

Preventing House Price Bubbles Lessons from the 2006–2012 Bust



JAMES R. FOLLAIN AND SETH H. GIERTZ

Preventing House Price Bubbles: Lessons from the 2006–2012 Bust

James R. Follain and Seth H. Giertz

Policy Focus Report Series

The policy focus report series is published by the Lincoln Institute of Land Policy to address timely public policy issues relating to land use, land markets, and property taxation. Each report is designed to bridge the gap between theory and practice by combining research findings, case studies, and contributions from scholars in a variety of academic disciplines and from professional practitioners, local officials, and citizens in diverse communities.

About This Report

While the fallout from the recent house price bubble and bust was widespread, local market conditions played an important role in how the crisis played out. In particular, new cost drivers—including the pace of appreciation, the amount of subprime lending, and the size of the distressed real estate inventory—fundamentally altered housing market dynamics in the hardest-hit metropolitan areas.

This report examines the results of extensive econometric research exploring the interrelationships of local house price patterns and their drivers and applies them to two timely policies—the Home Affordable Modification Program (HAMP), launched in mid-crisis in an effort to stem the flood of foreclosures; and countercyclical capital buffers, currently under debate as an option for limiting the formation of bubbles in the future. In the case of HAMP, several design improvements would have improved the early effectiveness of the program, including the targeting of specific housing markets. In the case of countercyclical capital buffers, this same focus on individual markets would allow regulators to selectively raise capital requirements for financial institutions during the initial stages of a price bubble and reduce them during the period of decline. Although difficult to implement, this approach would potentially ensure against another bubble bust of the magnitude just experienced.

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Executive Summary



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In hard-hit Las Vegas, Nevada, prospective buyers join bus tours of foreclosed properties.

An enormous literature has emerged that attempts to explain the many different causes and effects of the recent housing market boom and bust. The usual suspects in these investigations include subprime mortgage lending, irrational expectations by homebuyers and lenders, the complex securitization process, government policies to promote affordable lending, measures that foster institutions that are “too big to fail” and, of course, the eternal villain in many economic debacles: greed.

The boom and bust, however, varied greatly across housing markets, which

suggests that local conditions also played an important role in determining how the crisis played out. This report relates the results of recent econometric research that reveal the sharp differences in house price patterns, their drivers, and the fallout from the crisis across markets. While some of the traditional drivers of house prices such as rents, vacancy rates, and employment were still important, the strength of the relationships varied over the bubble-and-bust period and across housing markets. During the bust, new drivers included the size of the distressed real estate inventory, the pace of price appreciation in the first half of the decade, and the amount



of subprime lending just prior to the bust. Indeed, across metropolitan areas, the larger the volume of subprime lending and the larger the increases in prices prior to the bust, the larger the house price declines that were to follow.

These changes made policymaking in mid-crisis especially challenging. Design of the Home Affordable Modification Program (HAMP) is a case in point. This program was developed in 2007 just as the destructive effects of the crisis began to appear. The fallout was a byproduct of the speed and depth of house price declines, coupled with other factors such as the trend toward low down payments. Traditional tools for measuring and managing the crisis were insufficient. The design of HAMP thus rested upon a number of critical judgments about borrower and lender behavior made without benefit of strong empirical support. While doing the best they could at the time and with the information available, program designers needed more and better resources to combat the extraordinary surge in foreclosures.

This report discusses how econometric results could be used to signal and potentially prevent—or at least mitigate—future house price bubbles. Analysts often mention two specific options for preventing another crisis of the magnitude just experienced: monetary policy and countercyclical capital policies. But monetary policy is of limited use in this arena, given that price appreciation varies so widely across local markets. In contrast, countercyclical capital policies are a more promising direction because they could be tailored to specific housing markets, putting on the brakes where price bubbles appear to be developing without stalling healthy price growth in other areas.

Accurately capturing local market conditions and identifying their roots, however, remains a great challenge. A broader recognition of the importance of local market conditions would be a step in the right direction. We are in the midst of a data revolution that will ultimately enable us to measure house price trends at highly granular levels. For example, while not available early in the housing market crisis, house price data at the zip code level and below are now commonplace. Critical measures of the distressed real estate inventory have also become widely available. New information sources provide opportunities that make it more possible to address the wide variation in local market conditions. Using these data wisely, we can do a better job of predicting and heading off future house price bubbles.

Its owners long absent, a boarded-up home is left to deteriorate.



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CHAPTER 1

Fallout from the House Price Collapse



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Under-maintenance is the first sign of abandonment of this Maryland home.

Until the 2000s, house price booms and busts were regional phenomena; while harmful, they had limited spillover effects on the broader economy. Because people generally believed that large-scale declines in house prices had never occurred, some believed they never would (see box 1). This is the phenomenon that Nassim Taleb (2007) terms Black Swan Blindness, arguing that we often discount or ignore low-probability events and that these events, while rare, have major consequences.

When examining periods of history that do not include black swans, researchers can be fooled into believing that events have zero probability when in fact they have a low, but

positive, probability. Applying Taleb's framework, it is clear that we could have done a much better job of averting the recent housing price bubble-and-bust cycle had we paid more attention to key assumptions underlying capital policies for residential mortgages—policies built upon limited empirical evidence that, when proven incorrect, led to severe negative outcomes (see Follain [forthcoming]).

SEVERITY OF THE CYCLE

The recent housing market cycle had several unique underlying characteristics, but the magnitude of the price swings is perhaps the most striking. The S&P/Case-Shiller U.S. house price index surged 89 percent

The Myth and Reality about Housing Prices

Before 2006, the general public widely believed that (a) house prices would never undergo precipitous declines, and, (b) over the longer term, house prices would always trend upward. Because of the lack of good data, it is impossible to know for sure whether history supports these notions. But using data pieced together from various sources, Robert Shiller (2009 and updated at www.irrational-exuberance.com) developed a house price index that sheds light on this question.

Shiller's index shows a downward trend in real (inflation-adjusted) house prices from the 1890s through 1920 but, until just recently, no sustained declines after 1920 (figure 1). The data for the 85 or so years leading up to the 2006 peak thus support the belief that national house prices never undergo prolonged and substantial declines and, since World War II, this appears true even when accounting for inflation. This record may have led many to believe that housing is a safe investment and likely to hold its value.

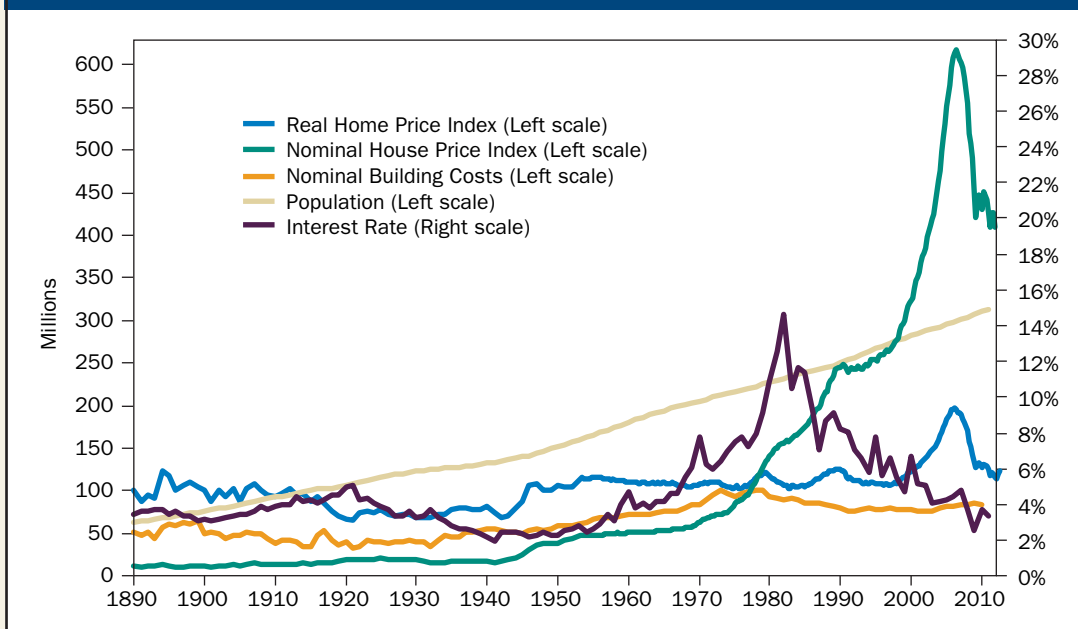
It is also true, by Shiller's measure, that real housing prices trended upward, climbing 92 percent in real terms from 1890 to 2006. But this was not a steady uptick. Indeed, the entire increase was concentrated in two brief periods: from 1942 to 1947, when the index rose by 60 percent; and

from 1997 to 2006, when the index soared by 80 percent. In other periods, real prices were stagnant or declining.

The picture is quite different for nominal house prices, which make no adjustment for the overall rate of inflation but do affect perceptions of investment returns. The nominal price index trended upward for more than 100 years with only modest drops until the Great Recession. Thus, history does suggest that, even if housing was not always a great investment as measured by real returns, it appeared safe in that its value rarely declined by more than the inflation rate. To be sure, there were historical episodes in which house prices fell in both real and nominal terms in selected regions, but there were no instances of a prolonged decline in nominal prices for the entire nation.

To the extent that this common belief fueled the house price bubble, it likely resulted from extrapolations of very recent history or particular housing markets. Beginning around 1997, both nominal and real house prices rose at an unprecedented rate. However, even if house prices did trend upward in nominal terms, this still provides a very misleading measure of the risk associated with housing investments, given that individuals do not invest in a national aggregate.

FIGURE 1
Shiller U.S. House Price Index and Traditional Drivers of House Prices



Note: Reproduced from Shiller, with the addition of the real home price index.

Source: Shiller, (2009), updated at www.irrational-exuberance.com

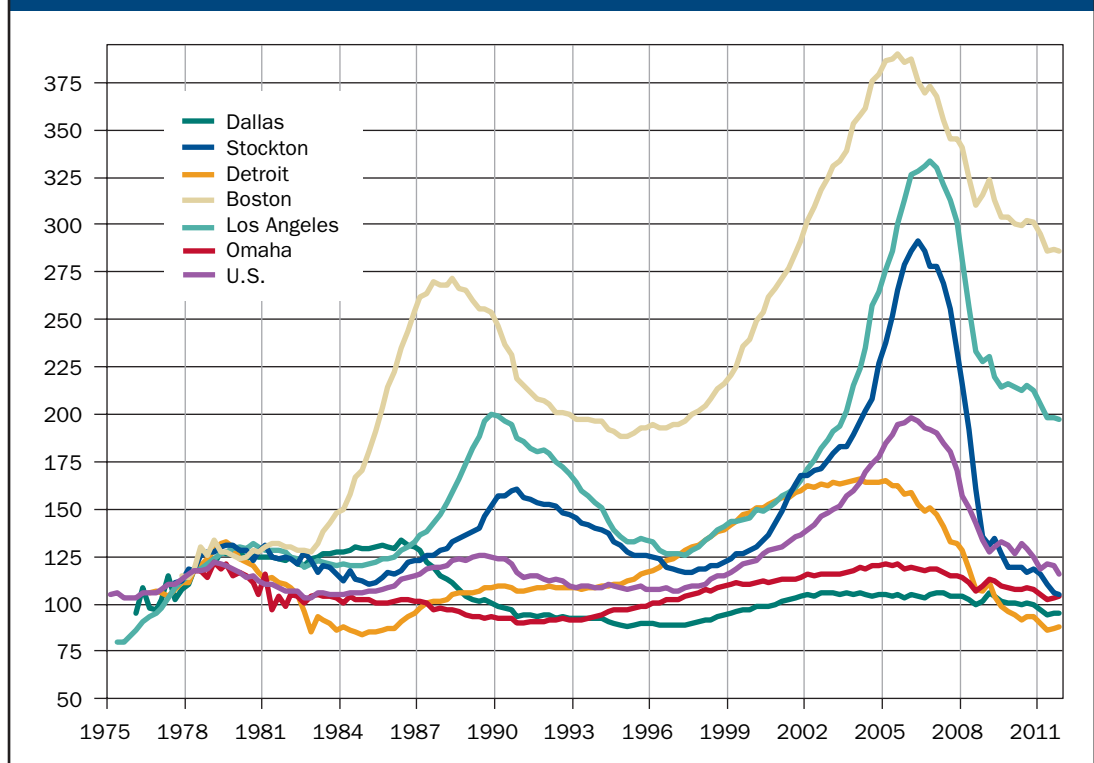
in nominal terms between 2000 and the mid-2006 peak and then plunged 34 percent through the end of 2011. Even so, the national price remained 26 percent above its 2000 value. Adjusting for inflation makes the bubble and bust more symmetrical since overall inflation was substantially higher during the boom years. In real terms, house prices climbed 59 percent between 2000 and the middle of 2006, before dropping 41 percent. By this measure, the real national house price at the end of 2011 was 6 percent lower than in 2000 (figure 2).

