009 article by Benjamin Keys and others.

was deemed likely only in rare circumstances. That is, the mortgage-backed securities would do badly only if the entire U.S. mortgage market failed, and otherwise would earn high profits.<sup>7</sup> But these securitization narratives fail to explain why banks took large losses on their own mortgage portfolios, and indeed, why bank mortgage portfolios swelled so much during the run-up. In 1995, U.S. banks and thrifts held \$755 billion in residential real estate loans (in 2009 dollars), and in 2006 they held \$1.72 trillion worth, or more than double in real terms. And between 2007 and 2012, some \$181 billion of those loans were charged off, a loss rate of roughly 10 percent.

Rather, banks and thrifts held these mortgages because they saw that during this period losses were low because house prices were continuing to rise. That is, these types of loans had been profitable in the recent past, and lenders thought these loans were likely to continue to be profitable as long as prices kept rising, or at least didn't fall.

**Creditworthiness.** Our central thesis is that favorable home price expectations, generated by previous increases in home prices, may cause lenders to be less cautious about the creditworthiness of borrowers. The reason is simple: As the collateral becomes stronger, reliance on the borrower may weaken. And as lending standards weaken, the number of potential homeowners will likely expand as those whose credit standing had previously been too weak to qualify them for loans enter the market. As the number of potential owners increases, house prices may be bid even higher, extending the price boom and fulfilling the expectation of rising prices.

We expect then to see a correla-

<sup>7</sup> See the 2009 article by Joshua Coval and others.

tion between rising house prices and falling credit standards. But which is the cause and which is the effect? Are rising house prices mainly feeding the drop in lending standards? Or is the drop in lending standards feeding the rise in home prices?

In my 2012 article with Jan Brueckner and Paul Calem, we argue that the rise in house prices has an important causal role in this process. The way we identify the direction of causation is to use the prior year's home inflation rate as a proxy for current expectations for the next year's home inflation rate. Specifically, our regressions look at whether the rate of home inflation four quarters ago predicted a decline in credit scores in the current period.<sup>8</sup> Because the inflation occurred four quarters ago, it seems unlikely to have been caused by the current decline in credit standards.

We examine quarterly house price

## Are rising house prices mainly feeding the drop in lending standards? Or is the drop in lending standards feeding the rise in home prices?

inflation data at the state level from 2001 to 2008. We then take state-by-state credit scores for those people who obtained new mortgages, dividing these new mortgagors into first-time homebuyers, repeat homebuyers (those who had a previous mortgage), investors (those with more than two mortgages), and refinancers. We measure credit scores using data from the Federal Reserve Bank of New York/Equifax Consumer Credit Panel database, and we use the state mean, the 25<sup>th</sup> percentile, and the 10<sup>th</sup> percentile

<sup>8</sup> Credit scores are numerical measures of creditworthiness based on the borrower's history of timely repayment of debts. Lenders typically use credit scores as one element in their decisions to offer credit to a borrower.

of credit scores so that we examine a broad profile of credit scores.<sup>9</sup> It is useful to examine the weaker credit scores as well as the mean to see whether the minimum credit score necessary for a mortgage is falling as well as the average credit score. For all four groups, and for all three measures, we find that past home inflation rates led to reductions in credit scores. Thus, the pool of borrowers whom lenders considered eligible for loans was widening in response to rising home prices.<sup>10</sup>

### Alternative mortgage products.

As people pay higher and higher prices for homes, some borrowers may find it difficult to make their mortgage payments out of their current income. One way to make a house more affordable is to switch to an alternative "back-loaded" mortgage that has lower payments in the early years of the loan and higher payments later. U.S. borrowers with this type of mortgage pay

only the interest due for the first five or 10 years, compressing the timeframe for paying off the principal and making later payments higher.

The average 30-year fixed-rate mortgage had an interest rate of 6.1 percent from 2003 to 2006, whereas the average adjustable-rate mortgage had an interest rate of 5 percent. Thus, a \$200,000 mortgage might have had

<sup>9</sup> The 25<sup>th</sup> percentile represents the highest credit score of the lowest quarter of new mortgage borrowers in the state that year; the 10<sup>th</sup> percentile represents the highest score of the lowest tenth of new mortgage borrowers.

