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# Securitization Reports

## Update: The Outlook for U.S. Home Prices

### Market Update

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## Introduction

Over the last quarter, home prices in most of the U.S. have continued to fall, prompting many to question whether we are at or near bottom yet for home prices. We think not. Foreclosures are still running at a very high pace. The U.S. unemployment rate is now 9.4%, and Deutsche Bank economists see that rate exceeding 10% by early 2010. While home sales activity has picked up in some regions, much of it reflects clearing of distressed inventory and is accompanied by falling prices. With that said, over the last several months, many MSAs reached their all-time highs in affordability, helped by low mortgage rates. Unfortunately, affordability is no longer the driving issue in the housing market, and we believe prices still have a ways to fall in many areas before home prices reach their trough. The bottom is getting closer, but we are not there yet.

In this quarterly update to our Metropolitan Statistical Area (MSA)-based U.S. home price outlook, we have applied the same methodology as first unveiled in March 2009.<sup>1</sup> That is, for each of the top 100 MSAs, we use an affordability analysis<sup>2</sup> as a starting point, and from there, incorporate the impact of four other variables (distressed inventory, unemployment, change-in-unemployment and home price momentum) to arrive at our forecasts.

Each MSA forecast has two elements: 1) the projected decline from “today’s” level (actually, the most recent data is the end of the first quarter 2009), which we call the “current-to-trough” forecast, and 2) the “peak-to-trough” forecast (which is the combined result of actual price declines to date and our projected future decline).

Continued price declines during the first quarter of 2009 mean that, for many MSAs, and for the U.S. as a whole, our “current-to-trough” forecast is a tad rosier than what we published in March. For the U.S., we are now projecting a further **14.0%** decline (from Q1 2009). This compares to the **16.5%** current-to-trough decline that we published in our last outlook, in March 2009.

Our peak-to-trough forecast is a bit worse, reflecting the actual declines to date and the expected future impact on home prices from rising foreclosure inventory and unemployment. Our new peak-to-trough forecast is **41.7%** for the U.S. This compares to **39.6%** as published in March 2009.

This report covers the 100 MSAs in Figure 6. We also discuss some highlights, such as 1) the Top 10 largest MSAs (as measured by share of the subprime/Alt-A mortgage market), 2) the 10 MSAs that experienced the biggest changes in our current-to-trough forecast since our last publication and 3) the 10 MSAs that currently have the *worst* HPA outlook (as well as some commentary on those with the best).

We encourage readers to review our March 2009 home price outlook for a complete explanation of the variables we consider and our methodology. Highlights of this methodology are also included in Appendices D and E. Most of the charts shown in the rest of this analysis start with the price decline that would be forecasted based on max affordability alone, but then also show columns and “scores” (from 1 to 10) for the four other variables.

Note that in this outlook, we have assumed a 5.0% mortgage rate in the affordability component of our analysis. This is the same level we assumed in our March 2009 report.

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<sup>1</sup> DB Securitization Research, *Update: The Outlook for U.S. Home Prices – Beyond the Bubble*, March 29, 2009.

<sup>2</sup> The historic median family income data used in our affordability analysis comes from the U.S. Department of Housing and Urban Development (HUD), and gets revised periodically as new U.S. Census data becomes available. Such revisions can of course impact our forecast results.

While mortgage rates have increased in recent weeks, some believe that the government may continue to try to manage mortgage rates lower. Clearly, higher mortgage rates will reduce affordability; for markets that are only barely affordable now, the rate increase could put downward pressure on prices. As a general matter, a 50 bp change in rates ends up changing home price results by about 300 bp.

### Affordability no longer an issue in most of the “Top 10”

Figure 1 shows the top 10 MSAs in the U.S. (i.e. the 10 MSAs with the largest share of subprime/Alt-A mortgage balances). Together, these 10 MSAs account for an estimated **38%** of the subprime/Alt-A mortgage market. The third column (*Price decline based on max. affordability*) shows how much prices would have to decline from end-Q1 2009 to restore affordability levels to the *maximum* historical level of affordability that has existed in the respective MSA. Note that “N/M” in that column stands for “Not Meaningful” and refers to MSAs where Q1 2009 home prices are *as, or more, affordable* than they have been at any other time.<sup>3</sup> Notably, only one market in the top 10 (New York) stands out as still having a serious affordability problem. But what is also evident from the chart is that even with affordable home prices, factors such as unemployment, distressed inventory and home price momentum are combining to still result in quite negative current-to-trough outlooks in some large MSAs.

**Figure 1: DB's new housing price forecast for the 10 largest mortgage markets**

Top 10 MSAs <sup>1</sup>	Share of subprime/Alt-A mortgage balances outstanding	Price decline based on max. affordability (%) <sup>2</sup>	Distressed inventory score	Unemployment score	Change-in-unemployment score	Home price momentum <sup>3</sup>	DB HPA outlook	
							Q1'09-to-trough (%)	Peak-to-trough (%)
Los Angeles-Long Beach-Glendale, CA MSAD	8.5%	N/M	8	9	5	7	-11.3%	-50.4%
Riverside-San Bernardino-Ontario, CA	5.0	N/M	10	10	6	9	-14.3	-63.1
New York-White Plains-Wayne, NY-NJ MSAD	3.8	-32.0	5	5	4	5	-40.6	-52.1
DC Metro Washington-Arlington-Alexandria, DC-VA-MD-WV MSAD	3.4	-2.3	6	5	2	8	-12.3	-42.7
Orange County Santa Ana-Anaheim-Irvine, CA MSAD	3.2	-7.9	6	6	7	6	-19.1	-49.7
San Diego-Carlsbad-San Marcos, CA	3.2	N/M	7	7	5	4	-8.7	-51.6
Phoenix-Mesa-Scottsdale, AZ	3.1	N/M	8	3	3	10	-10.8	-57.2
Oakland-Fremont-Hayward, CA MSAD	2.9	N/M	7	8	8	10	-13.1	-63.8
Chicago-Naperville-Joliet, IL MSAD	2.6	N/M	8	7	7	9	-12.7	-39.0
Las Vegas-Paradise, NV	2.4	N/M	9	9	8	9	-14.2	-57.8
<b>Total for Top 10</b>	<b>38.2%</b>							
<b>Nationwide</b>	<b>100.0%</b>						<b>-14.0%</b>	<b>-41.7%</b>

1. Within each MSA, there may also be subdivisions, referred to as MSADs or “Metropolitan Statistical Area Divisions.” An MSAD includes a subset of MSA counties with a population of 2.5 million or more. Because of their relatively large population, MSADs are often included in tables where MSAs are ranked.

2. Price decline to restore affordability to its historical peak in a given MSA.

3. Home price momentum is measured by the House Price Index (HPI), which measures the median sale prices for existing single-family homes sold in the U.S. The source for home price data for this analysis is National Association of Realtors (NAR). For more on this data source, as well as Case-Shiller and FHFA (two other commonly cited sources for home price data), please see Appendix C.

Note: Totals may not add due to rounding.

Source: US Department of Labor, National Association of Realtors (NAR), First American CoreLogic, LoanPerformance, Deutsche Bank

<sup>3</sup> The beginning of the data set is 1980.

## New York is least affordable of the Top 10

In New York, prices still have to drop an additional 32.0% from Q1 2009 levels just to restore affordability to its historic high (1998), as has already occurred in 74 of the top 100 markets. But including model risk factors beyond just affordability, we are projecting a 40.6% decline, from Q1 2009. This is, however, improvement from the projected decline that we published in March (47.4%). The improvement is due simply to the fact that recent price declines have brought New York closer to the trough. Somewhat confusingly, actual home price declines can impact our analytical framework in competing ways. First, all else equal, if prices have declined, then the MSA should be that much closer to its bottom for prices. However, because our model also includes a risk factor score for negative home price *momentum*, dramatic price declines can also have at least a partially offsetting negative effect.

The peak for home prices in the New York MSA was in Q2 2007, when the median home price hit \$552k. As of Q1 2009, the median home price had dropped to \$446k, down 19% from the peak. While this is painful, it pales in comparison to what has already been experienced in many other regions of the country, particularly in parts of California, Florida, Arizona and Nevada. Many MSAs in those states peaked earlier than New York and prices have been falling in those areas for longer. Our total, peak-to-trough forecasted decline in New York is 52.1%.

Like most of the other California MSAs, *Los Angeles* and *Riverside* (#1 and #2, respectively, by size) now appear to be undervalued as measured purely by affordability. However, also like many other California MSAs, the labor markets, and distressed inventory, will both likely weigh on new housing for the foreseeable future. The unemployment rates in these MSAs have soared, most recently hitting 11.9% and 13.7%, respectively, for Los Angeles and Riverside. In Riverside, we are projecting excess distressed inventory to account for a third of housing inventory (33.8%), resulting in a '10' risk ranking for that measure. Given the drags on these two California markets, we have a current-to-trough outlook in L.A. for a further 11.3% decline, and current-to-trough outlook for Riverside of 14.3%.

*Washington D.C.* is one of the few MSAs on this chart where housing does still seem to be overvalued, albeit barely. Based on affordability alone, we would forecast that prices would still have to drop another 2.3%. Government hiring has likely helped keep the unemployment and change-in-unemployment risk factor scores low (relative to other MSAs) in Washington. But because of the impact of the other risk factors in our model, our current-to-trough outlook in Washington, D.C. is for another 12.3% decline. *Orange County* is the other top MSA (after New York) that still has an affordability issue. Based on affordability reversion alone, we project that prices need to drop another 7.9% in Orange County. Orange County is likely to see some pressure from unemployment, which has been increasing at a faster pace in recent months. Our updated current-to-trough forecast considering all factors is now 19.1%, and peak-to-trough is 49.7%.

In our analysis, *San Diego* is still likely to see some declines, but with "only" an additional 8.7% of home price depreciation to go, it appears closest to its trough of the Top 10 MSAs on this list. Prices are still declining, but at a slower pace (3% between Q4'08 and Q1'09, versus an average quarterly decline of 11% for the previous four quarters). Excess distressed inventory still continues to weigh on that market, but most of the other risk factors in our model have improved slightly since we last published. It should be noted that San Diego was one of the earliest markets to see prices start declining, peaking four years ago, in 2005.

The *Phoenix* MSA has a relatively low unemployment rate score (a '3'), compared to others on this list. However, the negative home price momentum risk factor score is a '10'. The median price is now (Q1 2009) \$131k in Phoenix, down 16% from the Q4 2008 level (\$158k), and 42% from a year earlier in Q1 2008. While this has certainly pushed Phoenix into "affordable" territory, it will be difficult to reverse that negative momentum in the near

future. We project a further decline of 10.8% for Phoenix before reaching the trough. The *Oakland* MSA is also fundamentally affordable, but has relatively high scores for all of the other risk factors in our model. We are still projecting another 13.1% decline for Oakland, corresponding to a peak-to-trough decline of 63.8%.