As dramatic as these national changes are, they mask enormous variation in price movements across local housing markets (figure 3). During the recent bubble and bust, four of the five metropolitan areas experiencing the steepest declines were in

noncoastal areas of California; the fifth was Las Vegas, where nominal house prices plummeted 58 percent between 2006 and 2012. Even without adjusting for inflation, house prices in these areas were lower in 2012 than at the start of the decade. Prices in the five metros that performed the best (or the least poorly) were higher in 2012 than in 2000, and even than in 2006.

Within specific metropolitan areas, the low-priced segment of the market was particularly hard hit (figure 4). The S&P/Case-Shiller house price index shows that the disparities in price movements between the top and bottom tiers of the housing market were particularly large in Atlanta, Boston, New York City, and Washington, DC. In each of those four areas, nominal house prices in the low tier fell more than

FIGURE 2
Real House Price Indices for Selected MSAs

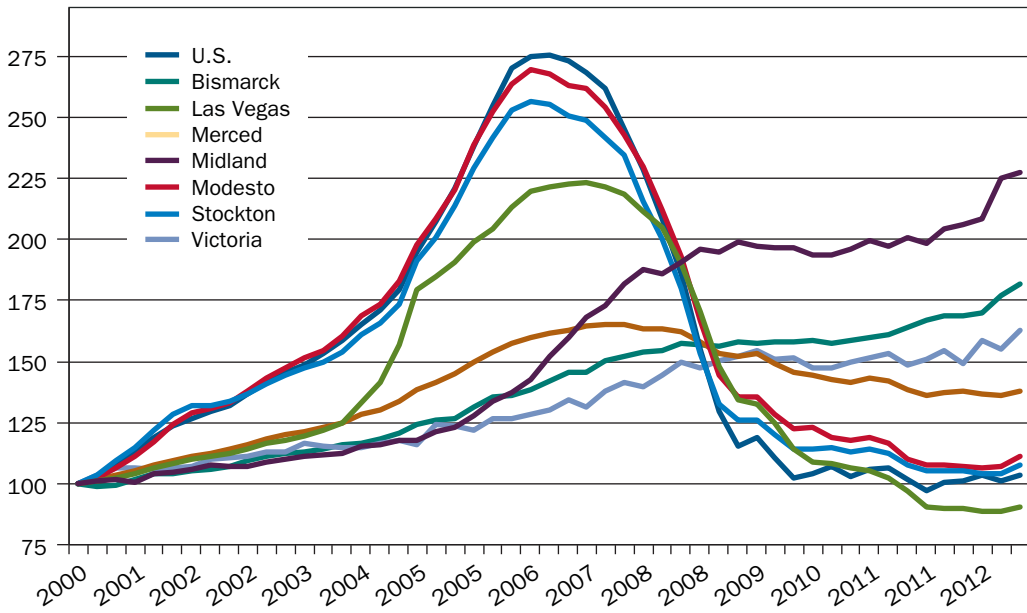


Note: House price indices are normalized to the U.S. value in 1978.

Sources: Shiller (2009); updates from www.irrationalexuberance.com and FHFA All-Transactions Indexes (www.fhfa.gov/Default.aspx?Page=87).

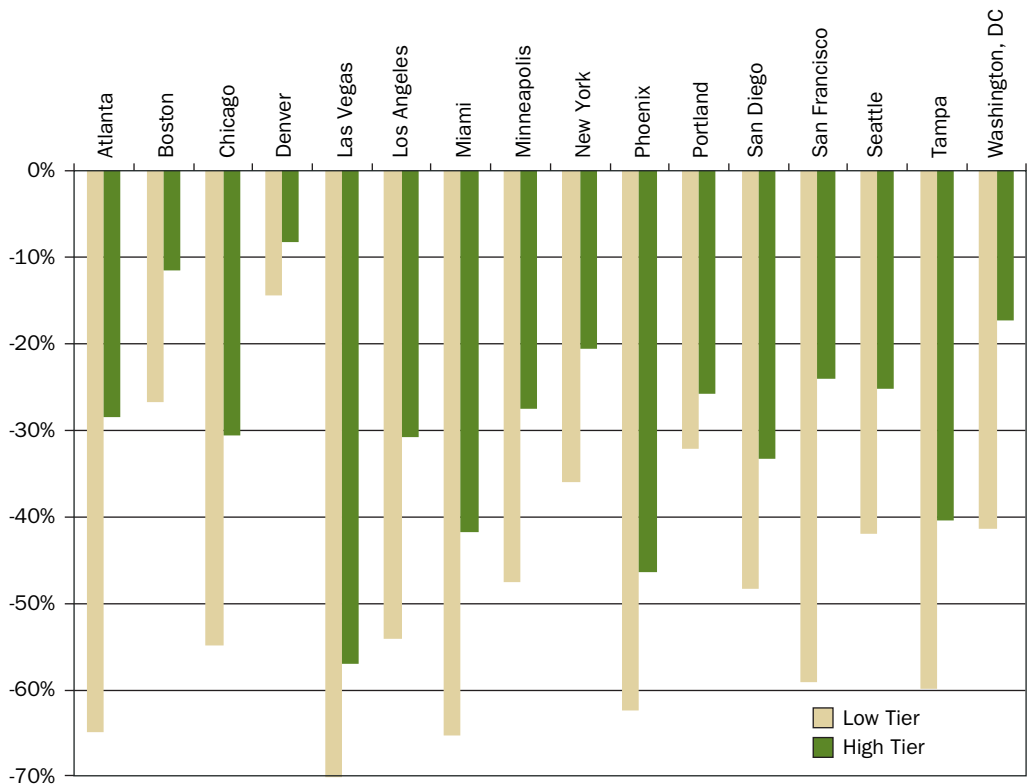


FIGURE 3
Normalized House Price Indices for Metros at the Extremes of the Distribution



Note: House price indices are normalized to U.S. value in 2000:1.
Source: FHFA All-Transactions Indexes (www.fhfa.gov/Default.aspx?Page=87).

FIGURE 4
Peak-to-Trough House Price Declines by Price Tier



Source: S&P/Case-Shiller home price index (2012:4).



The housing market bust put an end to construction of this luxury resort in Idaho.

40 percent from peaks. It is noteworthy that these metros are outside the “sand states” of Arizona, California, Florida, and Nevada that have been the focus of so much attention in the aftermath of the housing bust.

THE SPREAD OF DISTRESSED LOANS

Another key characteristic of the recent housing market crisis is the extraordinary increase in the volume of distressed real estate. Follain, Miller, and Sklarz (2012) discuss a variety of definitions or stages of distress. Stage one refers to homes for which the outstanding mortgage exceeds the market value of the property by a significant amount, say, 5 percent or more. These are often described as underwater mortgages or properties with negative equity and can include borrowers who are current on their mortgage payments as well as those who are delinquent.

Stage two includes properties on which the borrower is seriously delinquent (90

days or more) and the lender has begun the foreclosure process. This process ends with a completed foreclosure sale by the lender. The third stage consists of properties obtained by the lender that sit in foreclosure or REO (real estate owned) inventory until sold back into the private market. Measures of each of these stages are used to capture the spread of distressed loans during the recent crisis.

Between 2000 and 2009, the number of foreclosures rose at a pace well beyond what was normal in the previous 40 years. Since the bust, both academics and the media have commonly used the sand states (so named because of the dominance of beaches and deserts in these areas) to typify the hardest-hit markets because they experienced some of the highest rates of home price appreciation before the crisis, followed by the sharpest downturns. The number of foreclosures in these four states increased dramatically between 2000 and 2009. For example, they increased from just over

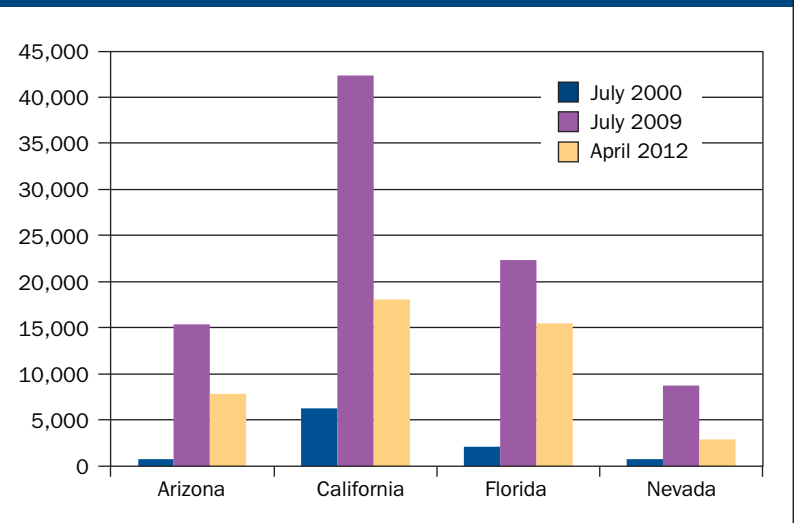
6,000 in July 2000 to over 42,000 in July 2009 in California. While down from their peaks, foreclosures in 2012 were still well above 2000 levels in all of these states (figure 5). Similarly, the size of the REO inventory in these states rose dramatically between 2000 and 2009; however, the size of the REO foreclosure inventory in the sand states changed little between 2009 and 2012—and in fact increased in Arizona and Florida (figure 6).

But the damage was hardly limited to the sand states. The size of the inventory of properties with negative equity is used to make this point. For example, in parts of Nassau County, a relatively affluent county just east of New York City, the number of single-family residential properties with at least 5 percent negative equity (i.e., the value of the home is at least 5 percent lower than the outstanding mortgage debt) exceeded 30 percent of the single-family stock in 2012 (see Follain 2012c and figure 7). The fallout from the housing market collapse thus varied widely not only across states and metros, but also within metropolitan areas.

DISPARITY IN LOCAL MARKET RECOVERIES

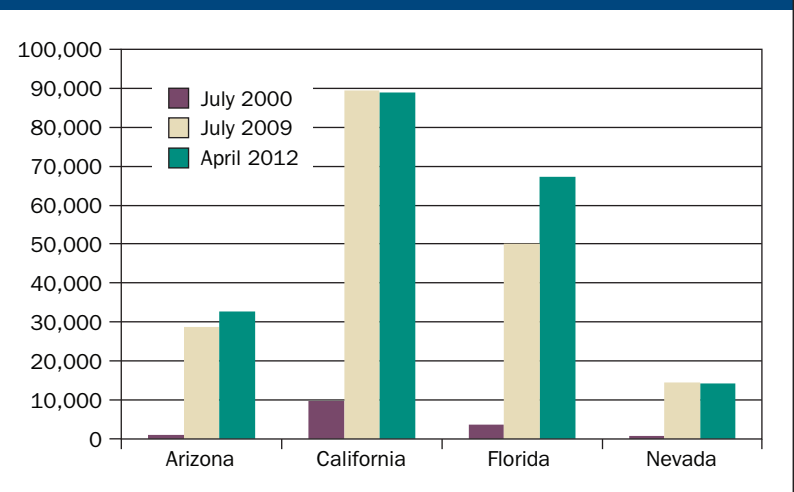
While it appears that the worst of the crisis is behind us, many areas still feel the negative impacts of the crash. According to a recent report from the Federal Housing Finance Agency (2013), house price growth had resumed in many states by the end of 2012, with annual increases averaging 5.45 percent. But the rebound in prices differed sharply across the country, and eight states continued to see declines (figure 8). Furthermore, these price rebounds were fueled in part by the extraordinary measures taken by the Federal Reserve, as well as the government’s willingness to use Freddie Mac, Fannie Mae, and Ginnie Mae to continue

FIGURE 5
Number of Foreclosures in the Sand States



Source: Collateral Analytics.