<sup>10</sup> Qualitatively similar results showing that house price inflation accompanies declines in credit standards can be found in 2012 articles by Giovanni Dell'Arricia and others and by William Goetzmann and others.

an interest payment of \$12,200 per year under a fixed-rate mortgage and \$10,000 under the adjustable-rate mortgage. On top of that, the mortgage borrower would pay an additional \$2,300 in the first year toward paying down principal, a process called amortization. Thus, for a standard 30-year fixed-rate mortgage, a borrower would be paying about \$14,500 per year. By contrast, with an interest-only adjustable-rate mortgage, the borrower might be able to pay \$3,000 or \$4,000 less annually, depending on the premium the borrower is charged for the interest-only feature. Borrowers who find themselves paying more for a home than they had hoped in a hot real estate market may be tempted to go for the interest-only mortgage to make the payments affordable, hoping that their earnings will rise, or that they can refinance, before the five- or 10-year grace period is up.

In my 2013 working paper with Brueckner and Calem, we show that expectations of increased home prices led to more widespread use of back-loaded mortgages, including interest-only adjustable rate mortgages (IO ARMs) and so-called option ARMs, which permitted *negative* amortization, allowing borrowers to pay even less for a few years.<sup>11</sup>

When home prices turned downward, the rate of default and delinquency turned out to be very high. We show that default rates on these back-loaded mortgages were unusually high, even after accounting for factors such as unemployment rates, house price changes, and the like. This higher default rate is not surprising, in that these products catered to home purchasers who were stretching to be able to afford

their homes and thus would be most vulnerable to an economic downturn. Moreover, as we shall explore further below, some of those who took advantage of the low payment requirements of these loans were likely investors who had bought the homes only in the hopes of further price increases and who walked away from the mortgages when house prices fell.

Finally, we show that, unlike subprime mortgages, many of these back-loaded mortgages were retained on banks' balance sheets. And the default rates of these back-loaded mortgages were in most cases worse than those for securitized mortgages. Thus, for this class of mortgages, it does not appear that lenders sold off the worst mortgages. Rather, they ate their own

percent, scarcely different from 2000 or 2001, before these lower-quality mortgages had become prevalent. But by 2009, the rate had risen 7 percentage points to 9.2 percent. Moreover, notice that the distress rate of adjustable-rate prime mortgages had risen 16 percentage points, while that of fixed-rate prime mortgages had risen 4 percentage points. Severely distressed subprime mortgages overall had risen 23 percentage points.<sup>12</sup> Thus, it is evident that lowered credit standards, as reflected in the widespread use of adjustable-rate and subprime mortgages, were a preponderant factor in the extremely high distress rates of mortgages. This also suggests that requiring lenders to keep some of the mortgages they originate on their own books

**It is evident that lowered credit standards were a preponderant factor in the extremely high distress rates of mortgages.**

cooking. This behavior strongly suggests that lenders believed that these mortgages would be reasonably profitable, although this turned out not to be the case.

We can see in Table 1 that from 2003 to 2006, mortgages of lower credit quality — subprime and alt-A — ballooned from 10 percent of all mortgages originated to 39 percent. We can also see that from 2004 to 2006, IO ARMs and option ARMs similarly ballooned from 8 percent to 25 percent of all mortgages originated. These adjustable-rate mortgages were sometimes subprime and alt-A, and sometimes prime.

The outcomes can be seen in Table 2, which depicts severely distressed mortgages — those in foreclosure or with payments three months or more overdue. In 2006, when these mortgages were being made, the overall rate of severely distressed mortgages was 2.2

rather than sell them into the securitization market — so lenders bear more of the risk of their lending decisions — may not be sufficient to prevent risky mortgage lending in a boom. Limiting the use of alternative mortgages may also need to be considered.