In *Chicago*, home price declines between Q4 2008 and Q1 2009 helped make progress toward a bottom for housing, resulting in a current-to-trough forecast of a 12.7% decline versus the 16.0% current-to-trough as of last quarter. Our peak-to-trough decline forecast is 39.0%; this is on the low side compared to the peak-to-trough projections that we have for areas where the credit bubble was more of an issue, or where whole industrial sectors have suffered. (e.g. autos in the Midwest.) Finally, *Las Vegas* is now also affordable, but we are still projecting another 14.2% decline (current-to-trough) based on high risk factor scores for all of the other model variables. In particular, Las Vegas has a '9' for distressed inventory, unemployment, and home price momentum.

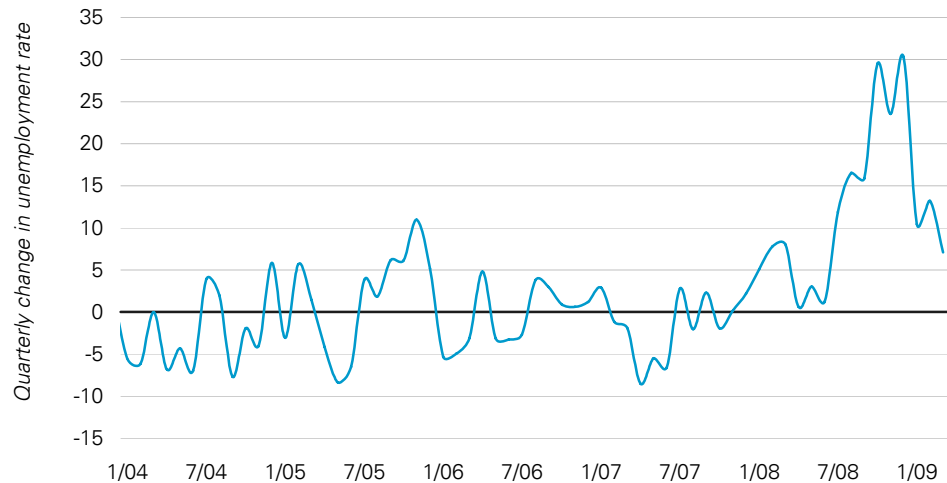
### **The 10 MSAs where our outlooks are most changed since last quarter**

The following chart shows the 10 MSAs where our "current-to-trough" forecast changed the most (all changed for the better), since we last published our outlook in March 2009. These MSAs together account for 18.5% of the subprime/Alt-A mortgage market. The chart compares the current-to-trough forecasts and peak-to-trough forecasts for these MSAs, between Q4 2008 and Q1 2009.

When referring to the chart in Figure 3, note that, in general, the changes in our "peak-to-trough" projections between these periods can be attributed to how our model functions and how it incorporates the effects of the four risk factors. Changes in "current-to-trough," however, will relate largely to the amount of actual price decline that was seen over the period.

The MSA to see the biggest forecast change is the *Barnstable, MA* MSA. To be sure, this is among the smallest of our 100 MSAs, accounting for just 0.12% of the total mortgage market. However, Barnstable provides a good illustration of how our methodology works and how the results can change from quarter to quarter. Back in March, Barnstable was still fundamentally overvalued by affordability standards—we estimated that prices would have needed to fall another 10.6% just based on affordability alone, from where prices were in Q4 2008. In fact, the median home price fell 12% between the two quarters. This helped get Barnstable prices closer to their trough, as did an improvement to its change-in-unemployment risk factor score. This factor moved from a 10 in Q4 2008, to a 1 for Q1 2009. Figure 2 shows how the quarterly change-in-unemployment has declined in recent quarters:

**Figure 2: The pace of increase for Barnstable's unemployment rate has been slowing dramatically in recent quarters, helping our projection**



Source: U.S. Department of Labor, Deutsche Bank

The effects of these factors taken together made our current-to-trough projection for Barnstable the "most changed" between our March publication and today, changing from an outlook of -24.4% in March, to -8.3% for this updated projection.

**Figure 3: MSAs with the most changed HPA outlook**

MSA name (shortened)	Share of subprime/Alt-A mortgage balances outstanding	Price decline based on max. affordability (%)	Current-to-trough outlook			Peak-to-trough outlook		
			Q4'08-to-trough (%) (March publication)	Q1'09-to-trough (%) (June publication)	Change since last report	March publication	June publication	Change since last report
Barnstable, MA	0.1%	N/M	-24.4%	-8.3%	+16.1%	-39.2%	-35.4%	+3.8%
Orlando, FL	1.3	N/M	-28.3	-14.6	+13.7	-53.2	-50.1	+3.1
Miami, FL	2.0	-18.2	-42.1	-29.9	+12.2	-67.3	-62.4	+4.9
Los Angeles, CA	8.5	N/M	-22.1	-11.3	+10.8	-53.0	-50.4	+2.6
Tampa, FL	0.4	-0.6	-24.4	-13.8	+10.6	-50.1	-46.5	+3.6
West Palm Beach, FL	1.0	-19.5	-43.4	-33.6	+9.8	-61.9	-58.4	+3.5
San Luis Obispo, CA	0.2	-2.4	-20.2	-11.9	+8.3	-38.9	-38.7	+0.2
Edison, NJ	0.8	-17.3	-33.4	-25.6	+7.8	-41.9	-38.4	+3.5
DC Metro, DC	3.4	-2.3	-20.0	-12.3	+7.7	-45.3	-42.7	+2.6
Newark, NJ	0.8	N/M	-14.4	-6.9	+7.5	-25.6	-21.4	+4.2
<b>Total for Top 10</b>	<b>18.6%</b>							

Note: Totals may not add due to rounding.

Source: US Department of Labor, National Association of Realtors (NAR), First American CoreLogic, LoanPerformance, Deutsche Bank

We now look at the other MSAs that appear on this most-changed list. *Orlando, FL* is the next most-changed; the entire difference in our Orlando projection can be attributed to changes in affordability. When we published in March, home prices would have had to have dropped 8.3% to restore affordability to the point of maximum affordability in Orlando. Between Q4'08 and Q1'09, prices declined 10.2%. The other four model factors were unchanged (at relatively high levels). We are projecting an additional 14.6% decline from here before the trough is reached, in spite of affordability no longer being an issue in Orlando. In *Miami, FL*, our new current-to-trough forecast is -29.9%. Both the change-in-unemployment score and the home price momentum score have moderated; the change-in-unemployment score improved from '8' to '3' during the quarter, while the home price momentum score improved from a '10' to a '3'.

We already wrote about some of the factors at work in the Los Angeles, CA market on page 5 in our section on the Top 10 markets. Distressed inventory and a high unemployment rate are likely to continue to weigh on the market, but improvements in both the change-in-unemployment risk factor, and the home price momentum risk factor, allowed us to revise our projection. The change in our current-to-trough outlook for the *Tampa, FL* MSA appears to be largely driven by a slowing pace of home price declines. (The median home price in Tampa as of Q1 2009 was \$142.5k, 5% lower than the Q4'08 price. But the Q4'08 price was, in turn, 10% lower than the Q3'08 price.) Affordability is now almost as high as it was in 1994, which was the peak point of affordability for Tampa since the beginning of our data set (1980).

The *West Palm Beach, FL* MSA is among the MSAs that still have a serious affordability problem. We project that home prices would still need to drop another 19.5% from Q1 2009 levels in order to reach their point of historic affordability. When we add in (quite negative) scores for the other four factors in our model, we still believe that prices have another 33.6% to fall before the bottom is reached in West Palm Beach, even after the meaningful progress toward the bottom that was made between the two quarters.

The *San Luis Obispo, CA* MSA, comprises just 0.2% of the subprime/Alt-A mortgage market, and with a peak-to-trough home price projection of 38.9%, is not bearing the brunt of the housing problems in California (where many other MSAs have peak-to-trough declines projected in the 50%–70% range). Our current-to-trough projection improved between the two quarters largely because of price declines seen over the quarter. *Edison, NJ* is another small MSA (0.8% of the market), and is a bedroom community of New York City. Edison has seen a significant improvement in its unemployment risk factor score (relative to other MSAs). Its change-in-unemployment score improved from 9 to 2 over the period since our last publication. And a 4% decline in the median home price (from \$348.8k down to \$333.3k) also contributed to a decline in the current-to-trough projection. For *Washington D.C.*, price declines that have improved affordability have allowed our current-to-trough projection to improve, with more progress made toward a home price trough. The *Newark, NJ* MSA, rounds out the list. As was the case for Edison, the change-in-unemployment rate score also improved here since our March publication, with the factor changing from 7 to 4. While prices had already reached their maximum affordability point back in March, the median home price continued to slip, declining another 3.3%. These trends combined to cause our current-to-trough projection for Newark to improve.

The next category of MSAs are those where we are projecting the most significant price declines still to come. These 10 MSAs are shown in Figure 4 below.

**Figure 4: The 10 MSAs with the largest expected future depreciation**

MSA name (shortened)	Share of subprime/Alt-A mortgage balances outstanding	Price decline based on max. affordability (%)	Distressed inventory score	Unemployment score	Change-in-unemployment score	Home price momentum score	DB HPA outlook	
							Q1'09-to-trough (%)	Peak-to-trough (%)
New York, NY	3.8%	-32.0%	5	5	4	5	-40.6%	-52.1%
Fort Lauderdale, FL	1.6	-22.5	10	6	9	2	-35.3	-62.1
West Palm Beach, FL	1.0	-19.5	9	8	8	6	-33.6	-58.4
Salt Lake City, UT	0.4	-26.3	2	1	9	1	-32.0	-32.0
Miami, FL	2.0	-18.2	10	5	3	5	-29.9	-62.4
Baltimore, MD	1.0	-19.6	5	3	6	5	-28.6	-36.8
Long Island, NY	1.7	-19.2	7	2	5	3	-28.0	-43.3
Allentown, PA	0.2	-19.4	6	4	1	5	-27.3	-36.5
Portland, OR	0.9	-15.4	4	9	10	6	-27.0	-37.3
Virginia Beach, VA	0.5	-16.8	4	2	8	6	-26.2	-38.1
<b>Total for Top 10</b>	<b>13.1%</b>							

Note: Totals may not add due to rounding.

Source: US Department of Labor, National Association of Realtors (NAR), First American CoreLogic, LoanPerformance, Deutsche Bank

Our largest projected current-to-trough decline is for the *New York, NY MSA*, of another 41% from Q1 2009, driven largely by continued expected home prices required to restore affordability per our methodology. (See page 5 for more on the factors driving New York.)

We are projecting prices in the *Fort Lauderdale, FL MSA* to drop an additional 35.3% from Q1 2009, which would ultimately result in a peak-to-trough decline of 62.1%. This magnitude of peak-to-trough decline is similar to what we expect in neighboring Florida MSAs that are also on this list; specifically, West Palm Beach and Miami, with peak-to-trough declines of -58.4% and -62.4%, respectively. Fort Lauderdale has an excess distressed inventory score of 10, and a change-in-unemployment rate score of 9. The West Palm Beach, FL MSA is #3 on this list. (Please see page 8 for more detail on West Palm Beach.)