FIGURE 6
Number of Homes in the REO Foreclosure Inventory in the Sand States



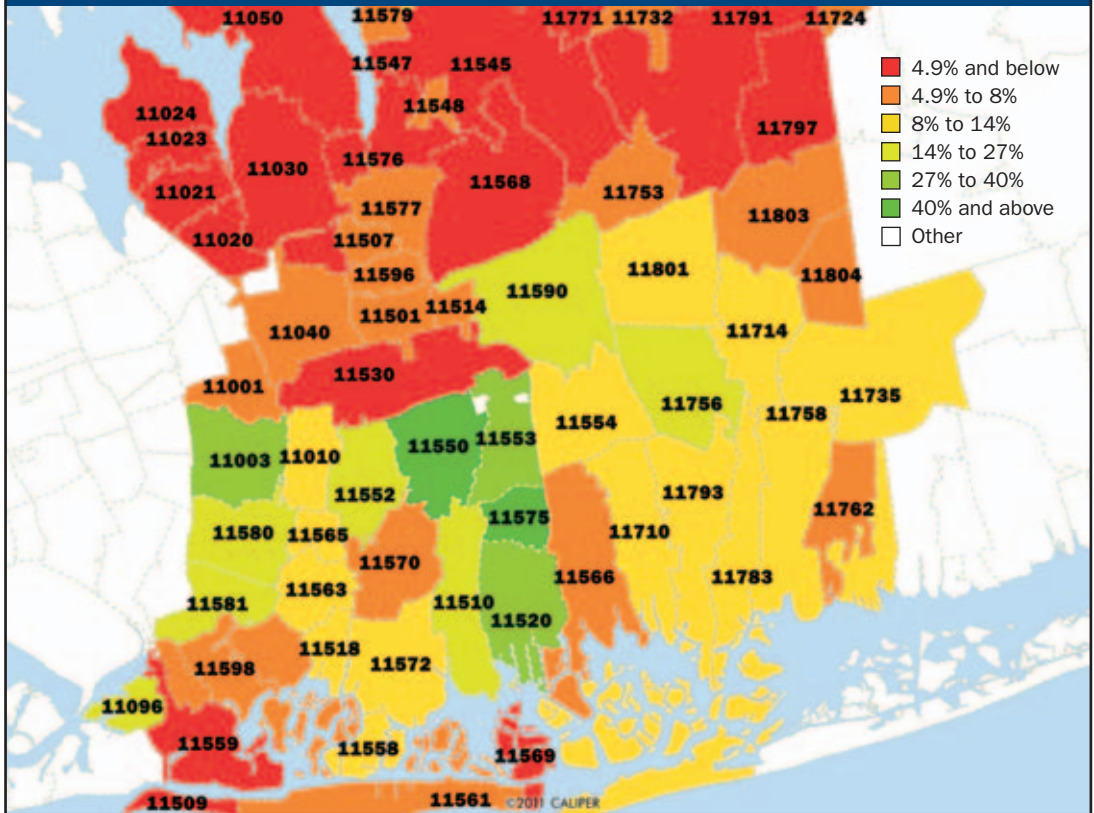
Source: Collateral Analytics.

to back home loans en masse. These policies are unlikely to last much longer, and, when they end, it is uncertain how housing markets will react.

POLICY FOCUS OF THIS REPORT

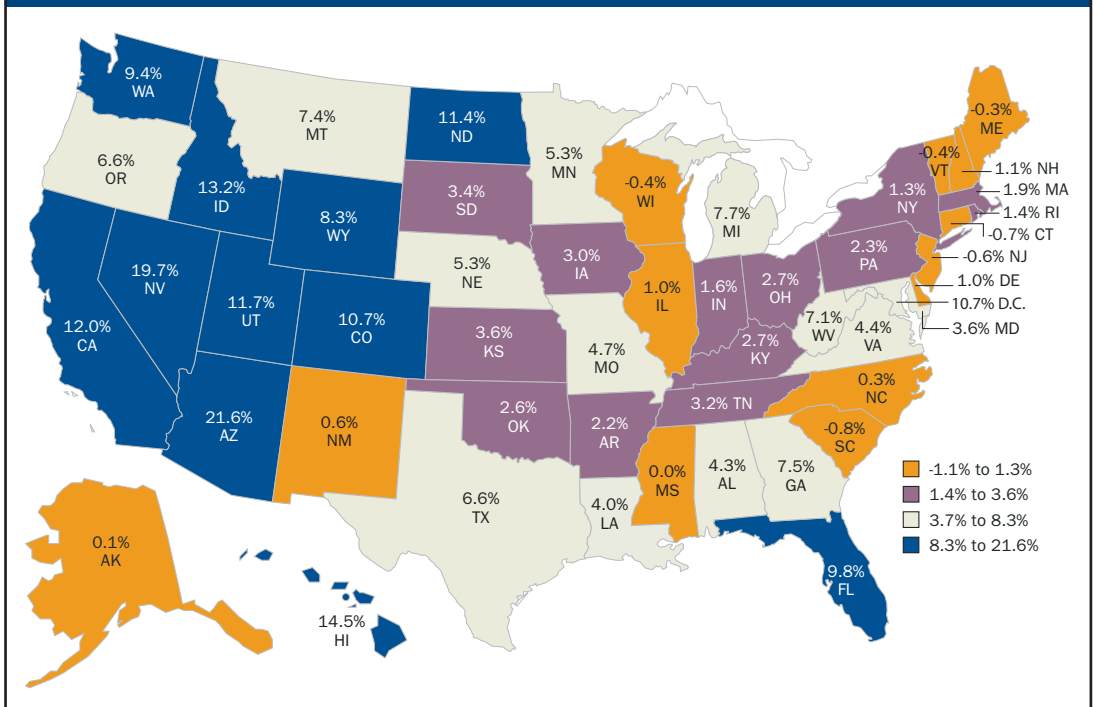
What follows is an analysis of policies intended to stem the tide once a housing

FIGURE 7
Share of Single-Family Residences in Nassau County, New York, with Negative Equity in 2012



Note: Negative equity indicates that the value of the home is at least 5 percent lower than the outstanding mortgage debt.
 Source: Collateral Analytics.

FIGURE 8
House Price Changes by State, 2011:4–2013:1



Note: Data are from the purchase-only house price index and are seasonally adjusted.
 Source: Federal Housing Finance Agency.



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market crisis hits and to reduce the likelihood that a crisis will occur in the first place. In the spirit of a remedy, attention centers on the Home Affordable Modification Program and the challenges faced in designing this or related programs. In terms of prevention, the discussion focuses on what are known as countercyclical capital buffers, an approach that would increase the cost of borrowing as evidence of a price bubble becomes more apparent. This policy, though challenging to implement, is in keeping with the words of Benjamin Franklin: “An ounce of prevention is worth a pound of cure.” Both of these mitigation and preventative policies can benefit from the signals provided by econometric models of house prices.

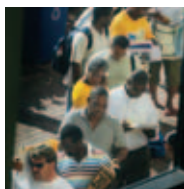
A common theme throughout this report is the recognition that tailoring policies to local market conditions is difficult. Despite the challenges, however, the emergence of geographically granular data—and models built upon such data—offers great potential for developing more targeted government responses. Indeed, these new information sources may help to ensure that the country does a better job of preventing a mortgage

market collapse than it did the last time around.

The overall results are also relevant to two general debates about econometric models of housing markets. The first of these is about the similarity of housing markets and the efficacy of building models by pooling large numbers of metropolitan areas. The econometric models underlying this report suggest that pooling multiple metropolitan areas for a single model does generate compelling results. However, urban economists are encouraged to work harder to incorporate widely varying local market conditions.

The second debate is about the difficulty of predicting extreme events with econometric models. The research underlying this report firmly supports the advice of Andrew Lo (2012), who urges economists to be more humble about their ability to predict complex events such as those associated with the recent boom and bust in the U.S. housing market. Such humility may also be used to encourage policy makers to construct financial systems that can better withstand the impacts of highly damaging but hard-to-predict events.

Foreclosure turned this residential development into a wasteland.



CHAPTER 2

Detecting Price Bubbles as They Develop

Many who bought at the peak could not afford to keep their homes once the recession hit.

Economists generally define an asset price bubble as a substantial deviation between the actual prices and those suggested by core drivers of prices (or fundamentals). Paul Krugman (2013) recently offered a slightly different and broader notion of a bubble as a “situation in which asset prices appear to be based on implausible or inconsistent views about the future.” The great challenge in bubble detection under either definition is to define the levels suggested by the core (longer-term) drivers of prices and to signal when prices are implausibly high.

A useful tool for potentially detecting a house price bubble—or at least conditions susceptible to a bust—is a statistical or

econometric model that captures the relationships between house prices and other variables. Econometric models may be used to improve policies for combating house price bubbles in two ways. One way is to use the models to produce out-of-sample predictions of future house prices, which may offer a signal about implausibly high price levels. The second is to examine changes in the estimated parameters of the model, which can also provide a signal about changing relationships between house prices and the fundamentals. While our ability to predict that house price bubbles are forming or that prices are fragile is imperfect, the econometric results can still help to guide policy making.



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PREDICTIVE POWER OF THE BUBBLE INDICATOR

Out-of-sample predictions are one test of a model's ability to detect the emergence of housing price bubbles and busts. These tests demonstrate whether the model does a reasonably good job of estimating future house prices, and whether it can predict a change in the direction of house prices before it occurs. If the models are reliable, they could be used to trigger policies that would put the brakes on during a price run-up and then ease up during the deflation. Without credible evidence of a model's predictive power, policy makers would be skeptical about its usefulness as a tool to guide capital policies. These model out-of-sample predictions would be made on an annual basis and even a quarterly basis in order to detect the potential of an emerging bubble.

Follain and Giertz (2011b), using annual data from 1980 to 2010, included a number of these out-of-sample predictions for various years before the most recent bubble-bust. The results suggest that the model does a fairly good job of anticipating price changes, at least qualitatively, during the early to middle stages of the bubble. For example, the average out-of-sample projection for real house prices in 2001–03 was 12 percent (about 4 percent per year) using data through 2000. This average, of course, masks wide variation across MSAs. In one metropolitan area, the projected price increase exceeded 30 percent over that three-year period; at the other extreme, projected price changes were negative for several MSAs. While this alone is not enough to conclude that the projections were out of line with fundamentals, it does suggest that unusually large price increases for many MSAs were possible.

Another component of a good indicator is the ability to anticipate a bust or a period when prices are especially sensitive to external

BOX 2

Modeling House Prices Across Markets and Over Time

The results discussed in this chapter are based on research presented in three recent Lincoln Institute publications.

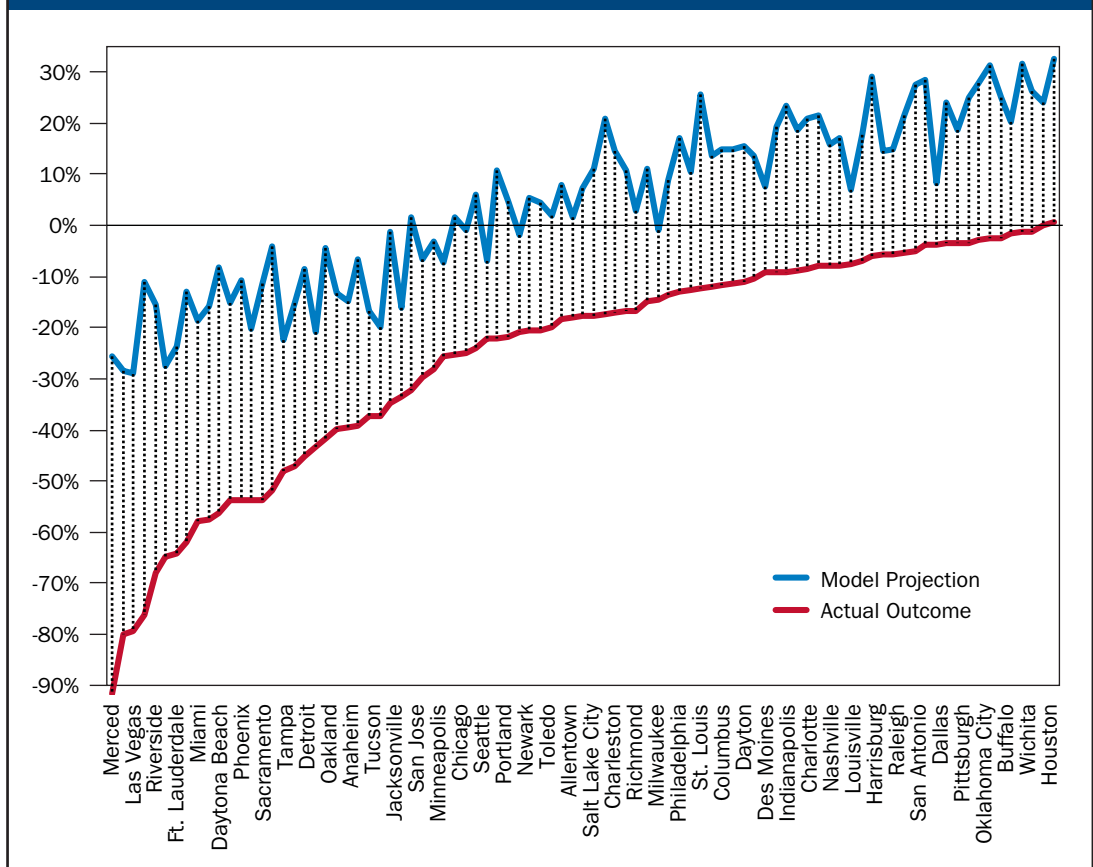
- Follain and Giertz (2011b), *A Look at US House Price Bubbles from 1980–2010 and the Role of Local Market Conditions*, takes a relatively long perspective and estimates models using data since 1980 for nearly 400 MSAs.
- Follain and Giertz (2012), *Predicting House Price Bubbles and Busts with Econometric Models: What We've Learned. What We Still Don't Know*, uses data since 1990 and expands the number of variables included in the models.
- Follain (2012a), *A Search for the Underlying Structure Driving House Prices in a Distressed Environment*, focuses on data and developments in the midst of the crisis (2005 through 2011), incorporates information about the distressed real estate inventory, and captures the challenges policy makers faced as the crisis unfolded.