Finally, these risky mortgages have now effectively disappeared from the mortgage market. They expanded demand during the boom, but now they are rarer than in 2000, well before the worst of the house price boom. This has contracted the potential demand for homes, contributing to the steepness of the decline in home prices.

**Flippers.** Buy low; sell high. That is the basic hope of any investor, in any market. Normally, invest-

<sup>11</sup> Similar results are found in the 2012 article by Michael LaCour-Little and Jing Yang. For a complementary point of view on back-loaded mortgages, see the 2012 working paper by Gadi Barlevy and Jonas Fisher.

<sup>12</sup> In this survey, respondents are asked to classify mortgages into prime and subprime; it is generally believed that alt-A mortgages are primarily classified as subprime.

**TABLE 1**
**First Lien Mortgage Originations During Housing Boom**

|      | Mortgages by Major Type       |          |       |              |            |       | IO ARMs* | Option ARMs* |
|------|-------------------------------|----------|-------|--------------|------------|-------|----------|--------------|
|      | Total, in billions of dollars | Subprime | Alt-A | Agency prime | Government | Jumbo |          |              |
| 2003 | \$3,725                       | \$310    | \$85  | \$2,460      | \$220      | \$650 | NA       | NA           |
| 2004 | 2,590                         | 540      | 190   | 1,210        | 135        | 515   | 55       | 145          |
| 2005 | 2,755                         | 625      | 380   | 1,090        | 90         | 570   | 418      | 238          |
| 2006 | 2,550                         | 600      | 400   | 990          | 80         | 480   | 387      | 255          |
| 2007 | 2,081                         | 191      | 275   | 1,151        | 116        | 348   | 295      | 111          |
| 2008 | 1,384                         | 23       | 42    | 928          | 293        | 98    | 76       | 8            |
| 2009 | 1,759                         | 4        | 6     | 1,201        | 451        | 97    | 8        | 0            |
| 2010 | 1,581                         | 4        | 4     | 1,092        | 377        | 104   | 9        | 0            |
| 2011 | 1,420                         | 4        | 4     | 948          | 294        | 170   | 0        | 0            |
| 2012 | 1,861                         | 4        | 4     | 1,270        | 380        | 203   | 0        | 0            |
|      | Percent of total              |          |       |              |            |       |          |              |
| 2003 | 100%                          | 8%       | 2%    | 66%          | 6%         | 17%   | NA       | NA           |
| 2004 | 100                           | 21       | 7     | 47           | 5          | 20    | 2        | 6            |
| 2005 | 100                           | 23       | 14    | 40           | 3          | 21    | 15       | 9            |
| 2006 | 100                           | 23       | 16    | 39           | 3          | 19    | 15       | 10           |
| 2007 | 100                           | 9        | 13    | 55           | 6          | 17    | 14       | 5            |
| 2008 | 100                           | 2        | 3     | 67           | 21         | 7     | 5        | 1            |
| 2009 | 100                           | 0        | 0     | 68           | 26         | 6     | 0        | 0            |
| 2010 | 100                           | 0        | 0     | 69           | 24         | 7     | 1        | 0            |
| 2011 | 100                           | 0        | 0     | 67           | 21         | 12    | 0        | 0            |
| 2012 | 100                           | 0        | 0     | 68           | 20         | 11    | 0        | 0            |

Source: Inside Mortgage Finance, 2013.

Notes:

**Subprime:** For borrowers with low credit scores.

**Alt-A:** For those who fail to qualify for prime mortgages but have high credit scores.

**Agency prime:** Originated, guaranteed, and securitized by the government-sponsored enterprises Fannie Mae and Freddie Mac.

**Government:** Guaranteed by the Federal Housing Administration or Department of Veteran Affairs.

**Jumbo:** Too large to be securitized by Fannie Mae or Freddie Mac.

**IO ARMs:** Interest-only adjustable rate.

**Option ARMs:** Adjustable rates plus the option of minimum payments that do not cover even the interest owed.

\*Figures for IO and option ARMs are also included within the results listed for subprime, alt-A, agency prime, and jumbo mortgages.

tors hope to identify assets that are for sale for less than they are intrinsically worth, buy them, and then sell them as other buyers come to see their intrinsic worth. For example, during the housing bust, many homes came

to be sold at very low prices, and real estate groups invested in these homes, hoping to rent them for a time and later sell them at higher prices. These professional investors help to stabilize markets, particularly in times of crisis.