The *Salt Lake City, UT MSA* is unique on this list, because prices have risen over the past two quarters, and are now at their historic peak. That being the case, our peak-to-trough forecast is identical to our current-to-trough forecast. Based on affordability alone, we believe that prices will need to decline in Salt Lake City by 26.3% from here, but other model factors bring that projection to a 33.6% decline from here. However, prices have been increasing in Salt Lake City, from \$222.8k in Q3 2008, to \$226.7 in Q4 2008, and again to \$237.2k in Q1 2009. So there is meaningful momentum in place, which could prove our current-to-trough outlook here to be conservative.

The *Miami, FL MSA* appears next on this list, with a current-to-trough projection of -29.9%. Please see our earlier discussion on page 7 for more on Miami. We are projecting another 28.6% decline in prices for the *Baltimore, MD MSA*, which corresponds to a 36.8% peak-to-trough decline projection. Affordability is the main factor that puts Baltimore on this list. The *Nassau-Suffolk County, NY MSA (Long Island)* is next on our list of MSAs with the largest expected future depreciation. Apart from affordability, the other risk factors that we consider are all relatively good (particularly unemployment). However, we believe that prices will have to fall by 19.2% just to bring affordability back to historic highs, and, including the other factors, believe that current-to-trough decline for Long Island of -28.0% is in the cards. Following Long Island on the list is the *Allentown, PA MSA*, which comprises just 0.1% of the mortgage market. In Allentown, prices would need to decline another 19.4% just to restore affordability to the peak affordability period. As a result, we project that prices will decline a total of 27.3% from Q1 2009 (after also considering the other four factors), before the bottom is reached.

The *Portland, OR MSA* also makes this list. While affordability is still somewhat of an issue (with prices needing to drop another 15.4% to restore maximum affordability levels), an equally important problem for Portland right now is its labor market situation. The current unemployment rate is 11.6%, and its change-in-unemployment rate risk score is a 10. Considering these, we believe another 27.0% decline in home prices is likely for Portland, which would correspond to a 37.3% peak-to-trough decline. The *Virginia Beach, VA MSA* rounds out our list of those MSAs where we are projecting the worst declines. We are projecting another 26.2% decline here, driven largely by the 16.8% decline related exclusively to our affordability analysis.

Our final set of Top 10 MSAs includes those where we are expecting the least amount of price decline going forward (lowest current-to-trough price declines). We are not going to address all of these individually, but want to point out a few things. First, altogether, these 10 MSAs account for just 4.7% of the subprime/Alt-A mortgage market. As a result, they contribute very little to our weighted average calculation when we are deriving our U.S. averages. The second thing to note is that affordability is no longer an issue in any of these areas. In most of these MSAs, five of which are in Texas, and two of which are in Colorado, affordability never became a huge problem to begin with. Also, in some of these MSAs home prices in Q1 2009 are higher than in Q4 2008 (specifically, in San Antonio, Oklahoma City and Boulder). The other thing to note about these MSAs is that none of them have any score in any of the four other categories higher than 6.



**Figure 5: 10 best MSAs with current-to-trough HPD**

MSA name (shortened)	Share of subprime/Alt-A mortgage balances outstanding	Price decline based on max. affordability (%)	Distressed inventory score	Unemployment score	Change-in-unemployment score	Home price momentum* score	DB HPA outlook	
							Q1'09-to-trough (%)	Peak-to-trough (%)
San Antonio, TX	0.3%	N/M	1	1	1	1	-0.2%	-2.4%
Oklahoma City, OK	0.1%	N/M	1	1	3	1	-1.0	-6.7
Pittsburgh, PA	0.2%	N/M	2	2	1	2	-1.6	-9.3
Austin, TX	0.3%	N/M	1	2	3	2	-1.7	-3.5
Houston, TX	1.2%	N/M	2	2	3	2	-2.4	-3.1
Dallas, TX	1.0%	N/M	1	3	5	2	-2.7	-10.5
Boulder, CO	0.1%	N/M	1	1	6	2	-2.7	-14.8
Fort Worth, TX	0.4%	N/M	1	2	4	4	-3.1	-11.0
Colorado Springs, CO	0.2%	N/M	2	5	4	3	-3.9	-19.5
Philadelphia, PA	0.8%	N/M	3	4	3	3	-4.2	-12.3
<b>Total for Top 10</b>	<b>4.7%</b>							

Note: Totals may not add due to rounding.

Source: US Department of Labor, National Association of Realtors (NAR), First American CoreLogic, LoanPerformance, Deutsche Bank

Figure 6 shows our current-to-trough and peak-to-trough forecasts for all 100 MSAs covered in our report.

**Figure 6: Deutsche Bank's current-to-trough and peak-to-trough home price outlook for 100 U.S. metropolitan areas<sup>a</sup>**

MSA name	DB HPA outlook <sup>b</sup>	
	Current-to-trough (%) <sup>1</sup>	Peak-to-trough (%) <sup>2</sup>
Los Angeles-Long Beach-Glendale, CA MSAD	-11.3%	-50.4%
Riverside-San Bernardino-Ontario, CA	-14.3	-63.1
New York-White Plains-Wayne, NY-NJ MSAD	-40.6	-52.1
DC Metro Washington-Arlington-Alexandria, DC-VA-MD-WV MSAD	-12.3	-42.7
Orange County Santa Ana-Anaheim-Irvine, CA MSAD	-19.1	-49.7
San Diego-Carlsbad-San Marcos, CA	-8.7	-51.6
Phoenix-Mesa-Scottsdale, AZ	-10.8	-57.2
Oakland-Fremont-Hayward, CA MSAD	-13.1	-63.8
Chicago-Naperville-Joliet, IL MSAD	-12.7	-39.0
Las Vegas-Paradise, NV	-14.2	-57.8
Sacramento-Arden-Arcade-Roseville, CA	-11.1	-60.1
Atlanta-Sandy Springs-Marietta, GA	-9.7	-38.7
Miami-Miami Beach-Kendall, FL MSAD	-29.9	-62.4
San Jose-Sunnyvale-Santa Clara, CA	-12.7	-53.1
Long Island Nassau-Suffolk, NY MSAD	-28.0	-43.3
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL MSAD	-35.3	-62.1
San Francisco-San Mateo-Redwood City, CA MSAD	-6.3	-33.3
Seattle-Bellevue-Everett, WA MSAD	-21.4	-35.2
Orlando-Kissimmee, FL	-14.6	-50.1
Denver-Aurora, CO	-14.3	-31.8
Tucson, AZ	-7.3	-34.3
Houston-Sugar Land-Baytown, TX	-2.4	-3.1
Minneapolis-St. Paul-Bloomington, MN-WI	-7.7	-30.7
Baltimore-Towson, MD	-28.6	-36.8
West Palm Beach-Boca Raton-Boynton Beach, FL MSAD	-33.6	-58.4
Dallas-Plano-Irving, TX MSAD	-2.7	-10.5

**Figure 6: Deutsche Bank's current-to-trough and peak-to-trough home price outlook for 100 U.S. metropolitan areas<sup>a</sup> (Cont'd)**

Oxnard-Thousand Oaks-Ventura, CA	-8.7	-49.0
Portland-Vancouver-Beaverton, OR-WA	-27.0	-37.3
Newark-Union, NJ-PA MSAD	-6.9	-21.4
Edison, NJ MSAD	-25.6	-38.4
Stockton, CA	-12.0	-69.2
Philadelphia, PA	-4.2	-12.3
Boston-Quincy, MA	-10.4	-34.4
Cape Coral-Fort Myers, FL	-14.4	-74.1
Vallejo-Fairfield, CA	-12.7	-63.4
Santa Rosa-Petaluma, CA	-7.6	-49.4
Detroit-Livonia-Dearborn, MI	-13.9	-58.9
Providence-New Bedford-Fall River, RI-MA	-9.5	-36.9
Jacksonville, FL	-13.0	-31.9
Bridgeport-Stamford-Norwalk, CT	-14.0	-31.1
Bakersfield, CA	-13.2	-61.4
Virginia Beach-Norfolk-Newport News, VA-NC	-26.2	-38.1
Modesto, CA	-12.7	-68.8
Honolulu, HI	-18.3	-27.3
Fresno, CA	-11.5	-55.3
St. Louis, MO-IL	-6.1	-30.0
Salinas, CA	-10.6	-69.9
Sarasota-Bradenton-Venice, FL	-14.7	-65.7
Salt Lake City, UT	-32.0	-32.0
Tampa-St. Petersburg-Clearwater, FL	-13.8	-46.5
Charlotte-Gastonia-Concord, NC-SC	-7.1	-18.7
Santa Barbara-Santa Maria, CA	-7.6	-60.6
Cleveland-Elyria-Mentor, OH	-7.9	-51.5
Fort Worth-Arlington, TX MSAD	-3.1	-11.0
Kansas City, MO-KS	-4.4	-19.4
Austin-Round Rock, TX	-1.7	-3.5
Cincinnati-Middletown, OH-KY-IN	-7.9	-29.2
Nashville-Davidson-Murfreesboro, TN	-5.3	-16.2
Tulsa, OK	-5.7	-7.2
Naples-Marco Island, FL	-13.4	-63.1
Santa Cruz-Watsonville, CA	-9.8	-55.2
Columbus, OH	-6.1	-22.8
Memphis, TN-MS-AR	-4.8	-32.8
Indianapolis-Carmel, IN	-5.6	-22.5
Richmond, VA	-21.5	-28.0
Reno-Sparks, NV	-9.6	-47.2
San Antonio, TX	-0.2	-2.4
Hartford-West Hartford-East Hartford, CT	-4.9	-17.9
New Haven-Milford, CT	-7.8	-28.8
Port St. Lucie-Fort Pierce, FL	-14.5	-58.6
Milwaukee-Waukesha-West Allis, WI	-9.0	-13.7
Colorado Springs, CO	-3.9	-19.5
Pittsburgh, PA	-1.6	-9.3
San Luis Obispo-Paso Robles, CA	-11.9	-38.7

**Figure 6: Deutsche Bank's current-to-trough and peak-to-trough home price outlook for 100 U.S. metropolitan areas<sup>a</sup> (Cont'd)**

Merced, CA	-12.7	-75.7
Boise City-Nampa, ID	-6.6	-29.2
Worcester, MA	-9.1	-43.1
Lakeland, FL	-14.7	-44.3
Poughkeepsie-Newburgh-Middletown, NY	-10.8	-30.4
Palm Bay-Melbourne-Titusville, FL	-13.2	-53.7
Deltona-Daytona Beach-Ormond Beach, FL	-13.3	-47.2
Raleigh-Cary, NC	-15.0	-17.8
Charleston-North Charleston, SC	-8.0	-19.8
Birmingham-Hoover, AL	-8.2	-25.7
Visalia-Porterville, CA	-9.8	-50.5
Albuquerque, NM	-4.7	-11.5
New Orleans-Metairie-Kenner, LA	-25.0	-35.9
Louisville, KY-IN	-6.4	-21.0
Provo-Orem, UT	-13.8	-21.3
Allentown-Bethlehem-Easton, PA-NJ	-27.3	-36.5
Napa, CA	-11.4	-48.4
Oklahoma City, OK	-1.0	-6.7
Ogden-Clearfield, UT	-8.0	-11.7
Boulder, CO	-2.7	-14.8
Portland-South Portland-Biddeford, ME	-8.8	-28.2
Greeley, CO	-5.1	-21.8
Barnstable Town, MA	-8.3	-35.4
Fort Collins-Loveland, CO	-4.4	-9.9
Akron, OH	-11.5	-60.1
Springfield, MA	-8.9	-24.9
<b>U.S.</b>	<b>-14.0%</b>	<b>-41.7%</b>

a. These MSAs are ranked by their relative shares of outstanding subprime/Alt-A mortgage credit, using First American CoreLogic, LoanPerformance data. (First American CoreLogic, LoanPerformance, a subsidiary of First American Real Estate Solutions, is an analytics tool, and one of the industry's largest mortgage loans, securities and servicing databases.)

b. Assuming a 5.0% mortgage rate. To derive the total U.S. home price outlook, we weight each MSA by its share of the total mortgage market (not just subprime/Alt-A). Underlying home price data comes from the National Association of Realtors (NAR) (or, where unavailable from the NAR, from local realtor associations such as California Association of Realtors).