Each of these working papers includes lengthy surveys of the literature related to the topic.

factors that could lead to sharp declines. Follain and Giertz pursued this by predicting price outcomes for the three years (2008–10) when most of the declines occurred. A comparison of actual house price outcomes during the bust years and the model predictions using data through 2007 (at or near the market peak) attest to the model's robustness (figure 9). Indeed, the simple correlation between predicted and actual outcomes for a representative set of MSAs is 88 percent. Importantly, however, the model consistently under-predicts house price declines during the worst of the housing market crash, especially in the MSAs where prices fell the most.

To narrow this gap, Follain and Giertz (2012) used a more detailed model incorporating more potential house price drivers, including employment, income per capita, rental prices, and the volume of single-

FIGURE 9
Comparison of Predicted House Price Changes versus Actual Outcomes
for 2008–2010



Source: Follain and Giertz (2011b).

family home sales. They also used quarterly rather than annual data from 1990 through 2010. Based on data through the fourth quarter of 2007, the model projections did a better job of predicting what actually happened in 2008–10, especially in the hardest-hit MSAs (figure 10). However, the pattern of predictions using data through the second quarter of 2006—just 18 months earlier—reveals a gap similar to that in the projections based on annual data. This suggests that, at or near the peak, models built on higher frequency data may do a better job of capturing turning points or abrupt changes in house price trends.

SIGNALS OFFERED BY THE MODEL

The fact that the models did not fully capture the extent of house price declines is unsurprising. Extreme events are at best difficult—some would argue impossible—to predict. In fact, it is unlikely that extreme price changes can be predicted with much reliability. But the results suggest that econometric models still have value as a policy-making tool because they can signal the increasing likelihood of a sharp drop in prices and raise awareness about a potential bust.

The MSA rankings based on the gap between actual and predicted house price growth clearly demonstrate this point. The



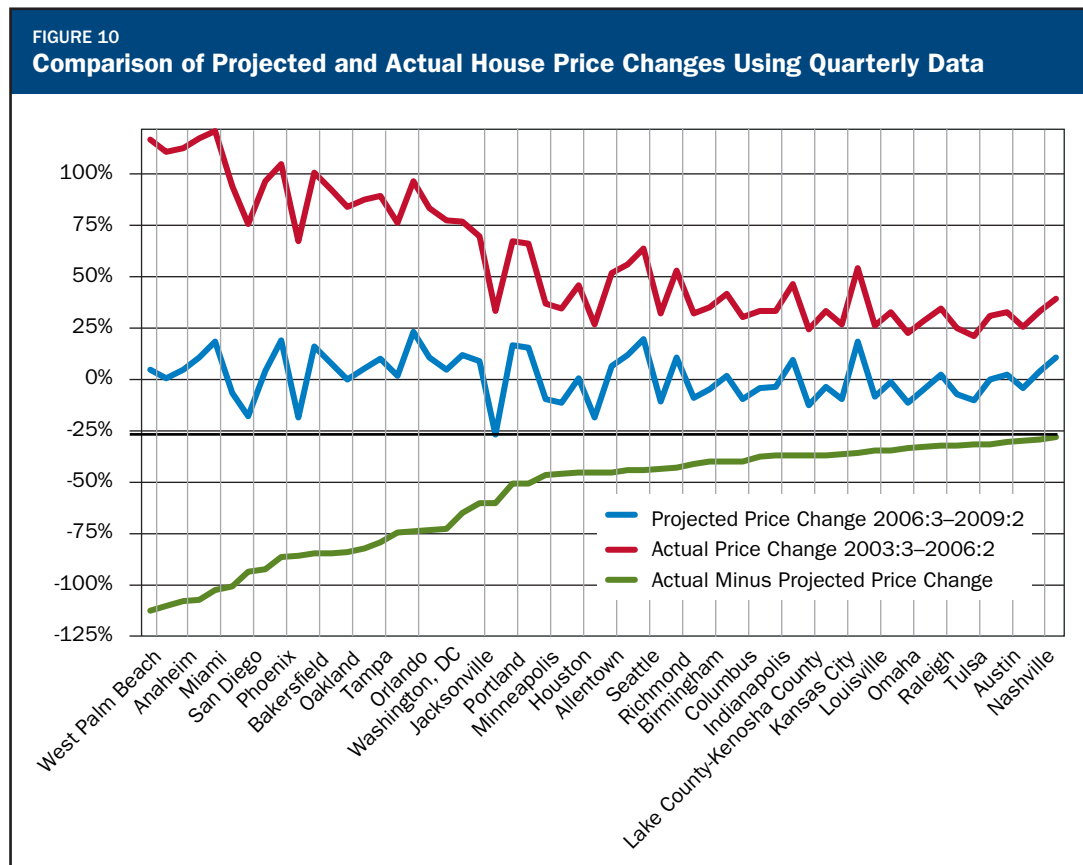
gaps are consistently negative, implying a price downturn ahead. This signal was especially strong for many MSAs in the sand states that were to suffer major price declines in the next few years. For example, the model predicted future house price growth of about 5 percent in West Palm Beach, where prices had risen more than 100 percent in the three years prior to the peak. A similar pattern appears among other MSAs that experienced extremely rapid house price appreciation.

The predictive power of one bubble indicator, measured as the gap between actual prices and levels predicted by a set of core house price drivers, is also strong (figure 11). This indicator is based on in-sample predictions of house prices instead of forecasts. When the measure is positive, house prices are predicted to grow more

slowly, all else equal. Note its substantial rise in the early 2000s, which was a signal that something was amiss with the pace of house price appreciation.

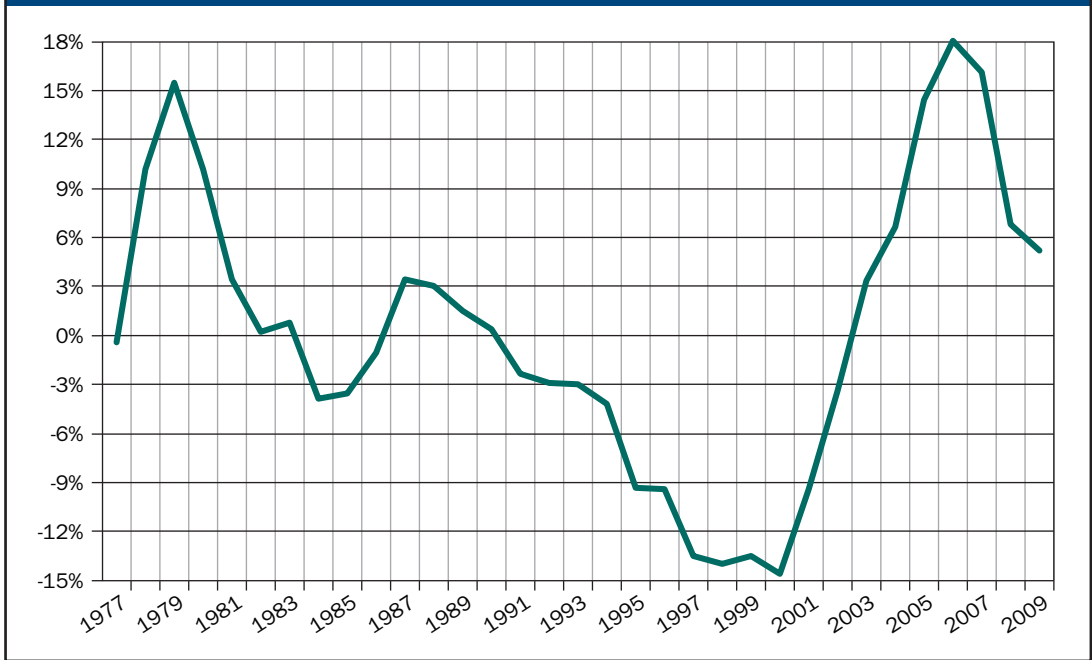
A possible explanation for the large discrepancy between the model predictions for 2008–10 is the sharp jump in unemployment during the Great Recession, especially in places where house prices plummeted. For example, the unemployment rate in Stockton, California, increased by more than 11 percent after the first quarter of 2007 and stood above 18 percent in the first quarter of 2010. A recent Brookings report (2011) indicates that employment declines in Stockton during the recession were much steeper and faster than in any of the previous four downturns.

To isolate the role of this factor, it is useful to compare the gaps between actual



Source: Follain and Giertz (2012).

FIGURE 11
Indicator of the Predictive Power of the Bubble Detector



Source: Authors' calculations based on Follain and Giertz (2011b).

FIGURE 12
Relationship of Actual and Predicted Price Changes in 2008–2010 to Unemployment Rate in 2010



Source: Follain and Giertz (2012).



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outcomes in 2008–10 and the predicted values of the model using data through 2007. When plotted against unemployment rates in 2010 for all 384 MSAs, the sizes of the gaps or residuals show a strong relationship with unemployment rates (figure 12). This relationship suggests that part of the problem was underestimation of unemployment rates—as well as underestimation of the impact of house price declines on unemployment rates—in the models. During the housing crisis, however, such information might have been available to policy makers and helped to send an alert about an impending bust.

Changes in the unemployment rate in 2008–10 are just one of many factors that could and did affect house price outcomes during this period. Another strong candidate is the diminishment of household wealth

due to the plunge in house prices. Yet another is the emergence of various state and local policies put in place to combat the fallout from the crisis. And on the micro level, there are myriad personal stories that testify to the widely varying impacts of the housing market crash. Capturing these effects in econometric models is very difficult.

In summary, the models provided some indication that a bubble was emerging. The evidence was stronger for some markets than for others, and the predictions were sensitive to the specific models used and time periods covered. While not perfect, the results nevertheless revealed information that may have been helpful to policy makers as they developed programs in mid-crisis and as they now consider options for preventing new house price bubbles from forming.

Soaring unemployment added to housing market woes in Stockton, California.



CHAPTER 3

Policy Making in Mid-Crisis

Fannie Mae was one of the organizations collaborating with federal agencies in the design of HAMP.



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When the mortgage market crisis hit, the size and suddenness of the shock were unprecedented. The volume of mortgages that were at least 30 days past due, an early indicator of foreclosures, spiked to more than \$300 billion nationally in 2008 (figure 13). The shares of loans at least 90 days past due (severely delinquent) showed a similar surge in five of the states hardest hit during the crisis. After tracking the national average through 2007, severe delinquency rates in these markets exceeded that average by two to three times in 2009 (figure 14).

The Home Affordable Modification Program was among the Obama Administration's key efforts to stabilize the U.S. housing market as mortgage delinquencies spread. Spearheaded by the Treasury Department, HAMP also involved representatives from several other federal government agencies

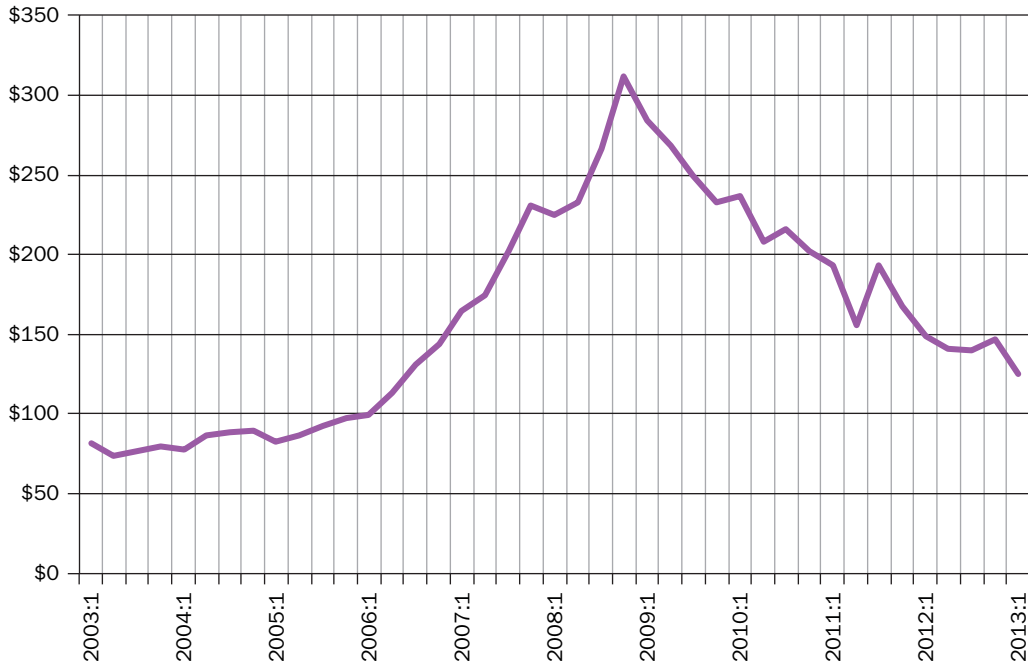
as well as Fannie Mae and Freddie Mac. The program designers faced a difficult assignment: design a program in mid-crisis that would help stem the rising tide of foreclosures.