These investors often do not require mortgages and instead pay cash. They can be identified in large part because they buy properties that are cheap relative to the rest of the home market. They will frequently buy from so-

**TABLE 2****Percent of Mortgages That Became Severely Distressed**

|                    | All Mortgages | All Prime | Prime Fixed Rate | Prime Adjustable Rate | All Subprime | Subprime Fixed Rate | Subprime Adjustable Rate | FHA | VA  |
|--------------------|---------------|-----------|------------------|-----------------------|--------------|---------------------|--------------------------|-----|-----|
| 1998               | 1.8           | 0.9       | 0.7              | 1.5                   | 5.7          | 5.3                 | 5.8                      | 3.8 | 3.2 |
| 1999               | 1.8           | 0.7       | 0.5              | 1.1                   | 7.6          | 7.4                 | 7.8                      | 3.5 | 2.9 |
| 2000               | 1.8           | 0.6       | 0.5              | 1.1                   | 8.9          | 9.3                 | 8.7                      | 3.5 | 2.5 |
| 2001               | 2.3           | 0.8       | 0.7              | 1.4                   | 11.9         | 12.7                | 11.0                     | 4.4 | 2.9 |
| 2002               | 2.3           | 0.8       | 0.7              | 1.3                   | 11.4         | 11.7                | 10.6                     | 5.2 | 3.2 |
| 2003               | 2.1           | 0.9       | 0.7              | 1.2                   | 8.3          | 8.1                 | 8.2                      | 5.7 | 3.4 |
| 2004               | 2.0           | 0.8       | 0.7              | 0.8                   | 6.5          | 7.4                 | 5.8                      | 5.5 | 3.1 |
| 2005               | 2.0           | 0.8       | 0.8              | 0.8                   | 6.3          | 6.2                 | 5.9                      | 5.9 | 2.8 |
| 2006               | 2.2           | 0.8       | 0.7              | 1.4                   | 7.7          | 6.0                 | 9.0                      | 5.5 | 2.5 |
| 2007               | 3.5           | 1.6       | 1.0              | 4.0                   | 14.1         | 8.1                 | 20.1                     | 5.7 | 2.7 |
| 2008               | 6.1           | 3.6       | 2.1              | 9.9                   | 22.4         | 13.1                | 33.0                     | 6.5 | 3.9 |
| 2009               | 9.2           | 6.7       | 4.7              | 17.3                  | 29.2         | 20.9                | 41.2                     | 8.9 | 5.1 |
| 2010               | 8.3           | 6.0       | 4.4              | 16.5                  | 26.2         | 19.8                | 37.4                     | 8.1 | 4.6 |
| 2011               | 7.5           | 5.2       | 4.0              | 13.5                  | 23.8         | 18.8                | 33.8                     | 8.6 | 4.6 |
| 2012               | 6.6           | 4.3       | 3.4              | 10.5                  | 21.3         | 17.6                | 30.1                     | 8.3 | 4.3 |
| Average 1998-2006  | 2.0           | 0.8       | 0.6              | 1.2                   | 8.2          | 8.2                 | 8.1                      | 4.8 | 2.9 |
| Average 2008-2012* | 7.5           | 5.1       | 3.7              | 13.5                  | 24.6         | 18.0                | 35.1                     | 8.1 | 4.5 |

Source: Mortgage Bankers Association, via Haver Analytics.

Note: Severely distressed mortgages are those 90 days or more past due or in foreclosure.

\*Averages were calculated without factoring in 2007, largely a transition year between boom and bust.

called motivated sellers, such as homeowners who have to move because they have taken jobs beyond commuting distance from their current homes or from a bank that has foreclosed on a property.