1. Cumulative nominal change in home prices from "current"-to-trough. "Current" is Q1 2009 home prices (which is the most recent available).

2. Cumulative nominal change (not inflation-adjusted) in home prices from "peak"-to-trough. The "peak" period varies by MSAs, as does the likely horizon for correction to occur.

Note: Totals may not add due to rounding.

Source: First American CoreLogic, LoanPerformance, Deutsche Bank

## Conclusion

Recent home price declines have made most MSAs in the U.S. as affordable as they have been in recent memory. However, we believe that a very weak labor market, and a surplus of housing inventory (much of it distressed), are likely to weigh on home prices for a while longer before bottom is reached. A low mortgage rate would certainly help hasten the recover; a significant downside risk to our forecast would be if mortgage rates stay closer to 6% (or higher), than the 4.5%–5.0% level that the government expressed interest in managing to, several months ago.

# Appendix A

## MSAs ranked by their percentage of Alt-A and subprime

**Figure 7: The following MSAs, ranked by their percentage share of Alt-A and subprime markets combined, represent 90% of the total mortgage market**

MSA name	% of Alt-A/ subprime outstandings	Cumulative % share of Alt-A/subprime outstandings
Los Angeles-Long Beach-Glendale, CA MSAD	8.5%	8.5%
Riverside-San Bernardino-Ontario, CA	5.0	13.5
New York-White Plains-Wayne, NY-NJ MSAD	3.8	17.3
DC Metro Washington-Arlington-Alexandria, DC-VA-MD-WV MSAD	3.4	20.7
Orange County Santa Ana-Anaheim-Irvine, CA MSAD	3.2	24.0
San Diego-Carlsbad-San Marcos, CA	3.2	27.2
Phoenix-Mesa-Scottsdale, AZ	3.1	30.2
Oakland-Fremont-Hayward, CA MSAD	2.9	33.2
Chicago-Naperville-Joliet, IL MSAD	2.6	35.8
Las Vegas-Paradise, NV	2.4	38.2
Sacramento-Arden-Arcade-Roseville, CA	2.1	40.3
Atlanta-Sandy Springs-Marietta, GA	2.1	42.4
Miami-Miami Beach-Kendall, FL MSAD	2.0	44.3
San Jose-Sunnyvale-Santa Clara, CA	1.8	46.2
Long Island Nassau-Suffolk, NY MSAD	1.7	47.9
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL MSAD	1.6	49.5
San Francisco-San Mateo-Redwood City, CA MSAD	1.6	51.1
Seattle-Bellevue-Everett, WA MSAD	1.4	52.4
Orlando-Kissimmee, FL	1.3	53.8
Denver-Aurora, CO	1.3	55.1
Tucson, AZ	1.3	56.3
Houston-Sugar Land-Baytown, TX	1.2	57.5
Minneapolis-St. Paul-Bloomington, MN-WI	1.2	58.7
Baltimore-Towson, MD	1.0	59.7
West Palm Beach-Boca Raton-Boynton Beach, FL MSAD	1.0	60.7
Dallas-Plano-Irving, TX MSAD	1.0	61.7
Oxnard-Thousand Oaks-Ventura, CA	0.9	62.6
Portland-Vancouver-Beaverton, OR-WA	0.9	63.5
Newark-Union, NJ-PA MSAD	0.8	64.4
Edison, NJ MSAD	0.8	65.2
Stockton, CA	0.8	66.0
Philadelphia, PA	0.8	66.8
Boston-Quincy, MA	0.7	67.5
Cape Coral-Fort Myers, FL	0.6	68.1
Vallejo-Fairfield, CA	0.6	68.6
Santa Rosa-Petaluma, CA	0.5	69.2
Detroit-Livonia-Dearborn, MI	0.5	69.7
Providence-New Bedford-Fall River, RI-MA	0.5	70.2
Jacksonville, FL	0.5	70.7
Bridgeport-Stamford-Norwalk, CT	0.5	71.2

**Figure 7: The following MSAs, ranked by their percentage share of Alt-A and subprime markets combined, represent 90% of the total mortgage market (Cont'd)**

Bakersfield, CA	0.5	71.7
Virginia Beach-Norfolk-Newport News, VA-NC	0.5	72.2
Modesto, CA	0.5	72.7
Honolulu, HI	0.5	73.2
Fresno, CA	0.5	73.7
St. Louis, MO-IL	0.5	74.2
Salinas, CA	0.5	74.6
Sarasota-Bradenton-Venice, FL	0.4	75.0
Salt Lake City, UT	0.4	75.5
Tampa-St. Petersburg-Clearwater, FL	0.4	75.9
Charlotte-Gastonia-Concord, NC-SC	0.4	76.3
Santa Barbara-Santa Maria, CA	0.4	76.7
Cleveland-Elyria-Mentor, OH	0.4	77.1
Fort Worth-Arlington, TX MSAD	0.4	77.4
Kansas City, MO-KS	0.4	77.8
Austin-Round Rock, TX	0.3	78.2
Cincinnati-Middletown, OH-KY-IN	0.3	78.5
Nashville-Davidson-Murfreesboro, TN	0.3	78.8
Tulsa, OK	0.3	79.2
Naples-Marco Island, FL	0.3	79.5
Santa Cruz-Watsonville, CA	0.3	79.8
Columbus, OH	0.3	80.1
Memphis, TN-MS-AR	0.3	80.4
Indianapolis-Carmel, IN	0.3	80.7
Richmond, VA	0.3	81.0
Reno-Sparks, NV	0.3	81.3
San Antonio, TX	0.3	81.6
Hartford-West Hartford-East Hartford, CT	0.3	81.8
New Haven-Milford, CT	0.3	82.1
Port St. Lucie-Fort Pierce, FL	0.3	82.3
Milwaukee-Waukesha-West Allis, WI	0.2	82.6
Colorado Springs, CO	0.2	82.8
Pittsburgh, PA	0.2	83.0
San Luis Obispo-Paso Robles, CA	0.2	83.3
Merced, CA	0.2	83.5
Boise City-Nampa, ID	0.2	83.7
Worcester, MA	0.2	83.9
Lakeland, FL	0.2	84.2
Poughkeepsie-Newburgh-Middletown, NY	0.2	84.4
Palm Bay-Melbourne-Titusville, FL	0.2	84.6
Deltona-Daytona Beach-Ormond Beach, FL	0.2	84.8
Raleigh-Cary, NC	0.2	85.0
Charleston-North Charleston, SC	0.2	85.2
Birmingham-Hoover, AL	0.2	85.4
Visalia-Porterville, CA	0.2	85.6
Albuquerque, NM	0.2	85.8
New Orleans-Metairie-Kenner, LA	0.2	86.0
Louisville, KY-IN	0.2	86.1

**Figure 7: The following MSAs, ranked by their percentage share of Alt-A and subprime markets combined, represent 90% of the total mortgage market (Cont'd)**

Provo-Orem, UT	0.2	86.3
Allentown-Bethlehem-Easton, PA-NJ	0.2	86.4
Napa, CA	0.2	86.6
Oklahoma City, OK	0.1	86.7
Ogden-Clearfield, UT	0.1	86.9
Boulder, CO	0.1	87.0
Portland-South Portland-Biddeford, ME	0.1	87.1
Greeley, CO	0.1	87.2
Barnstable Town, MA	0.1	87.4
Fort Collins-Loveland, CO	0.1	87.5
Akron, OH	0.1	87.6
Springfield, MA	0.1	87.7
<b>Cumulative Total % of Subprime/Alt-A Markets*</b>		<b>87.7%</b>
<b>Cumulative Total % of Total Mortgage Market*</b>		<b>90.0%</b>

\* The respective shares for each MSA of the subprime/Alt-A markets (2nd column above) were derived by using each MSAs percentage of the state level data in the LoanPerformance (LP) database. When calculating the respective shares for each MSA of the *total* mortgage market (3rd column), we extrapolated based on what is shown for other prime mortgage categories in LP to estimate the relative percentages attributed to conforming, incorporating that to get the shares of the total.

Source: Deutsche Bank

# Appendix B

## MSAs ranked price decline based on max. affordability (%)

**Figure 8: Home price change required to restore affordability—a minority of MSAs still are fundamentally overvalued (5% mortgage rate assumed)**

MSA name	Price decline based on max. affordability (%)*
New York-White Plains-Wayne, NY-NJ MSAD	-32.0%
Salt Lake City, UT	-26.3
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL MSAD	-22.5
New Orleans-Metairie-Kenner, LA	-19.6
Baltimore-Towson, MD	-19.6
West Palm Beach-Boca Raton-Boynton Beach, FL MSAD	-19.5
Allentown-Bethlehem-Easton, PA-NJ	-19.4
Long Island Nassau-Suffolk, NY MSAD	-19.2
Miami-Miami Beach-Kendall, FL MSAD	-18.2
Edison, NJ MSAD	-17.3
Virginia Beach-Norfolk-Newport News, VA-NC	-16.8
Portland-Vancouver-Beaverton, OR-WA	-15.4
Richmond, VA	-14.1
Seattle-Bellevue-Everett, WA MSAD	-12.8
Honolulu, HI	-9.5
Raleigh-Cary, NC	-8.1
Provo-Orem, UT	-8.0
Orange County Santa Ana-Anaheim-Irvine, CA MSAD	-7.9
Bridgeport-Stamford-Norwalk, CT	-7.6
Denver-Aurora, CO	-6.9
Ogden-Clearfield, UT	-5.0
Poughkeepsie-Newburgh-Middletown, NY	-2.5
San Luis Obispo-Paso Robles, CA	-2.4
DC Metro Washington-Arlington-Alexandria, DC-VA-MD-WV MSAD	-2.3
Tampa-St. Petersburg-Clearwater, FL	-0.6
Milwaukee-Waukesha-West Allis, WI	0.0
Greeley, CO	N/M
Philadelphia, PA	N/M
San Francisco-San Mateo-Redwood City, CA MSAD	N/M
Fresno, CA	N/M
Salinas, CA	N/M
Charleston-North Charleston, SC	N/M
Worcester, MA	N/M
Sarasota-Bradenton-Venice, FL	N/M
Memphis, TN-MS-AR	N/M
Birmingham-Hoover, AL	N/M
Charlotte-Gastonia-Concord, NC-SC	N/M
Riverside-San Bernardino-Ontario, CA	N/M
Santa Rosa-Petaluma, CA	N/M
San Diego-Carlsbad-San Marcos, CA	N/M
Bakersfield, CA	N/M