THE CHALLENGE

Consider a man driving home who encounters a meteor crash directly in front of him. He is eager to get home and care for his family but realizes there is considerable risk in taking his normal route because a bridge has been wiped out. He is in a quandary: one option is to move quickly and head home in the normal direction; another is to await more information about whether the usual route is still viable and whether better but more time-consuming routes are available. Each entails risk.

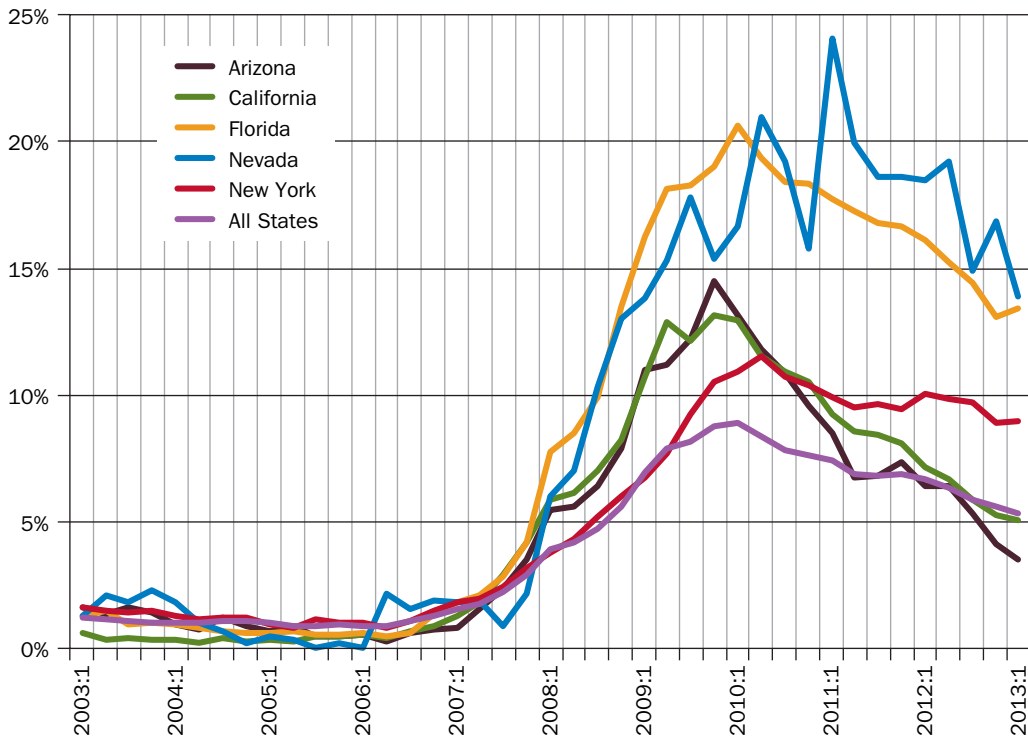
This is more or less the situation that policy makers in 2007 and 2008 faced when

FIGURE 13
Volume of Mortgages at Least 30 Days Delinquent (Billions)



Source: Federal Reserve Bank of New York (April 2013).

FIGURE 14
Share of Mortgage Debt 90 or More Days Delinquent in the Hardest-Hit States



Source: Federal Reserve Bank of New York (April 2013).



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South Florida homeowners line up to talk with Mortgage Assistance Group Counselors.

the devastating fallout of the housing crisis began to appear. Calls came from many quarters that the government should take steps to mitigate the damage and speed the recovery of the housing market. At that time, though, the information needed to

develop effective, reliable, and standardized remedies was unavailable. Policy makers could move quickly by taking a national approach based upon highly speculative expectations about the program’s ultimate effectiveness, demonstrating a commitment to help people across the country. A more measured approach would have involved more study through, for example, localized experiments and explicit partnerships with state and local governments in the hardest-hit areas. Lessons learned from these early test cases could have been used to design a more effective program for other parts of the country.

SETTING THE NET PRESENT VALUE RULES

HAMP’s mission was to help homeowners avoid foreclosure and, in doing so, specifically addressed the operational challenges facing mortgage servicers in dealing with the foreclosure process. Most pooling and servicing agreements require servicers to increase the value of cash flows to investors, or essentially improve their net present value (NPV). HAMP was therefore designed to provide both a decision-making framework to neutrally assess the value of a modification structure as well as subsidies

BOX 3

HAMP Scorecard

Loan modifications under HAMP include reductions to principal and interest rates, as well as extension of the repayment schedule. As of December 2012, more than 1.1 million homeowners received first-lien permanent loan modifications, saving approximately \$545 on their monthly mortgage payments for total estimated savings of \$17.3 billion. Of the 1,975,649 applicants that began the program with a trial modification on either a first or second lien, 57 percent received permanent modifications. Among the 939,854 borrowers that had a permanent modification for at least six months, 85 percent remained current on their payments.

For more details, see <http://www.makinghomeaffordable.gov/about-mha/Pages/default.aspx>; <http://www.treasury.gov/press-center/press-releases/Pages/tg1850.aspx>; https://www.hmpadmin.com/portal/learningcenter/docs/presentations/mhaservicerwebinar_HAMP1_presentation.pdf.

for mortgage investors to increase the value of modified loans.

The NPV rule laid out steps and subsidies for servicers to use for HAMP applications. The rule called for computation of the NPV of benefits to the lender from a loan modification, compared with the NPV with no modification. If the NPV of a modification exceeded the NPV of no modification, then the servicer was encouraged to offer the modification according to the rules of the program.

KEY DESIGN CHOICES

HAMP designers of the NPV rule were in a difficult position, with little empirical guidance about how borrowers or lenders would behave within a formal modification process. Some literature did exist involving Federal Housing Administration (FHA) lending in the 1990s (Ambrose and Capone 1996) and the Federal Deposit Insurance Corporation’s (2012) version of the NPV rule dealing specifically with foreclosures associated with the bankruptcy of IndyMac. But neither of these approaches was designed for the environment policy makers encountered in 2008.

As noted above, program designers had to make a number of key decisions, not the least of which was whether to move quickly with incomplete information or to delay in hopes of obtaining more information and building a better program. Among these fundamental choices were the following tradeoffs. (See Holden et al. 2012 for more discussion.)

Reduce the loan-to-value ratio or the debt-to-income ratio. At the top of the list of decisions, program designers had two broad options to encourage loan modifications: one targeting the traditional driver of default (the LTV ratio), and the other focusing on the borrower’s ability to

BOX 4
Calculating NPV Before the Crisis

Before the crisis, lenders used sophisticated econometric models to estimate the probability of mortgage default as well as the cost of foreclosure. The key driver of default in these models was the borrower’s current loan-to-value (LTV) ratio. The models consistently showed that the probability of default increased substantially as the LTV exceeded 100 percent. Other variables in the models included the borrower’s credit or FICO score and, in many cases, estimates of the borrower’s ability to repay the mortgage as measured by the initial ratio of the debt to the borrower’s income. Both of these variables were based on values at the time the mortgage was originated. Little if any attention was given to changes in the borrower’s FICO score or payment-to-income ratio over time.

The second stage in modeling mortgage performance focused on the lender’s cost of foreclosure, or the loss given default (LGD). This loss included the interest foregone once the borrower stopped monthly payments: the longer the time to complete the foreclosure process, the greater the lost interest. The LGD also assumed the lender would be unable to recoup the full amount of the outstanding loan when reselling the property. This followed for two reasons: (1) the LTV ratios on defaulted loans typically indicated substantial negative equity; and (2) the sale prices that lenders received for foreclosed properties were typically below those for regular market transactions between two private parties (known as the REO discount). During stressful times, the lender’s losses could be 50–70 percent (or more) of the original loan balance.

Unlike the sophisticated econometric models used in the first stage of assessment, the calculations underlying the LGD were typically simple and rules-based. For example, states where foreclosures took more time were assigned a higher number of days between default and completion of the process. In New York, where foreclosures must go through the courts, these delays could mean more than a year of foregone interest to lenders. Rules governing the REO discount were also relatively simple applications of historical averages, with little or no consideration given to the possibility of a loan modification. As such, the implicit NPV rule was straightforward: it was less costly to foreclose than to modify troubled loans.

pay (the debt-to-income or DTI ratio). Arguments can be made for both. The LTV ratio provides a critical incentive to borrowers. If the property’s value is well below the outstanding mortgage balance, borrowers effectively face the possibility of throwing

good money after bad. They also have little incentive to maintain the property. All else equal, emphasizing the LTV ratio gives more weight to principal forgiveness. In contrast, the DTI ratio measures the borrower's capacity to make the modification work. If the Great Recession temporarily reduced this ability and the prospects for a recovery were good, then modest assistance to help the borrower weather the storm might be sufficient.

HAMP designers chose to focus on lowering borrowers' DTI ratios as its primary policy response. This was achieved by reducing the interest rate and extending the maturity of loans, and by basing the new DTI on a borrower's current income. These efforts were meant to reduce the DTI value on the modified loan to 31 percent, thereby making the new loan more affordable.

Allow principal forgiveness or principal forbearance. HAMP initially gave servicers the option of principal forbearance (postponing the borrower's payments) to reach the 31 percent DTI ratio in the first year of the loan modification. The major alternative was to permit actual and immediate forgiveness of some of the outstanding loan balance. Of course, in a true present value sense, postponing debt repayment without the accrual of interest liabilities is equivalent to some amount of debt forgiveness.

Nonetheless, the distinction between principal forgiveness and forbearance became a topic of hot debate in 2012 for loans guaranteed by the two Government Sponsored Enterprises (GSEs): Freddie Mac and Fannie Mae (see Follain 2012b). For example, the Treasury Department strongly supported principal forgiveness and offered empirical evidence to support its position. The Federal Housing Finance Agency (FHFA), which oversees the GSEs, argued that principal

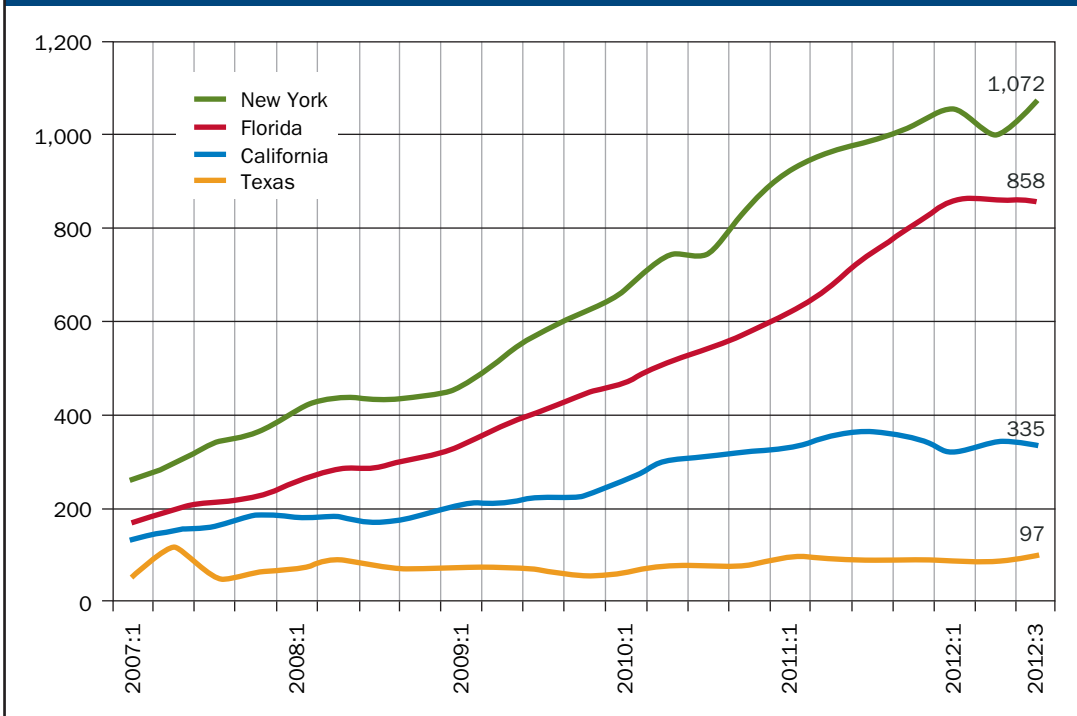
forgiveness would raise the problem of moral hazard, increasing the likelihood of default among those with the potential to continue payments. FHFA also offered empirical evidence of its own that suggested the distinction made little difference in practice. That debate did not lead to any changes in the use of principal forgiveness by the two GSEs.