However, because home price increases tend to be predictable, unsophisticated home investors may also come in who believe that home prices will continue to rise. If you live in a hot real estate market in a home worth, say, \$200,000, and suddenly you find that comparable homes nearby are worth \$300,000, you may think to yourself that your home has earned

more money than you did by working. Since you now have \$100,000 in unexpected home equity, you may decide to borrow against it to buy an additional house or two, planning to make some minor improvements and sell them in a year or two. If home prices are rising rapidly enough, you can make a profit even if you bought houses that were not especially intrinsically cheap. Of course, you will borrow as much as you can to limit your cash outlay, to stretch your home equity. If home prices fall, you may quickly walk away from the homes, mortgages and all.

This type of investment is particu-

larly pernicious to the housing market because the homes often remain unoccupied, since the buyer is not a professional real estate investor and has no easy way to rent them out. These types of purchases exaggerate the apparent demand for homes, and thus the market appears to have a more unequal balance between supply and demand, which also tends to prolong the boom and drive prices higher.

A 2011 working paper by Andrew Haughwout and his coauthors at the New York Fed showed that this type of investor became surprisingly prevalent in the later years of the housing

boom. They estimate that in the states hit hardest by the bubble — Arizona, California, Florida, and Nevada — as much as 20 percent of all home purchases were made by borrowers who already had two or more mortgaged homes. Patrick Bayer and others, in a careful study of investors in Los Angeles County during the housing boom, are able to show that there were two types of investors — those who bought houses relatively cheaply and those who bought houses more or less at the market rate. The latter tended to come into the market as house price inflation increased, earned rates of return no different from others in the market, and were statistically associated with price instability in their markets.

### **BOOMS, BUSTS, AND CRISES**

We have seen in recent years repeated financial crises associated with housing booms and busts in the United States, Europe, and Asia. Carmen Reinhart and Kenneth Rogoff (2009) present evidence that the most intractable recessions have been associated with financial crises related to housing booms and busts. They note that the five worst financial crises post-World War II and before the latest world crisis — Spain in 1977, Norway in 1987, Finland and Sweden in 1991, and Japan in 1992 — all coincided with very large housing booms and busts.

They point out that a “massive run-up in housing prices usually precedes a financial crisis” (p. 217). This perspective suggests that reducing housing booms and busts might well reduce the magnitude of ensuing financial crises and recessions.

Indeed, around the world, regulators have stepped up efforts to contain housing booms. In a July 2013 article in the *Wall Street Journal*, David Wessel and Alex Frangos examine efforts in South Korea, Israel, and Canada to use housing regulations to slow housing booms. For example, the South Korean government and central bank have required homebuyers in certain neighborhoods to come up with down payments as high as 50 percent and limited the ratio of mortgage payments to income. To discourage investors, they have imposed high taxes on sales by people who own more than one home. In Canada, government-insured mortgage loans have to be paid off in 25 years instead of 30, raising the required monthly payment. Those efforts have succeeded, at least as of this writing, in slowing home price booms. But in Israel, Wessel and Frangos report, despite higher down payment requirements, home prices continue to rise at double-digit rates.

At the same time, we should recognize that government regulation may be part of the problem as well. The U.S. government has a long history of

support for homeownership, and ironically, this support may have contributed to problems in the housing market. See Wenli Li and Fang Yang's 2010 article for a discussion of government support for homeownership.

### **FINANCIAL STABILITY AND PROCYCLICALITY**

A key question, then, for financial stability is whether we can tone down housing booms and busts by moderating the procyclical impact of appraisals, credit standards, and alternative mortgage instruments. Our research has not yet reached the stage of showing us how to optimally moderate housing booms and busts. But we have identified some mechanisms that appear to make boom and bust cycles greater and therefore more dangerous to financial stability. They may point the way toward strategies for moderating these cycles. Indeed, as we have seen, regulators and central banks around the world are already taking steps in hopes of moderating these cycles.

Preserving financial stability may require a tradeoff between allowing the mortgage market to adapt freely to changes in demand and ensuring a stable housing market through greater regulation of mortgages and appraisals. But precisely where that balance lies is beyond our current understanding and deserves further study. 

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