**Figure 8: Home price change required to restore affordability—a minority of MSAs still are fundamentally overvalued (5% mortgage rate assumed) (Cont'd)**

Visalia-Porterville, CA	N/M
Los Angeles-Long Beach-Glendale, CA MSAD	N/M
Austin-Round Rock, TX	N/M
Jacksonville, FL	N/M
Vallejo-Fairfield, CA	N/M
Oklahoma City, OK	N/M
Cleveland-Elyria-Mentor, OH	N/M
Hartford-West Hartford-East Hartford, CT	N/M
Oakland-Fremont-Hayward, CA MSAD	N/M
Merced, CA	N/M
Santa Barbara-Santa Maria, CA	N/M
Colorado Springs, CO	N/M
Detroit-Livonia-Dearborn, MI	N/M
Minneapolis-St. Paul-Bloomington, MN-WI	N/M
St. Louis, MO-IL	N/M
Houston-Sugar Land-Baytown, TX	N/M
Louisville, KY-IN	N/M
Indianapolis-Carmel, IN	N/M
Pittsburgh, PA	N/M
Santa Cruz-Watsonville, CA	N/M
Cape Coral-Fort Myers, FL	N/M
Boulder, CO	N/M
Cincinnati-Middletown, OH-KY-IN	N/M
San Antonio, TX	N/M
Chicago-Naperville-Joliet, IL MSAD	N/M
Springfield, MA	N/M
Phoenix-Mesa-Scottsdale, AZ	N/M
Lakeland, FL	N/M
Fort Worth-Arlington, TX MSAD	N/M
Palm Bay-Melbourne-Titusville, FL	N/M
Akron, OH	N/M
Sacramento-Arden-Arcade-Roseville, CA	N/M
Atlanta-Sandy Springs-Marietta, GA	N/M
Boise City-Nampa, ID	N/M
Providence-New Bedford-Fall River, RI-MA	N/M
Kansas City, MO-KS	N/M
Port St. Lucie-Fort Pierce, FL	N/M
Newark-Union, NJ-PA MSAD	N/M
Columbus, OH	N/M
Reno-Sparks, NV	N/M
New Haven-Milford, CT	N/M
Orlando-Kissimmee, FL	N/M
Tucson, AZ	N/M
Stockton, CA	N/M
Fort Collins-Loveland, CO	N/M
Las Vegas-Paradise, NV	N/M
Modesto, CA	N/M
Naples-Marco Island, FL	N/M



**Figure 8: Home price change required to restore affordability—a minority of MSAs still are fundamentally overvalued (5% mortgage rate assumed) (Cont'd)**

Albuquerque, NM	N/M
Barnstable Town, MA	N/M
Dallas-Plano-Irving, TX MSAD	N/M
San Jose-Sunnyvale-Santa Clara, CA	N/M
Tulsa, OK	N/M
Boston-Quincy, MA	N/M
Napa, CA	N/M
Nashville-Davidson–Murfreesboro, TN	N/M
Deltona-Daytona Beach-Ormond Beach, FL	N/M
Portland-South Portland-Biddeford, ME	N/M
Oxnard-Thousand Oaks-Ventura, CA	N/M

\* Price decline to restore affordability to its historical peak in a given MSA

Source: Deutsche Bank

# Appendix C

## Definitions of three widely used home price indices

The S&P/Case-Shiller Home Price Index (HPI) measures the prices of repeated paired sales<sup>4</sup> of single-family homes in the U.S., excluding refinancings, home improvements and investment purchases. The data underlying the index is retrieved from house deeds recorded at county courts. The S&P/Case-Shiller national HPI is reported quarterly, with a two-month lag. At the MSA level, S&P/Case-Shiller provides data for 20 MSAs, which is available monthly with a two-month lag. (This nationwide data is available for free for both the national and MSA data series at <http://www2.standardandpoors.com>.) For expanded MSA coverage, additional data can also be purchased from Economy.com (<http://www.economy.com/home/products/housepriceforecasts.asp>).<sup>5</sup>

The FHFA House Price Index (HPI) measures paired repeated "sale prices" of single-family homes in the U.S., but also includes refinancings. For a refinancing, the value of the home is based on an appraised value, not an actual buy-sell transaction. Because appraisals can lag the actual market, including appraised values in a home price index along with actual selling prices may create an upward bias when prices are falling. The data underlying the index also covers only conventional conforming mortgages provided by Fannie Mae and Freddie Mac. By excluding jumbo mortgages, the index may also understate deterioration, as (traditionally) higher-priced homes are more volatile. The FHFA HPI is reported quarterly, with a two-month lag. (Data is available for free at <http://www.fhfa.gov>.)

The National Association of Realtors (NAR) House Price Index (HPI) measures the median sale prices for existing single-family homes sold in the U.S. The data underlying the index is retrieved from local associations/boards and multiple listing services nationwide. The NAR HPI is reported quarterly at the MSA level, with a two and a half month lag. The data is also available monthly at the national and regional level (i.e. Northeast, Midwest, South and West), with a one-month lag. (Data is available for free at <http://www.realtor.org/research.nsf/pages/ehspage>.) While median data has its limitations, this source is also the most timely.

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<sup>4</sup> Repeated paired sales measure the price movement of the same properties over time.

<sup>5</sup> In addition to the national S&P/Case-Shiller Home Price Index, S&P/Case-Shiller also has two tradable indices, one covering the home prices of 10 major MSAs across the U.S. and the other covering the prices of 20 major MSAs in the U.S. (For more information, see SPCS10 <Index> and SPCS20 <Index> on Bloomberg.) These indices are very illiquid.

# Appendix D

## Our affordability methodology

***“Affordability” includes home prices, incomes and mortgage rates***

Our HPA outlook is predicated on the assumption that the home price correction underway will take the form of mean reversion to historic levels of affordability.

To begin, we calculated “equilibrium affordability.” Equilibrium affordability is based on existing home prices using the following assumptions:

- The current mortgage rate – for our analysis, we are assuming a rate of 5.00%.
- Mortgage qualifying ratios appropriate for the given MSA.<sup>6</sup>
- An assumption of 0% future income growth over the next 12–18 months, consistent with an economic slowdown in most regions.

***We selected the respective period of maximum affordability for each MSA as our “affordability equilibrium”***

For our analysis, we calculated an affordability ratio in each MSA, and then solved for the change in home prices that would return affordability to its point of maximum affordability for that MSA. We calculate an affordability ratio for a given area using the local median home price, median income and an MSA-specific mortgage assumption. Affordability is based on a 30-year conforming fixed-rate mortgage (FRM) with 10% down and a 40% qualifying ratio<sup>7</sup> for high cost areas (e.g., Los Angeles, San Diego). For the other areas affordability is based on a 30-year FRM with 10% down and a 28% qualifying ratio.<sup>8</sup> Although other types of mortgages were also common in recent years, their near-extinction makes them unsuitable for this analysis. A distribution of income would be more useful than a simple median, however income distribution by MSA is not consistently available.<sup>9</sup>

The calculation of affordability is:

$$\text{Affordability Index} = 100 \times \frac{\text{Family Income}}{\text{Qualifying Income}}$$

where “Family Income” represents the median family income for an MSA as calculated by HUD.<sup>10</sup> Qualifying Income represents the level of income needed to qualify for a mortgage under the above referenced loan assumptions and current mortgage rates.

Using this measure of affordability, the change in homes prices needed to equate levels of affordability at the peak with the average level of affordability during each MSA’s period of maximum affordability is then calculated. For example, as of the Q2 2007, the median home price in Orange County, CA was \$713,327 and median family income was \$78,700. Based on

<sup>6</sup> Lenders use “qualifying ratios” to try to assess the ability of a borrower’s income to cover monthly expenses. For example, a back-end qualifying ratio of 40% means that a borrower’s potential home-related monthly costs, together with their other monthly debt payments, can not comprise more than 40% of their gross (pre-tax) monthly income.

<sup>7</sup> Note that qualifying ratios, in practice, are typically calculated using not just the mortgage payment (principal and interest, a.k.a. “P and I”) but also including property taxes and homeowners’ insurance (“PITI”). Because the data on “T and I” is difficult to obtain, we have used just “P and I.” It should not materially impact our analysis as designed.

<sup>8</sup> See footnote above.

<sup>9</sup> The California Association of Realtors (“CAR”) does have income distributions for areas within California. CAR uses this data to produce an affordability index that answers the question “what percent of the population in a given area can afford to buy the median priced home in a given area?” We find this index more useful than one that uses a median income, but again, are constrained by the unavailability of data.

<sup>10</sup> The U.S. Department of Housing and Urban Development. HUD rebenchmarks its median income data periodically as it gets new information from the Census Bureau. However, HUD does not then go back and revise its historical data. This can result in some extreme moves in its income data from year to year.

this home price the income required to qualify for a 30-year fixed-rate mortgage assuming 10% down and a qualifying ratio of 40% is \$120,471. This amount is derived from the following equation,

$$(\$4,015.71) \times (2.5) \times (12 \text{ Months}) = \$120,471$$

where \$4,015.71 is the principal and interest (P&I) payment on a 30-year FRM and 2.5 represents the reciprocal of the qualifying ratio ( $\frac{1}{40\%} = 2.5$ ). The affordability index is the ratio,

$$\text{Affordability Index} = 100 \times \frac{\$78,700}{\$120,471} = 65.3$$

The current index is in comparison to the affordability index level (the peak, in the period since 1980) of 142.1 in 1994. Therefore, for current affordability to revert back to that 1994 level, home prices had to decline to approximately \$408,327 assuming family income of \$84,100. The home price can be obtained through some simple algebra by first noting that the P&I payment for a 30-year FRM is calculated as:

$$P \ \& \ I = B(0.90) \frac{\left(\frac{r}{1200}\right) \left(1 + \frac{r}{1200}\right)^{360}}{\left(1 + \frac{r}{1200}\right)^{360} - 1}$$

where  $B$  is the home price,  $r$  is the mortgage rate and 360 is the term of the loan in months. Finally, home price is multiplied by 0.9, because we assume a 10% down payment.