Focus on short- or long-term house price forecasts. Pre-crisis, the first stage of mortgage performance modeling included a variety of scenarios looking at the expected path of house prices over five or more years. As such, future house price movements would determine the ultimate success or failure of the loan. Rapid price increases would reduce the LTV ratio and provide borrowers an incentive to continue paying; further price declines would have the opposite effect.

This was an approach that HAMP could have pursued in the NPV rule since, in effect, borrowers were given new loans. But the default equation governing a loan modification's success did not explicitly consider future house prices. A modest part of the incentive offered to servicers to modify a loan did, however, include a larger subsidy in markets where house prices had declined in the previous two quarters.

Relative to the kinds of future house price scenarios used in mortgage performance models, this was quite a modest view of what was possible and potentially relevant. For example, if a borrower lived in an area in which house prices were expected to recover relatively rapidly, the NPV rule would miss this. But applicants might take this into account in the decision to apply for a modification, while servicers might decide to use discretion in making the modification. Just the opposite might happen in markets with a more negative outlook. As such, it seems

FIGURE 15
Average Number of Days Required to Complete Foreclosures in Judicial and Nonjudicial States



Source: RealtyTrac (October 9, 2012).

that the current rule has led to more applications and modifications in areas where house prices were expected to rise. At the same time, however, any set of scenarios would be based upon imperfect models of future house price growth and thus introduce another layer of complexity that HAMP designers found hard to justify.

Design a simple, rules-based, transparent model or a more complex, opaque model. HAMP designers chose to err on the side of complexity. The original version of the NPV model began operation in 2008 but was not released to the public until 2011. The rationale for the delay was apparently twofold. First, the model was indeed complex and rested upon a wide variety of judgments buttressed by only modest empirical support. Second, the concern existed that too much transparency would lead to

attempts to undermine fairness. It was not until 2011 that detailed documentation of the NPV rule was released so that borrowers, counselors, and others could conduct detailed analyses based on its requirements.

Take a top-down federal approach or work cooperatively with state governments. In addition to HAMP designers, many states were simultaneously developing their own remedies to the foreclosure crisis and adapting their legal systems accordingly. Variations in state laws thus complicated the structure of the NPV rule. For example, the number of days required to complete a foreclosure was already significantly higher in states where cases had to go through the courts. Moreover, in judicial foreclosure states such as Florida and New York, the number of days to completion rose dramatically during the crisis (figure 15).

A variety of factors drove the increases, including changes in state policies and capacity limits in the face of huge volumes. Clearly, the original assumptions about the number of days required to complete a foreclosure embedded in the NPV rule needed to be adapted as the crisis evolved.

Other state laws on the books during the crisis also complicated NPV assumptions. In particular, certain states allowed dual tracking, enabling a lender or its servicing representative to initiate the foreclosure process while also negotiating a loan modification with the homeowner. California allowed dual tracking until 2013 when new legislation was passed to prohibit it. In addition, New York State had initiated its own settlement conferences in 2008 and the resources in its court system devoted to these settlement conferences increased dramatically (see Pfau 2011).

Other criteria. HAMP designers clearly had to make a large number of other critical decisions in order to move quickly with less than optimal information. Just a few of these choices related to the promotion of alternatives such as short sales, investigation of lender liability for inappropriate loans, detection of racial and ethnic discrimination, treatment of second liens, and pursuit of recourse to borrower assets.

OBSERVATIONS WITH THE BENEFIT OF HINDSIGHT

First and foremost, HAMP focused attention on a serious and very real problem: the escalating volume of distressed real estate. Given the drag that the huge backlog of foreclosed properties imposed on the housing recovery, efforts to speed the resolution of the distressed inventory were well placed. Second, program designers acknowledged the evolving state of the housing market by revising many key program parameters.

Whether the adjustments were as comprehensive as they might have been and whether they prove to be more accurate representations of current market conditions remains to be seen.

But there are some key areas where the government's emergency loan modification program might have benefited from certain different design decisions.

Target the hardest-hit markets. While a national approach is appropriate for the political institutions that have surrounded housing policy for many years, it may not have been the most effective way to help resolve the foreclosure crisis because the distressed inventory and its spillover effects were so unevenly distributed across housing markets. Rather than begin with a nationwide effort to offer assistance to all or most areas, HAMP might have conducted experiments or case studies in areas where the distressed inventory problem was most acute and most damaging to the local housing market.

These pilot programs might have looked at how emphasizing ability to pay versus the loan-to-value ratio affected outcomes. In addition, they could have provided opportunities to collaborate with state and local governments seeking their own solutions to the foreclosure crisis. These experiments also could have focused upon small and geographically granular areas within zip codes, which would not have been feasible before the crisis occurred.

Consider the longer-term outlook for prices. HAMP designers might have given more consideration to expectations about future house prices, especially in the default decisions underlying the NPV rule. The benefits and costs of loan modifications to servicers and borrowers reflect in part what they expect to happen over a longer



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A guard stands outside a home whose owner is in the eviction process.

period than a year because the modifications are long-term contracts.

While long-term forecasts of house prices are difficult to make and easy to criticize, they do offer some valuable insights about the potential paths of future house prices and their sensitivity to certain shocks to the core drivers of house prices, such as employment rates, interest rates, and aspects of housing policy. HAMP could have been an opportunity to shed light on these potential benefits and, in the process, help bring about better long-run decisions. As it now stands, this missed opportunity may have even added to the uncertainty about how long housing markets will take to recover.

Foster cooperation with state and local governments. Prior to the crisis, relatively simple approaches were used to incorporate differences in state policies affecting the length of the foreclosure process and the ultimate costs of mortgage defaults to the lenders. As noted earlier, however, state policies were themselves evolving in an effort

to deal with the housing market crisis. New York provides a prime example. The state instituted a settlement conference approach to help bring about mortgage modifications. The combination of this state policy and the surge in delinquencies led to an enormous and unexpected burden on the state's judicial system.

In 2009, New York had about 55,000 pending foreclosure cases. By 2010, the number had increased by more than 40 percent to about 78,000. As Pfau (2010, 3) states, "What was not apparent from the outset is how complex and labor-intensive the conferences are." For example, it was not uncommon for a single foreclosure case in 2009 and 2010 to require six to eight settlement conference appearances before it could be resolved. Better coordination with the HAMP program may thus have provided a more effective modification program and better use of scarce resources.

Local governments also could have been more engaged in the foreclosure prevention process by bringing their knowledge of local

markets to the task of identifying and prioritizing the places where need was most pronounced. For example, local assessor data could have been tapped to measure and visualize the areas where the crisis was emerging. Local governments also had good reason to participate in these efforts, given that the spread of distressed properties is known to have a substantial impact on the sales prices of surrounding homes and the revenues collected from the local property tax. One possible approach that local governments might have taken was to offer incentives to stimulate more loan modifications in the hardest-hit areas.

Recognize inherent weaknesses of mortgage securitization. In the end, the key lesson about combating future house price bubbles is the importance of recognizing the inherent difficulties created by the mortgage securitization process, especially during a crisis when delinquencies are running high. The HAMP program was a response to the inability of the existing system to deal with the huge volume of delinquencies and foreclosures. This applied to both servicers of the mortgages and the legal systems in place to deal with them, especially in judicial foreclosure states.

In hindsight, the vulnerability of a system strongly reliant upon the securitization of mortgages could have, and should have, been easily detectable. In the larger regulatory scheme, this would fall under what is called operational risk. Indeed, financial institutions already address operational risks from computer hacking by developing scenarios of what might occur during a

crisis and then putting resources in place to reduce their likelihood. Investigation of such scenarios would have identified the problems with the U.S. securitization system, especially as it grew to include instruments based upon a wide variety of relatively untested mortgages and securitization types.

These suggestions are not unlike the measures that emerge in the aftermath of a severe storm such as Hurricane Sandy, which hit the Northeast in October 2012. In just one example of follow-up to the disaster, the Federal Emergency Management Agency (FEMA) recently released new maps of areas defined as flood plains. This is information that was obtained from and generated by the storm itself, and will play a critical role in plans designed to reduce the damage of future hurricanes.

Similarly, policy makers seeking to address the mortgage meltdown were operating in an environment that was different in many important ways from the one they thought existed prior to the crisis. Something went terribly wrong with the mortgage system and housing market in place in the mid-2000s, and it would take time to obtain the information needed to produce effective remedies. As such, program designers would have been prudent to be more humble about what was possible and about how much information they needed to design effective loan modification programs. Perhaps there is a lesson for the federal government akin to the one noted earlier for economists: it is important to be humble about the ability to resolve the long-run consequences of major financial crises.



CHAPTER 4

Preventing Future Crises



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Former Federal Reserve Chairman Alan Greenspan addresses a real estate summit in 2009.

An intense debate continues about the best ways to prevent a recurrence of a house price boom and bust of the magnitude just experienced. One aspect of these discussions centers on the role that monetary policy may have played in contributing to house price bubbles and whether the Federal Reserve could have curtailed the development of these bubbles in the early stages. But a more promising policy direction under consideration is the imposition of counter-cyclical capital buffers for banks. A bank's capital is the difference between its assets and liabilities; the larger the gap, the higher the cost of mortgage lending and the greater the ability of the bank to withstand a severe negative shock to the price of its assets. The effectiveness of such a preventative

policy, of course, hinges on the ability of econometric models to identify the emergence of price bubbles and provide a signal that could then be used to trigger higher capital ratios for particular financial institutions.

THE ROLE OF MONETARY POLICY

Excerpts from Former Federal Reserve Chairman Alan Greenspan's now-famous 2002 speech summarize the board's views prior to the housing bust:

Certainly, lurking in the background of any evaluation of deflation risks is the concern that those forces could be unleashed by a bursting bubble in asset prices. This connection, real or speculative, raises some interesting

questions about the most effective approach to the conduct of monetary policy. If the bursting of an asset bubble creates economic dislocation, then preventing bubbles might seem an attractive goal. *But whether incipient bubbles can be detected in real time and whether, once detected, they can be defused without inadvertently precipitating still greater adverse consequences for the economy remain in doubt.* [italics added]

He went on to explain how his view was influenced by the stock market crash of October 1987 and the dot.com bubble bust of the late 1990s—two extreme events that were difficult to predict but had relatively modest long-term impacts. For example, Greenspan said this about the dot.com bubble: “The notion that a well-timed incremental tightening could have been calibrated to prevent the late 1990s bubble is almost surely illusion.... In short, unless a model can be specified to capture the apparent market tendency toward bidding stock prices higher in response to monetary policies aimed at maintaining macroeconomic stability, the accompanying forecasts will belie recent experience. Faced with this uncertainty, the Federal Reserve has focused on policies that would . . . mitigate the fall-out [of an asset bubble] when it occurs and, hopefully, ease the transition to the next expansion.”

In short, Greenspan was skeptical about the ability of monetary policy to deflate a bubble because econometric models have a difficult time determining whether a rapid price rise is legitimate and driven by fundamentals rather than by irrational expectations.

Greenspan (2010) was also involved in a debate about whether loose monetary policy in the early 2000s contributed to the house price bubble. He believed that it was

not a primary cause, largely based on estimates from a simplistic model that considers national house prices as functions of short- and long-term interest rates. He concluded that the model results demonstrate that national house prices are primarily driven by long-term rather than short-term rates, which are the object of monetary policy. As a result, his position was that monetary policy was not the culprit in the crash.

The results of an econometric model that allows a much wider set of variables to drive local house prices support this conclusion (see Follain and Giertz 2012). For example, this model reveals more information about how house prices in a particular market interact with measures of income, employment, rents, and the volume of residential sales within the market. As a result, it does a better job of predicting house prices than one focusing on national house prices driven solely by national interest rates.

Indeed, monetary policy appears to be especially ineffective in combating house price bubbles. While interest rates do affect housing demand, they do not dominate or dampen the effects of all other drivers of house prices such as local employment and household income. Policies to prevent house price bubbles must therefore recognize these key indicators of local market conditions.

If a major house price escalation occurred in all or most major regions of the country, however, raising interest rates would surely send a negative signal and likely curtail the bubble, diminishing the threat of a severe bust. But history suggests that such a scenario is unlikely. Absent this situation, tighter monetary policy is likely to help stem emerging price bubbles in some regions but dampen legitimate growth in others. Furthermore, using monetary policy to combat bubbles would likely compromise the Fed’s dual mandate of promoting employment growth while maintaining stable prices.

BENEFITS OF COUNTERCYCLICAL CAPITAL POLICIES

An approach that may be better at combating house price bubbles is for regulators to adjust capital requirements for financial institutions based on local market conditions. At a high level, bank capital or bank net worth equals the difference between the market value of assets and liabilities. The higher the ratio of bank capital to assets (the capital ratio), the safer the bank and the more likely it is to be able to honor its liabilities if asset values drop sharply. The issue of countercyclical buffers has arisen in recent discussions regarding capital policies for financial institutions. Driven in part by the Dodd-Frank Act and a common belief that the regulatory system was somewhat culpable in the recent bubble and bust, attention has turned to the design of models capable of predicting bubbles and guiding policies to avert the devastating fallout. (See Basel Committee on Banking Supervision 2010 for more background.)