In our analysis we assume the mortgage rate is known (we used 5.0%) so the only unknown is the home price. This reduces the payment calculation to:

$$P \ \& \ I = B(0.90) \frac{\left(\frac{5.0}{1200}\right) \left(1 + \frac{5.0}{1200}\right)^{360}}{\left(1 + \frac{5.0}{1200}\right)^{360} - 1} = B \times (.004834)$$

Inputting this information into the affordability ratio by utilizing the Qualifying Income equation provided earlier, we have,

$$100 \times \frac{\$84,100}{(B \times .004834)(2.5)(12)} = 142.1 = 100 \times \frac{\$84,100}{(B \times .1450)}$$

Solving for the home price  $B$  results in,

$$B = \frac{\$84,100}{.20597} = \$408,327$$

In this example of Orange County, a home price of \$408,327 represents a 43% decline from the recent peak in price realized during Q2 2007 of \$713,327.

# Appendix E

## Explanation of remaining methodology

As in all of our previous home price outlooks, we arrive at a view on *nationwide* home prices using a “bottom up” approach. We develop a home price outlook for each of the 100 largest<sup>11</sup> MSAs in the country, and weight them to estimate a nationwide average HPA. In this analysis, we continue to look at affordability (as further detailed below), but only as a starting point. We add to affordability the impact of four other variables that have become increasingly important as the subprime mortgage credit bubble fades, and as macroeconomic conditions continue to deteriorate. For each MSA, these four variables are 1) the unemployment rate, 2) the change-in-unemployment rate, 3) recent home price changes (as a measure of momentum) and 4) excess distressed inventory.

These four variables have shown strong negative correlation to HPA, albeit only recently. This is one of the chief difficulties with modeling HPA today. We believe intuitively, have heard anecdotally, and observe in recent data, that all of these variables are impacting HPA. But we are faced with a paucity of data, because these variables’ importance to HPA movement is a relatively recent paradigm shift. Theoretically one might put a greater weight on the “pure affordability” results, and allow a broader range for the new adjustments. We do provide the results in a parsed fashion to allow users to consider affordability separately. In any event, it is clear to us that the four variables with which we have augmented our model are very important to the near term outlook and as such must be modeled in some fashion.

Our house price model is in the form of  $\Delta HPI_{T,N} = Aff_{T,N} + \sum_{i=1}^4 \sum_{j=1}^{10} \beta_{i,j} \cdot X_{T,N}^{i,j}$ , where

$\Delta HPI_{T,N}$  is the 2-year<sup>12</sup> forward change in home prices (HPI) from time T for metro area N,  $Aff_{T,N}$  is the 2-year forward change in HPI at time T as derived from our affordability analysis, assuming a 5% mortgage rate, and a reversion to the specific period of maximum affordability for each respective MSA, and  $X_{T,N}^{1,1}, X_{T,N}^{1,2}, \dots, X_{T,N}^{1,10}$  are scores derived from the excess distressed inventory for metro N at time T,  $X_{T,N}^{2,1}, X_{T,N}^{2,2}, \dots, X_{T,N}^{2,10}$  are scores derived from the unemployment rate for metro N at time T,  $X_{T,N}^{3,1}, X_{T,N}^{3,2}, \dots, X_{T,N}^{3,10}$  are scores derived from the quarterly change-in-unemployment rate for metro N at time T, and  $X_{T,N}^{4,1}, X_{T,N}^{4,2}, \dots, X_{T,N}^{4,10}$  are scores derived from the quarterly change in home price appreciation rate for metro N at time T.  $\beta_{i,j}$ ’s are coefficients where  $i = 1, \dots, 4; j = 1, \dots, 10$ . In order of importance, the distress factor has the greatest weight, followed by HPI (home price momentum), then the rate of *change* in the unemployment rate, then the level of unemployment.

<sup>11</sup> As measured by their respective percentages of Alt-A and subprime mortgage credit outstanding. Please see Appendix A for that list, in order.

<sup>12</sup> Our two-year horizon is loosely based on the duration of past downturns, where the time from housing price peak to housing price trough ranged from four to six years. Given the nationwide peak in approximately Q2 2006, an additional two years would imply 4.5 years peak-to-trough.

We tested model estimations extensively to ensure the stability of the coefficients and robustness of the structure over time from Q3 2007 to Q4 2008. For each variable  $X^i$ , we sort the values across 100 MSAs from the worst to the best. We then create 10 cohorts with 10 MSAs in each cohort. The worst 10 MSAs with respect to  $X^i$  are assigned score  $X^{i,1} = 10$ , the second worst 10 MSAs are assigned score  $X^{i,2} = 9$ , and so on so that the best 10 MSAs are assigned score  $X^{i,10} = 1$ .

For much more detail on these four variables, we encourage readers to review pages 9-15 in our March 2009 home price outlook.

# Appendix F

## Unemployment rate

Please see our commentary on page 9 in the 29 March 2009 issue of Update: The Outlook for U.S. Home Prices, where we discuss the unemployment score in more detail.

**Figure 9: Nationwide, the U.S. unemployment rate hit 9.4% in May 2009, but many local economies have been disproportionately levered to industries that have been harder hit**

MSA name	Unemployment rate (%)	DB HPA model unemployment score
Akron, OH	9.7%	7
Albuquerque, NM	6.8	2
Allentown-Bethlehem-Easton, PA-NJ	8.4	4
Atlanta-Sandy Springs-Marietta, GA	9.9	7
Austin-Round Rock, TX	6.6	2
Bakersfield, CA	13.9	10
Baltimore-Towson, MD	7.9	3
Barnstable Town, MA	8.5	4
Birmingham-Hoover, AL	8.8	5
Boise City-Nampa, ID	7.6	3
Boston-Quincy, MA	7.5	3
Boulder, CO	6.3	1
Bridgeport-Stamford-Norwalk, CT	7.5	2
Cape Coral-Fort Myers, FL	13.4	10
Charleston-North Charleston, SC	10.0	7
Charlotte-Gastonia-Concord, NC-SC	12.3	9
Chicago-Naperville-Joliet, IL MSAD	9.4	7
Cincinnati-Middletown, OH-KY-IN	9.1	6
Cleveland-Elyria-Mentor, OH	8.8	5
Colorado Springs, CO	8.5	5
Columbus, OH	8.4	4
Dallas-Plano-Irving, TX MSAD	7.6	3
DC Metro Washington-Arlington-Alexandria, DC-VA-MD-WV MSAD	8.6	5
Deltona-Daytona Beach-Ormond Beach, FL	11.3	9
Denver-Aurora, CO	8.1	4
Detroit-Livonia-Dearborn, MI	14.2	10
Edison, NJ MSAD	8.1	4
Fort Collins-Loveland, CO	6.5	1
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL MSAD	9.3	6
Fort Worth-Arlington, TX MSAD	7.2	2
Fresno, CA	15.1	10
Greeley, CO	8.5	4
Hartford-West Hartford-East Hartford, CT	7.8	3
Honolulu, HI	6.3	1
Houston-Sugar Land-Baytown, TX	7.1	2
Indianapolis-Carmel, IN	8.5	5
Jacksonville, FL	10.2	7

**Figure 9: Nationwide, the U.S. unemployment rate hit 9.4% in May 2009, but many local economies have been disproportionately levered to industries that have been harder hit (Cont'd)**

Kansas City, MO-KS	8.5	5
Lakeland, FL	11.9	9
Las Vegas-Paradise, NV	11.3	9
Long Island Nassau-Suffolk, NY MSAD	7.4	2
Los Angeles-Long Beach-Glendale, CA MSAD	11.9	9
Louisville, KY-IN	9.8	7
Memphis, TN-MS-AR	9.2	6
Merced, CA	17.5	10
Miami-Miami Beach-Kendall, FL MSAD	8.5	5
Milwaukee-Waukesha-West Allis, WI	8.7	5
Minneapolis-St. Paul-Bloomington, MN-WI	8.0	3
Modesto, CA	16.1	10
Napa, CA	8.9	6
Naples-Marco Island, FL	11.4	9
Nashville-Davidson-Murfreesboro, TN	8.8	6
New Haven-Milford, CT	7.8	3
New Orleans-Metairie-Kenner, LA	6.4	1
New York-White Plains-Wayne, NY-NJ MSAD	8.6	5
Newark-Union, NJ-PA MSAD	8.3	4
Oakland-Fremont-Hayward, CA MSAD	10.6	8
Ogden-Clearfield, UT	5.6	1
Oklahoma City, OK	5.7	1
Orange County Santa Ana-Anaheim-Irvine, CA MSAD	8.9	6
Orlando-Kissimmee, FL	10.7	8
Oxnard-Thousand Oaks-Ventura, CA	10.4	7
Palm Bay-Melbourne-Titusville, FL	11.1	8
Philadelphia, PA	8.3	4
Phoenix-Mesa-Scottsdale, AZ	7.7	3
Pittsburgh, PA	7.3	2
Port St. Lucie-Fort Pierce, FL	14.1	10
Portland-South Portland-Biddeford, ME	6.8	2
Portland-Vancouver-Beaverton, OR-WA	11.6	9
Poughkeepsie-Newburgh-Middletown, NY	7.7	3
Providence-New Bedford-Fall River, RI-MA	10.8	8
Provo-Orem, UT	5.1	1
Raleigh-Cary, NC	9.2	6
Reno-Sparks, NV	10.9	8
Richmond, VA	8.3	4
Riverside-San Bernardino-Ontario, CA	13.7	10
Sacramento-Arden-Arcade-Roseville, CA	11.2	8
Salinas, CA	11.7	9
Salt Lake City, UT	5.3	1
San Antonio, TX	6.3	1
San Diego-Carlsbad-San Marcos, CA	9.7	7
San Francisco-San Mateo-Redwood City, CA MSAD	8.8	6
San Jose-Sunnyvale-Santa Clara, CA	11.3	9
San Luis Obispo-Paso Robles, CA	8.9	6