The basic idea is straightforward: when prices for a particular asset or sector are rising much faster than market fundamentals justify, bank regulators would increase the capital ratios for that asset. In the case of housing, the capital ratios would apply to residential mortgages. For example, during “normal” times, a bank might be required to have a capital ratio of 4 percent for a traditional mortgage with an LTV ratio of 80 percent or less. If evidence of a price bubble was increasing, the ratio could be raised to, say, 6 percent. As such, countercyclical capital requirements offer two major benefits: they better enable financial institutions to withstand severe shocks, and they lower the likelihood of an extreme event. If this policy had been in place prior to the recent boom-bust, it would have helped to temper both lending activity and housing demand.

To help envision what such policy might entail in practice, it is useful to examine a recent proposal by Smith and Weiher (2012), economists at FHFA, for a capital buffer



Federal Reserve Chairman Ben Bernanke believes that bubble detection is an area that needs more attention.

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President Obama signed the Dodd-Frank Act into law in 2010, instituting significant financial regulatory reform.



COURTESY OF THE WHITE HOUSE / LAWRENCE JACKSON

regime for residential mortgages. The critical premise underlying their approach is that housing prices have stable trends and those trends can be identified. To support their argument, the authors estimate trend lines for each of the 50 states using FHFA house price index data, and they test their methodology on the book of loans acquired by Fannie Mae from 2003 to 2010. They conclude that, under their approach, capital requirements would have increased dramatically during the early years of the house price bubble.

Furthermore, had the countercyclical requirements been in place, Fannie Mae would have been unable to obtain (or at least been deterred from obtaining) sufficient additional capital to acquire the loans that ultimately resulted in excessive losses. If Fannie Mae had been able to raise such additional capital, it would have also had to raise prices to maintain an adequate return on that capital. In this respect, the countercyclical capital regime that Smith and Weiher propose would likely have weakened the demand for new mortgages, thereby reducing the magnitude of the house price bubble.

There is much to like in this scheme. For example, the authors claim that the

design for a countercyclical capital regime is relatively straightforward and could be easily implemented by regulators or financial institutions as part of their economic capital models. Their goals were to build a simple and transparent stress scenario that reflects asset risk, is rules-based, and is not discretionary. Moreover, it does not treat all states equally.

The countercyclical capital policy proposed here replaces the trend line in the Smith and Weiher approach with the output and ongoing evaluation of more comprehensive models of local housing markets. These models would include core house price drivers such as local area employment as well as an explicit bubble indicator that measures the gap between actual house prices and the level predicted by fundamentals. These models would be used to project local house prices for baseline and stress scenarios, laying the groundwork for variations in capital ratios over time and across markets most at risk of a house price bubble.

This approach is built upon traditional models of mortgage performance used to price the additional credit risk generated by markets in the midst of a potential bubble. The critical output of this model is a mea-



sure of the credit risk associated with a loan and how much the lender needs to charge for that additional risk. The likelihood of a mortgage default is higher in markets with a greater potential for a bubble bust; as such, the lender needs to charge a higher mortgage interest rate to compensate for the added risk. This measure, or credit risk spread, is higher in markets with a greater potential for a bubble bust and lower in markets where the potential is less. A key aspect of these models is the evaluation of credit risk and the likelihood of default in a severe or worst-case scenario. These stress scenarios are more severe in markets with a higher prospect for a bubble bust, all else equal.

Follain and Sklarz (2005) develop a model of this type. The model generates estimates of the credit risk inherent in residential mortgages, which varies across metropolitan areas. These credit risk spreads incorporate variations in capital for the credit risk inherent in mortgages and the potential of a bubble and bust. For example, the largest credit risk spreads for a newly originated 2005 loan with a relatively high LTV ratio and low credit score were 144 basis points in Santa Barbara and 124 basis points in Vallejo, California. The other end of the distribution included a number of relatively small MSAs in Texas, where the estimated credit risk spreads were below 30 basis points. If adopted, these credit spreads would have led to higher capital requirements and higher mortgage rates in the areas with the greatest threat of a price bubble. Such changes would potentially have slowed demand in these areas and lessened the negative fallout from the bubble bust that was to come.

GENERATING ALTERNATIVE STRESS SCENARIOS

Stress tests are used to evaluate changes in the values of portfolios as a result of a severe and negative economic event. They

are also central to Federal Reserve policy in monitoring large financial institutions (see Board of Governors of the Federal Reserve System 2012). Probably the most notable example of a stress test scenario for house prices is the one the Office of Federal Housing Enterprise Oversight (OFHEO) used to monitor the capital positions of Fannie Mae and Freddie Mac until September 2008. (After 2008, what had been OFHEO was folded into the newly created FHFA.)

The OFHEO stress test envisioned about a 15 percent nominal decline in house prices over five years and was based on the experience of the four ALMO states—Arkansas, Louisiana, Mississippi, and Oklahoma—during the savings and loan crisis in the early and middle 1980s. Adjusting for inflation, the real value of the decline was closer to 30 percent—still well below what occurred in areas hardest hit by the recent house price bust. (See Follain and Giertz 2011a for a fuller description of the scenario and its limitations.)

Indeed, the actual outcomes in 2008–10 show much more stress than implied by the OFHEO scenario (table 1). Of 380 MSAs, 148 (39 percent) experienced *real* price declines in excess of 15 percent, while 64 (17 percent) experienced declines in excess of 30 percent. In this sense, conditions in the last few years clearly exceeded prior notions of severe stress and thus the tests that guided regulation of Fannie Mae and Freddie Mac.

Monte Carlo simulation results indicate that price declines in the largest MSAs at the mean and median range from 4.5 percent in 1996–98 to 9.1 percent in 2001–03 (see figure 16 and box 5). The median for 2008–10 is -15 percent. These numbers are in line with the OFHEO stress scenario. Note that the severity of the OFHEO scenario varies depending on inflation during the period when it is applied.

TABLE 1
Actual Cumulative Real House Price Changes for Three Selected Periods (Percent)

MSA	1996–98	2001–03	2008–10
Albuquerque	14.0	-3.4	-12.8
Austin	12.9	13.3	0.2
Beaumont	-1.4	6.9	0.3
Boise City	13.7	2.5	-33.6
Bridgeport	-11.4	13.9	-21.6
Canton	6.6	5.7	-13.2
Chico	-9.7	2.7	-37.9
Columbia	-2.0	6.4	-3.5
Davenport	6.3	8.5	-2.9
Des Moines	7.4	6.3	-9.0
Fort Collins	24.2	13.8	-9.2
Ft. Lauderdale	-3.6	6.3	-57.9
Harrisburg	-2.0	0.9	-5.7
Jacksonville	-3.5	11.3	-32.3
Lancaster	-6.9	-0.5	-6.6
Little Rock	3.9	2.3	-5.0
Merced	-15.1	8.6	-91.6
Modesto	-19.3	7.4	-79.9
New York	-10.1	15.0	-19.9
Oklahoma City	1.7	4.6	-2.6
Peabody	-8.5	23.3	-19.0
Pittsburgh	-0.6	2.8	-3.4
Pueblo	15.6	9.2	-11.8
Riverside	-28.7	13.3	-64.3
Salinas	-11.1	23.8	-65.0
San Francisco	-13.9	33.9	-24.9
Santa Barbara	-18.3	24.1	-43.3
Spokane	12.6	-3.3	-12.0
Tampa	-6.1	9.8	-45.2
Vallejo	-19.0	18.9	-69.3
West Palm Beach	-8.9	7.1	-53.8
Worcester	-12.4	16.4	-21.3
Mean	-2.7	9.0	-23.7
Median	-1.9	7.0	-17.7
Maximum	28.7	36.5	1.1
Minimum	-29.9	-10.4	-91.6
Standard Deviation	11.0	8.6	20.5

Source: Follain and Giertz (2011b).

Looking at 5th percentile predictions of cumulative house price changes in 2008–10, the stress scenarios are more severe, with midrange projected price declines near 60 percent. While the severity of these two scenarios is very different, the results are highly correlated. Another consistent theme is that the severity of the stress scenarios varies widely across metropolitan housing markets (table 2). This finding is relevant to the development not only of capital requirements that vary by geography, but also of countercyclical capital buffers.

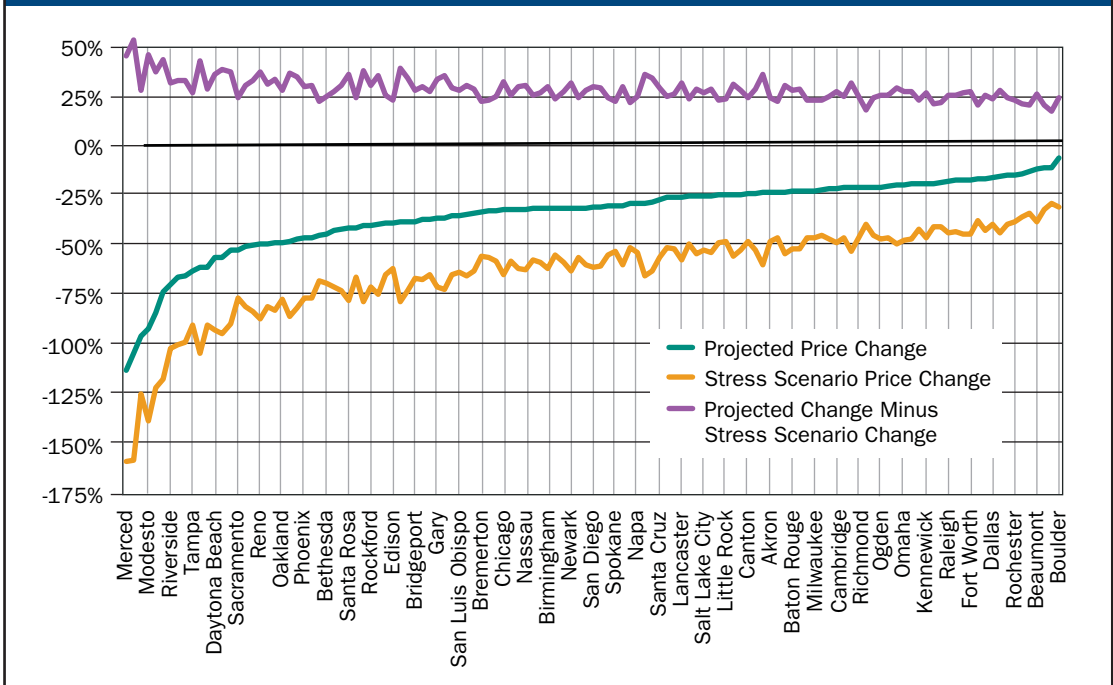
The stress scenarios thus suggest that many of the MSAs with the sharpest run-up in house prices would have had to pass more severe stress tests than those experiencing milder house price appreciation. As a result, banks with loan portfolios concentrated in parts of Florida and California would have had to have more capital than those with portfolios concentrated in, for example, MSAs in Texas.

IMPLEMENTATION CHALLENGES

Development of countercyclical capital policies merits serious consideration. Ongoing estimation of econometric models to predict house price growth would be a key requirement. These models would include a bubble indicator of the type described here. The stress test would be more severe during periods of excessively strong house price growth and less severe when house prices were growing more moderately. The scenarios should also vary across metropolitan areas.

It is clear, however, that policy makers would face several challenges in implementing countercyclical capital buffers. In sharp contrast to Smith and Weiher’s relatively simple, transparent, and rules-based model, implementation would involve a team of analysts estimating various types of models

FIGURE 16
Comparison of Expected Price Changes to the 5th Percentile Stress Scenario, 2008–2010



Source: Follain and Giertz (2012).

BOX 5
Using Monte Carlo Simulations to Estimate Stress Scenarios

Monte Carlo simulations recognize that future house prices, and the factors that drive them, are uncertain. Thus, the model produces price paths that would result if variables input into the model deviated from their expected path. The projected house price one period out is no longer assumed to equal the expected path, but is drawn from a distribution of future house prices dictated by statistical analysis of historical data (and whose average value equals that of the expected path). The same process of selecting from a distribution is repeated for each subsequent period included in the projections. Note that, in addition to the other variables in the model, past house prices influence the distribution from which these prices are drawn. The model recognizes that the drivers of house prices are interconnected and that house prices in one period may have feedback effects on future prices.

The Monte Carlo approach repeats this exercise of projecting house price paths many times, each time producing a different path. The cumulative price changes are calculated for each path (extending over several years) and arranged in ascending order by percent change and thus by probability. For example, a scenario that is more severe (that is, one with a larger price decline) than 950 out of 1,000 price paths would be expected to occur with 5 percent likelihood. The price path associated with this decline can be thought of as a stress scenario.