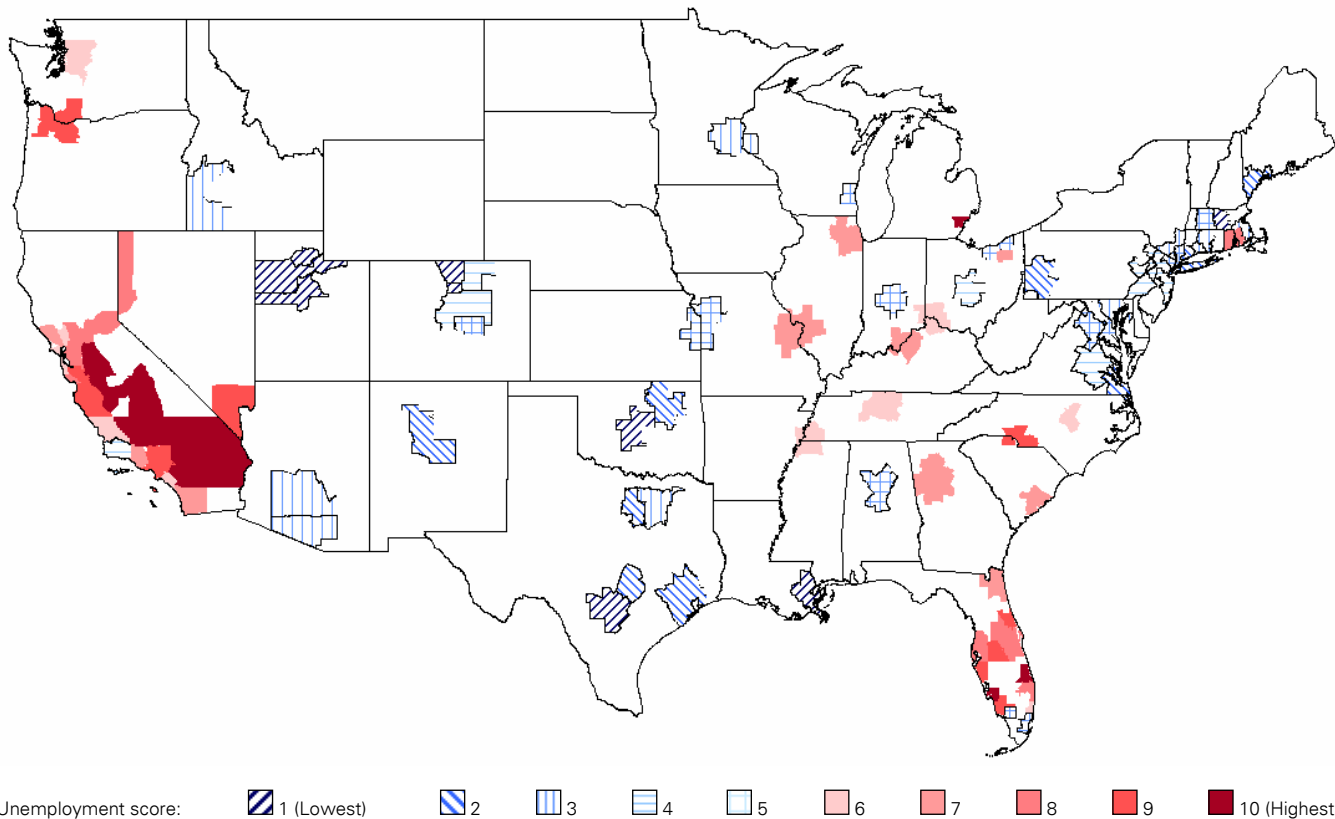


**Figure 9: Nationwide, the U.S. unemployment rate hit 9.4% in May 2009, but many local economies have been disproportionately levered to industries that have been harder hit (Cont'd)**

Santa Barbara-Santa Maria, CA	8.2	4
Santa Cruz-Watsonville, CA	11.2	8
Santa Rosa-Petaluma, CA	9.7	7
Sarasota-Bradenton-Venice, FL	12.0	9
Seattle-Bellevue-Everett, WA MSAD	8.9	6
Springfield, MA	8.6	5
St. Louis, MO-IL	9.5	7
Stockton, CA	15.5	10
Tampa-St. Petersburg-Clearwater, FL	11.2	8
Tucson, AZ	7.6	3
Tulsa, OK	6.7	2
Vallejo-Fairfield, CA	11.1	8
Virginia Beach-Norfolk-Newport News, VA-NC	7.2	2
Visalia-Porterville, CA	15.3	10
West Palm Beach-Boca Raton-Boynton Beach, FL MSAD	11.2	8
Worcester, MA	6.2	1

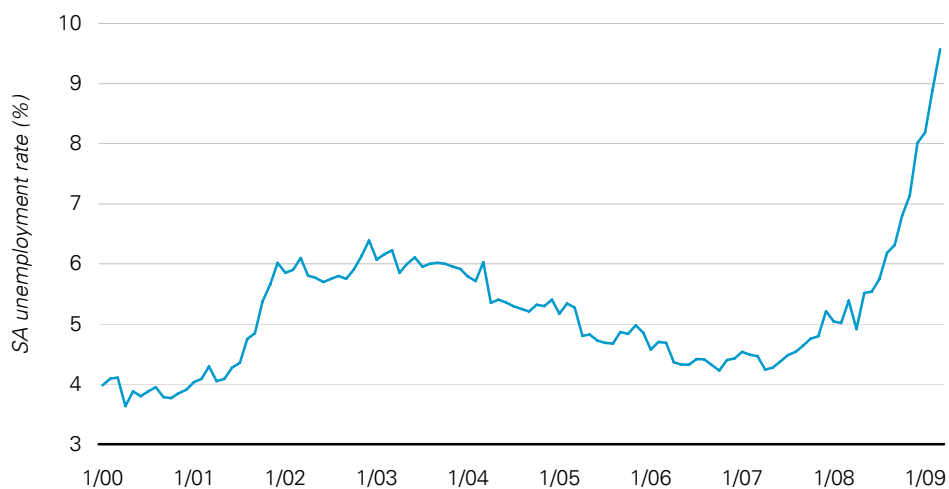
Source: US Department of Labor, Deutsche Bank

**Figure 10: MSAs sorted by unemployment rate, with the highest unemployment rates in bucket #10, and the lowest unemployment rates in bucket #1**



Source: Census Bureau, US Department of Labor, Deutsche Bank

**Figure 11: Seasonally-adjusted unemployment rate among top 100 MSAs**



Source: US Department of Labor, Deutsche Bank

# Appendix G

## Change-in-unemployment rate

Please see our commentary on page 11 in the 29 March 2009 issue of Update: The Outlook for U.S. Home Prices, where we discuss the change-in-unemployment score in more detail.

**Figure 12: The change in the unemployment rate (over the last three months, annualized and seasonally-adjusted) captures labor market momentum, and gives a sense of the pace of deterioration or improvement**

MSA name	Change-in-unemployment rate (%)	Change-in-unemployment score
Akron, OH	23.1%	8
Albuquerque, NM	21.1	7
Allentown-Bethlehem-Easton, PA-NJ	10.8	1
Atlanta-Sandy Springs-Marietta, GA	20.5	6
Austin-Round Rock, TX	14.9	3
Bakersfield, CA	14.4	2
Baltimore-Towson, MD	21.0	6
Barnstable Town, MA	7.1	1
Birmingham-Hoover, AL	38.7	10
Boise City-Nampa, ID	-2.4	1
Boston-Quincy, MA	17.0	5
Boulder, CO	19.9	6
Bridgeport-Stamford-Norwalk, CT	5.8	1
Cape Coral-Fort Myers, FL	18.0	5
Charleston-North Charleston, SC	24.5	9
Charlotte-Gastonia-Concord, NC-SC	30.3	10
Chicago-Naperville-Joliet, IL MSAD	21.4	7
Cincinnati-Middletown, OH-KY-IN	22.6	8
Cleveland-Elyria-Mentor, OH	14.9	3
Colorado Springs, CO	16.8	4
Columbus, OH	21.3	7
Dallas-Plano-Irving, TX MSAD	17.2	5
DC Metro Washington-Arlington-Alexandria, DC-VA-MD-WV MSAD	13.5	2
Deltona-Daytona Beach-Ormond Beach, FL	22.1	7
Denver-Aurora, CO	23.8	8
Detroit-Livonia-Dearborn, MI	24.6	9
Edison, NJ MSAD	13.4	2
Fort Collins-Loveland, CO	24.9	9
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL MSAD	25.6	9
Fort Worth-Arlington, TX MSAD	15.9	4
Fresno, CA	11.8	2
Greeley, CO	25.9	9
Hartford-West Hartford-East Hartford, CT	1.6	1
Honolulu, HI	21.4	7
Houston-Sugar Land-Baytown, TX	14.7	3
Indianapolis-Carmel, IN	19.2	6
Jacksonville, FL	24.4	9

**Figure 12: The change in the unemployment rate (over the last three months, annualized and seasonally-adjusted) captures labor market momentum, and gives a sense of the pace of deterioration or improvement (Cont'd)**

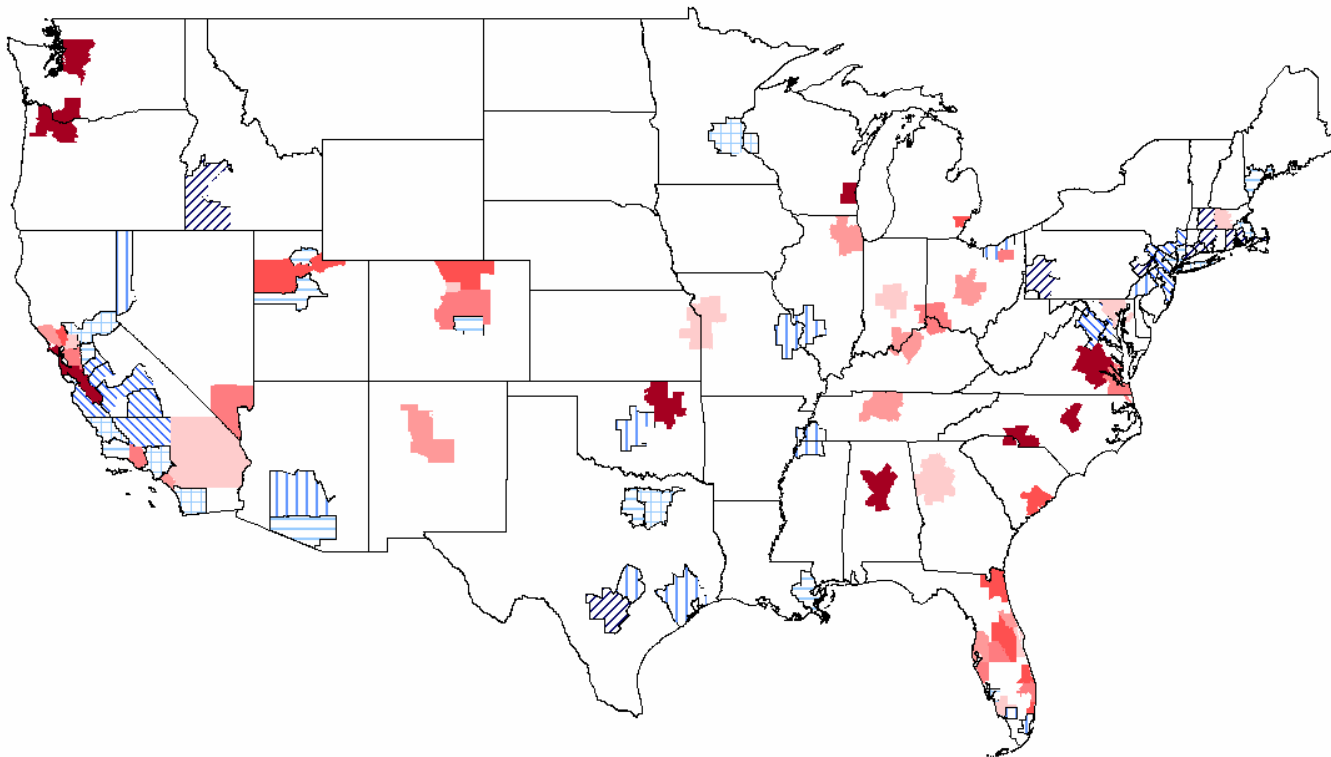
Kansas City, MO-KS	18.2	6
Lakeland, FL	23.3	8
Las Vegas-Paradise, NV	22.6	8
Long Island Nassau-Suffolk, NY MSAD	18.0	5
Los Angeles-Long Beach-Glendale, CA MSAD	16.9	5
Louisville, KY-IN	22.1	7
Memphis, TN-MS-AR	14.8	3
Merced, CA	13.0	2
Miami-Miami Beach-Kendall, FL MSAD	14.7	3
Milwaukee-Waukesha-West Allis, WI	33.1	10
Minneapolis-St. Paul-Bloomington, MN-WI	17.9	5
Modesto, CA	12.9	2
Napa, CA	26.6	9
Naples-Marco Island, FL	20.6	6
Nashville-Davidson-Murfreesboro, TN	22.0	7
New Haven-Milford, CT	2.4	1
New Orleans-Metairie-Kenner, LA	15.7	4
New York-White Plains-Wayne, NY-NJ MSAD	16.5	4
Newark-Union, NJ-PA MSAD	13.3	2
Oakland-Fremont-Hayward, CA MSAD	23.2	8
Ogden-Clearfield, UT	16.3	4
Oklahoma City, OK	15.2	3
Orange County Santa Ana-Anaheim-Irvine, CA MSAD	21.0	7
Orlando-Kissimmee, FL	24.7	9
Oxnard-Thousand Oaks-Ventura, CA	23.8	8
Palm Bay-Melbourne-Titusville, FL	19.9	6
Philadelphia, PA	15.0	3
Phoenix-Mesa-Scottsdale, AZ	14.7	3
Pittsburgh, PA	11.6	1
Port St. Lucie-Fort Pierce, FL	25.6	9
Portland-South Portland-Biddeford, ME	16.0	4
Portland-Vancouver-Beaverton, OR-WA	31.5	10
Poughkeepsie-Newburgh-Middletown, NY	13.6	2
Providence-New Bedford-Fall River, RI-MA	4.5	1
Provo-Orem, UT	15.8	4
Raleigh-Cary, NC	30.6	10
Reno-Sparks, NV	15.3	3
Richmond, VA	36.4	10
Riverside-San Bernardino-Ontario, CA	20.4	6
Sacramento-Arden-Arcade-Roseville, CA	18.2	5
Salinas, CA	13.7	2
Salt Lake City, UT	24.8	9
San Antonio, TX	7.9	1
San Diego-Carlsbad-San Marcos, CA	18.0	5
San Francisco-San Mateo-Redwood City, CA MSAD	27.4	10
San Jose-Sunnyvale-Santa Clara, CA	31.5	10
San Luis Obispo-Paso Robles, CA	17.6	5