For preventing bubbles, low-probability price declines are often more relevant than the expected price path. It is important to keep in mind that these stress scenarios, like the expected price paths, assume that past statistical relationships will continue into the future.

TABLE 2
5th Percentile Model Forecasts (Stress Scenarios) of House Price Changes for Three Selected Periods (Percent)

MSA	1996–98	2001–03	2008–10
Austin	-2.9	1.4	1.8
Birmingham	-3.0	-11.9	0.1
Cambridge	3.6	7.7	-15.3
Chicago	-12.8	-10.6	-15.1
Columbus	-13.3	-10.8	-7.4
Detroit	-14.7	-21.7	-25.5
Ft. Lauderdale	-11.1	-9.5	-41.5
Indianapolis	-7.3	-7.2	-2.5
Las Vegas	-9.3	-9.2	-33.5
Memphis	-0.3	-8.7	2.1
Minneapolis	-3.7	-5.1	-23.2
New York	-2.5	-0.8	-19.4
Oklahoma City	3.3	3.3	12.2
Phoenix	-2.2	-8.4	-30.3
Providence	-9.0	3.6	-23.8
Riverside	-32.8	-6.1	-44.9
Salt Lake City	-14.6	-30.2	-1.4
San Francisco	-12.4	8.1	-17.3
Seattle	-25.6	-19.5	-12.8
Tucson	-10.7	-14.8	-21.6
Washington, DC	-17.3	1.7	-27.3
Mean	-9.1	-4.5	-15.0
Median	-8.5	-4.8	-15.1
Maximum	3.6	16.0	12.2
Minimum	-32.8	-30.2	-44.9
Standard Deviation	8.3	9.2	14.5

Source: Follain and Giertz (2011b).

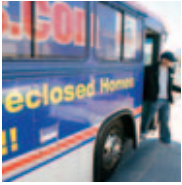
and making complex, subjective decisions about how to define and vary stress test scenarios for different markets and time periods. The challenge to the Smith and Weiher approach is that changes in fundamentals can drive deviations from trends, which the proposed approach highlights. For example, rules or judgments for adjusting capital requirements could be based on a multi-faceted process that considers simple indicators or rules of thumb in conjunction with less transparent but more sophis-

ticated measures from econometric models.

At the end of the day, however, the greatest challenge is whether decision makers would be able to implement tougher stress tests as a bubble is developing. The experience of the recent boom and bust shows that it is very difficult to do. For example, the head of OFHEO said that Fannie Mae and Freddie Mac were adequately capitalized in May 2008, but then announced the need for the government to take them over just four months later.

The obstacles are many. First, predicting extreme events with precision is difficult, and efforts to define them are easily countered because of this uncertainty. Second, the possibility of a “false positive” is real. For instance, the model results indicated that the price increases in San Francisco and San Jose in 2001–03 would have warranted a severe stress test. In fact, house prices continued to climb for several years.

What alternative approach to countercyclical capital policies would recognize the complexity, subjectivity, and courage needed to combat bubbles? Perhaps one that recognizes both the dangers posed by large financial institutions considered too big to fail and the complexity of managing the risk they pose to the broader economy. This approach would impose substantial capital standards for large financial institutions, over and above what smaller banks are required to hold. The capital required would also be higher than the amount needed for normal economic times. Hopefully, study of this issue will continue, and decision makers will not be lulled into thinking that the Dodd-Frank Act and countercyclical capital buffers that apply equally to all regions of the country offer lasting and enduring protection against price bubbles. Moreover, any policy along these lines will require close monitoring and adjustments as circumstances evolve.



CHAPTER 5 Findings and Recommendations



The housing market collapse and ensuing Great Recession revealed fundamental problems at the heart of U.S. housing and financial markets. The crisis has spawned great interest and intensified research into how best to address these issues. While progress has been made, disagreements persist regarding such key questions as the causes of the crisis, effective policies for stabilizing hard-hit communities, and sound approaches to preventing future catastrophes.

The evidence presented here documents how the impacts of the house price bubble varied widely across local housing markets. Indeed, the evidence strongly suggests that

the idea of a national housing market is a fiction. There are in fact hundreds of housing markets, albeit with some interconnectedness or shared features. Thus, it is impossible to rely completely on national aggregates to judge the performance of housing. Without more detailed information, the picture is likely to be misleading and policy prescriptions flawed. As Nassim Taleb is known to have quipped: “Never cross a river because it is *on average* four feet deep.”

This report illustrates how econometric modeling can be applied to address many of the complex issues that have been brought to the fore. Such models have their limitations

To speed up reoccupation of foreclosed homes, the City of Perris, California, hired contractors to make dead lawns look more presentable.

but are able to provide insights into the interrelationships between factors that contributed to the crisis. In addition, the ability of these models to project into the future may help policy makers better respond to similar problems that lie ahead.

POLICIES TO SPEED RECOVERY

The wide variation in local housing market conditions has important implications for the design of policies to help stem the negative fallout from the recent house price bubble and bust. At issue here is the Home Affordable Modification Program, which was created in mid-crisis to address the large and growing volume of mortgage delinquencies and foreclosures. The biggest challenge for HAMP designers was the lack of proven remedies for the extreme conditions they faced.

While it is premature to assign a final grade to HAMP, two positive observations are possible. First and foremost, HAMP targeted a serious and very real problem—the volume of distressed real estate—that was and continues to be an enormous drag on housing markets. Efforts to speed the resolution of distressed properties have the potential to help borrowers and lenders alike, as well as the overall housing market recovery.

Second, econometric modeling strongly suggests that the crisis severely altered the structural equations underlying the housing market and that policies designed to combat the mortgage market crisis need to recognize and adapt to this fact. The HAMP program in fact acknowledges that housing market conditions are evolving, and its designers have therefore been willing to revise many key parameters. Whether the adjustments were as comprehensive as they could have been and whether they more accurately represent actual conditions remains to be seen.

With the benefit of hindsight, certain different decisions may have improved HAMP's initial effectiveness.

Focus on hardest-hit markets.

Rather than attempt to offer some assistance to all or most areas of the country, HAMP might have conducted experiments or case studies in areas where the distressed real estate inventory was highest and most damaging to the local housing market. These experiments could have focused on geographically granular zones as small as zip code areas. Although such an approach may not have been feasible before the foreclosure crisis, the ongoing data revolution has now made such targeting more possible.

Develop longer-term forecasts

of house prices. Policy makers should have paid more attention to longer-term expectations about house price growth, especially in the default decisions underlying the NPV rule. The benefits and costs of loan modifications to both servicers and borrowers are driven in part by what they expect to happen over a longer period than a year because the loan modifications are long-term contracts. The modeling results presented here demonstrate that, while imperfect, long-term forecasts for a variety of scenarios and local housing markets can offer early warning signs of future risk.

Coordinate more closely with state and local governments.

At the same time that policy makers were developing the parameters for HAMP, states were also attempting to evolve their own approaches to loan modifications. Better coordination of federal and state efforts would likely have yielded not only a more effective program but also made better use of scarce resources. In addition, local governments could have played a more integral role in foreclosure



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prevention efforts by targeting neighborhoods that were especially hard hit by the crisis.

Recognize the operational risk inherent in large-scale mortgage securitization. The boom in securitization actually began in the 1990s as GSE mortgage-backed securities grew to replace the traditional deposit-based system of housing finance. Securitization became even more prevalent and complex in the ensuing years as it spread to encompass a wider array of mortgages outside the traditional GSE product offerings, such as subprime loans, low documentation loans, pay option adjustable-rate mortgages, and second lien loans. The risk inherent in the growing volume of these widely varying pools of mortgage-backed securities should have been more apparent to regulators.

In the larger regulatory scheme, this would fall under what is called operational

risk. This component can be compared to ongoing efforts at financial institutions to reduce the risk of computer hacking by conducting scenarios that might occur during a crisis and putting the resources in place to reduce their likelihood and potential impacts. Had regulators conducted similar scenarios to test the existing system's ability to evaluate large numbers of delinquent loans, they surely would have uncovered serious limitations. Going forward, regulators would be prudent to increase their awareness of the operational risk associated with new products and developments, especially among relatively untested mortgages and securitization types.

MEASURES TO PREVENT FUTURE BUBBLES

Two approaches are often mentioned as preventative measures against house price bubbles. Monetary policy is considered one

Residents of Miami's Liberty City neighborhood come together to clean up the yard of an abandoned home.

option, although combating price bubbles would divert the Federal Reserve from the complex task of balancing inflation pressures and employment growth. More important, monetary policy is a blunt instrument unsuited to address problems that vary greatly across markets.

A better approach is to impose countercyclical capital requirements that would enable financial institutions to sustain substantial losses during unanticipated crises. The recent housing market collapse has fueled interest in revisiting capital requirements and stress testing for large financial institutions, and in avoiding the longstanding practice of bailing out those that have become too big to fail (see Stern and Feldman 2009). Econometric modeling is a useful tool for defining the stress scenarios that would trigger higher capital requirements.

Countercyclical capital buffers would not only help financial institutions withstand future shocks but also reduce the likelihood that house price bubbles would form. Following a housing market downturn, lower capital requirements would have the opposite effect, leading to increased lending and counteracting the tendency for prices to decline. But in contrast to a one-size-fits-all policy, capital requirements should vary across markets. During the recent crisis, for example, the countercyclical capital buffer would have been first implemented in Arizona, California, Florida, and Nevada, where signs of emerging house price bubbles were most apparent.

Admittedly, tailoring capital requirements to local markets is challenging. Indeed, identifying price bubbles or the increasing risk of a severe price drop is not easy, and con-

sensus about the risk is unlikely. Projecting future price changes will never be error-free, and the costs of such errors must be weighed against any gains from this policy. Moreover, the degree of success of such a program will depend on forecasting ability.

Nevertheless, a broader recognition of the importance of local market conditions would be a step in the right direction. We are in the midst of a data revolution that will ultimately enable us to measure house price trends at highly granular levels and to measure the size and composition of distressed housing markets much better than ever before. Indeed, both private and public sector entities are moving to take advantage of this highly positive development in the mortgage market. These new information sources provide opportunities to prepare better for the next housing market bubble.

A more fundamental issue, however, is whether the political will exists to carry out a countercyclical capital policy. There will always be resistance to raising capital requirements when times appear to be good. In the early 2000s, for example, housing markets were booming, but employment was only slowly recovering from the recession. Would policy makers have been willing to adjust capital requirements in such an environment? And would politicians with a lot of clout attempt to manipulate capital requirements for their advantage? If the courage or political will to carry out these steps is lacking, raising capital requirements for all banks to a level that is at least above what is expected during normal times would help to recognize the inherent risk of an economy that depends so heavily upon mortgage debt.



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Preventing House Price Bubbles

Lessons from the 2006–2012 Bust

The recent boom and bust in house prices generated widespread fallout, affecting metropolitan areas across the country. But the extent of the damage varied widely, suggesting that local market conditions also played an important role in determining how the crisis played out. As a result, national aggregates were an unreliable guide to both housing performance and the design of policies to mitigate the crisis.

Based on their recent research for the Lincoln Institute, James R. Follain and Seth H. Giertz document how econometric models can be used to address some of the complex issues that have arisen since the house price bust. In particular, these models provide valuable insights into the interrelationships between house price patterns and their drivers—including new drivers that changed the fundamental dynamics of housing markets, such as the size of the distressed real estate inventory, the pace of price appreciation, and the amount of subprime lending.

These changes made policy making in mid-crisis especially challenging. To illustrate this point, the authors analyze one of the major programs put in place to stem the spread of foreclosures. The Home Affordable Modification Program (HAMP) was developed in 2007 just as the destructive fallout of the crisis began to appear. Traditional tools for measuring and managing the crisis were insufficient. The design of HAMP thus rested upon a number of critical judgments about borrower and lender behavior made without benefit of strong empirical support. While recognizing the challenges of responding to a bust once it has begun, the authors suggest that attempts to deal with any future crises of this type would benefit from certain different design decisions:

- an initial focus on hardest-hit markets to fine-tune program parameters,
- development of longer-term forecasts of house prices for local markets,
- greater efforts to foster more cooperation among all levels of government, and
- fuller recognition of the inherent weaknesses of mortgage securitization.

The report then discusses how econometric results can also be used to identify and prevent, or at least limit, the formation of future house price bubbles. Analysts often mention two specific options for combating unsustainable price increases: monetary policy and countercyclical capital policies. Follain and Giertz argue that monetary policy is of limited use in this arena, given that price appreciation varies so widely across local markets. Countercyclical capital buffers—which would raise capital requirements for financial institutions during the initial stages of the price bubble and reduce them during the period of decline—are a much more promising policy direction because they could be designed to put the brakes on only in those markets where bubbles appear to be developing. The growing availability of geographically granular data make this approach to bubble prevention much more viable than in the past.

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