**Figure 12: The change in the unemployment rate (over the last three months, annualized and seasonally-adjusted) captures labor market momentum, and gives a sense of the pace of deterioration or improvement (Cont'd)**

Santa Barbara-Santa Maria, CA	16.1	4
Santa Cruz-Watsonville, CA	17.4	5
Santa Rosa-Petaluma, CA	21.6	7
Sarasota-Bradenton-Venice, FL	22.1	8
Seattle-Bellevue-Everett, WA MSAD	36.1	10
Springfield, MA	9.5	1
St. Louis, MO-IL	14.6	3
Stockton, CA	15.7	4
Tampa-St. Petersburg-Clearwater, FL	21.2	7
Tucson, AZ	16.6	4
Tulsa, OK	29.6	10
Vallejo-Fairfield, CA	19.2	6
Virginia Beach-Norfolk-Newport News, VA-NC	23.5	8
Visalia-Porterville, CA	13.0	2
West Palm Beach-Boca Raton-Boynton Beach, FL MSAD	23.5	8
Worcester, MA	20.9	6

Source: US Department of Labor, Deutsche Bank

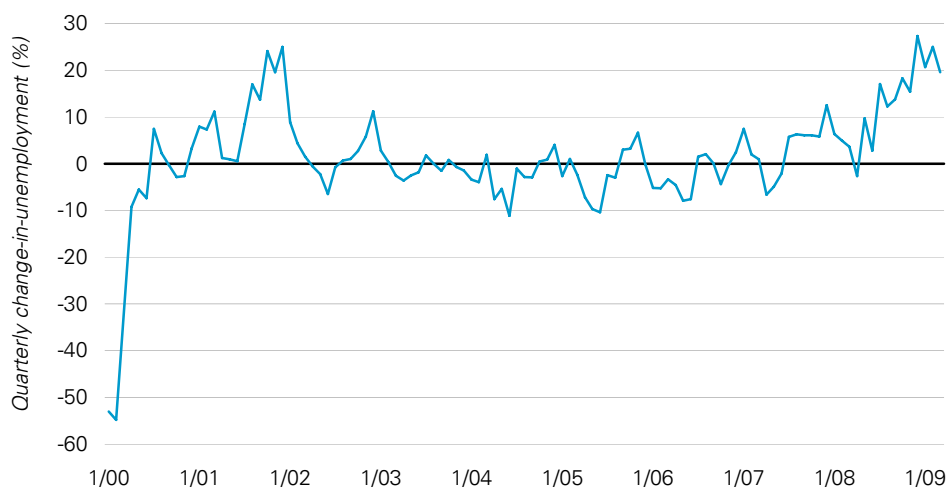
**Figure 13: MSAs sorted by change-in-unemployment rate, with the largest increase in the unemployment rate in bucket #10, and the smallest increase in the unemployment rate in bucket #1**



Change-in-unemployment score: 

Source: Census Bureau, US Department of Labor, Deutsche Bank

**Figure 14: Quarterly change-in-unemployment among top 100 MSAs**



Source: US Department of Labor, Deutsche Bank

# Appendix H

## Actual home price declines

Home price declines are quarter-over-quarter from December 2008 to March 2009, based on data from National Association of Realtors (NAR). Please see our commentary on page 12 in the 29 March 2009 issue of Update: The Outlook for U.S. Home Prices, where we discuss the home price momentum score in more detail.

**Figure 15: Home price trends are highly self-perpetuating—downward movement begets more downward movement, and vice versa when prices are increasing**

MSA name	Change in HPI* rate (%)	Home price momentum score
Akron, OH	-39.1%	10
Albuquerque, NM	-3.0	2
Allentown-Bethlehem-Easton, PA-NJ	-7.5	5
Atlanta-Sandy Springs-Marietta, GA	-12.2	8
Austin-Round Rock, TX	-3.3	2
Bakersfield, CA	-19.2	10
Baltimore-Towson, MD	-7.2	5
Barnstable Town, MA	-15.1	9
Birmingham-Hoover, AL	-5.5	4
Boise City-Nampa, ID	-9.0	6
Boston-Quincy, MA	-14.4	9
Boulder, CO	-2.8	2
Bridgeport-Stamford-Norwalk, CT	-11.9	7
Cape Coral-Fort Myers, FL	-22.6	10
Charleston-North Charleston, SC	-6.9	5
Charlotte-Gastonia-Concord, NC-SC	-4.7	3
Chicago-Naperville-Joliet, IL MSAD	-15.9	9
Cincinnati-Middletown, OH-KY-IN	-9.0	6
Cleveland-Elyria-Mentor, OH	-16.3	9
Colorado Springs, CO	-4.9	3
Columbus, OH	-6.9	4
Dallas-Plano-Irving, TX MSAD	-4.1	2
DC Metro Washington-Arlington-Alexandria, DC-VA-MD-WV MSAD	-13.3	8
Deltona-Daytona Beach-Ormond Beach, FL	-13.4	8
Denver-Aurora, CO	-5.4	4
Detroit-Livonia-Dearborn, MI	-16.7	10
Edison, NJ MSAD	-7.4	5
Fort Collins-Loveland, CO	-4.5	3
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL MSAD	-3.6	2
Fort Worth-Arlington, TX MSAD	-5.7	4
Fresno, CA	-12.8	8
Greeley, CO	2.5	1
Hartford-West Hartford-East Hartford, CT	-5.7	4
Honolulu, HI	-8.9	6
Houston-Sugar Land-Baytown, TX	-3.8	2
Indianapolis-Carmel, IN	-3.6	2

**Figure 15: Home price trends are highly self-perpetuating—downward movement begets more downward movement, and vice versa when prices are increasing (Cont'd)**

Jacksonville, FL	-12.4	8
Kansas City, MO-KS	-2.5	1
Lakeland, FL	-17.7	10
Las Vegas-Paradise, NV	-16.0	9
Long Island Nassau-Suffolk, NY MSAD	-5.4	3
Los Angeles-Long Beach-Glendale, CA MSAD	-10.2	7
Louisville, KY-IN	-3.6	2
Memphis, TN-MS-AR	-2.8	1
Merced, CA	-15.7	9
Miami-Miami Beach-Kendall, FL MSAD	-7.9	5
Milwaukee-Waukesha-West Allis, WI	3.8	1
Minneapolis-St. Paul-Bloomington, MN-WI	-7.2	5
Modesto, CA	-15.4	9
Napa, CA	-14.2	8
Naples-Marco Island, FL	-16.0	9
Nashville-Davidson-Murfreesboro, TN	-4.2	3
New Haven-Milford, CT	-10.7	7
New Orleans-Metairie-Kenner, LA	-4.3	3
New York-White Plains-Wayne, NY-NJ MSAD	-7.7	5
Newark-Union, NJ-PA MSAD	-6.3	4
Oakland-Fremont-Hayward, CA MSAD	-18.7	10
Ogden-Clearfield, UT	-2.2	1
Oklahoma City, OK	-2.0	1
Orange County Santa Ana-Anaheim-Irvine, CA MSAD	-9.0	6
Orlando-Kissimmee, FL	-13.0	8
Oxnard-Thousand Oaks-Ventura, CA	-4.6	3
Palm Bay-Melbourne-Titusville, FL	-16.0	9
Philadelphia, PA	-4.7	3
Phoenix-Mesa-Scottsdale, AZ	-18.9	10
Pittsburgh, PA	-4.0	2
Port St. Lucie-Fort Pierce, FL	-11.2	7
Portland-South Portland-Biddeford, ME	-11.2	7
Portland-Vancouver-Beaverton, OR-WA	-8.8	6
Poughkeepsie-Newburgh-Middletown, NY	-5.9	4
Providence-New Bedford-Fall River, RI-MA	-10.8	7
Provo-Orem, UT	-1.2	1
Raleigh-Cary, NC	-4.0	2
Reno-Sparks, NV	-10.8	7
Richmond, VA	4.2	1
Riverside-San Bernardino-Ontario, CA	-14.8	9
Sacramento-Arden-Arcade-Roseville, CA	-11.7	7
Salinas, CA	-12.6	8
Salt Lake City, UT	1.4	1
San Antonio, TX	0.1	1
San Diego-Carlsbad-San Marcos, CA	-6.4	4
San Francisco-San Mateo-Redwood City, CA MSAD	-5.8	4
San Jose-Sunnyvale-Santa Clara, CA	-16.3	10
San Luis Obispo-Paso Robles, CA	-11.6	7



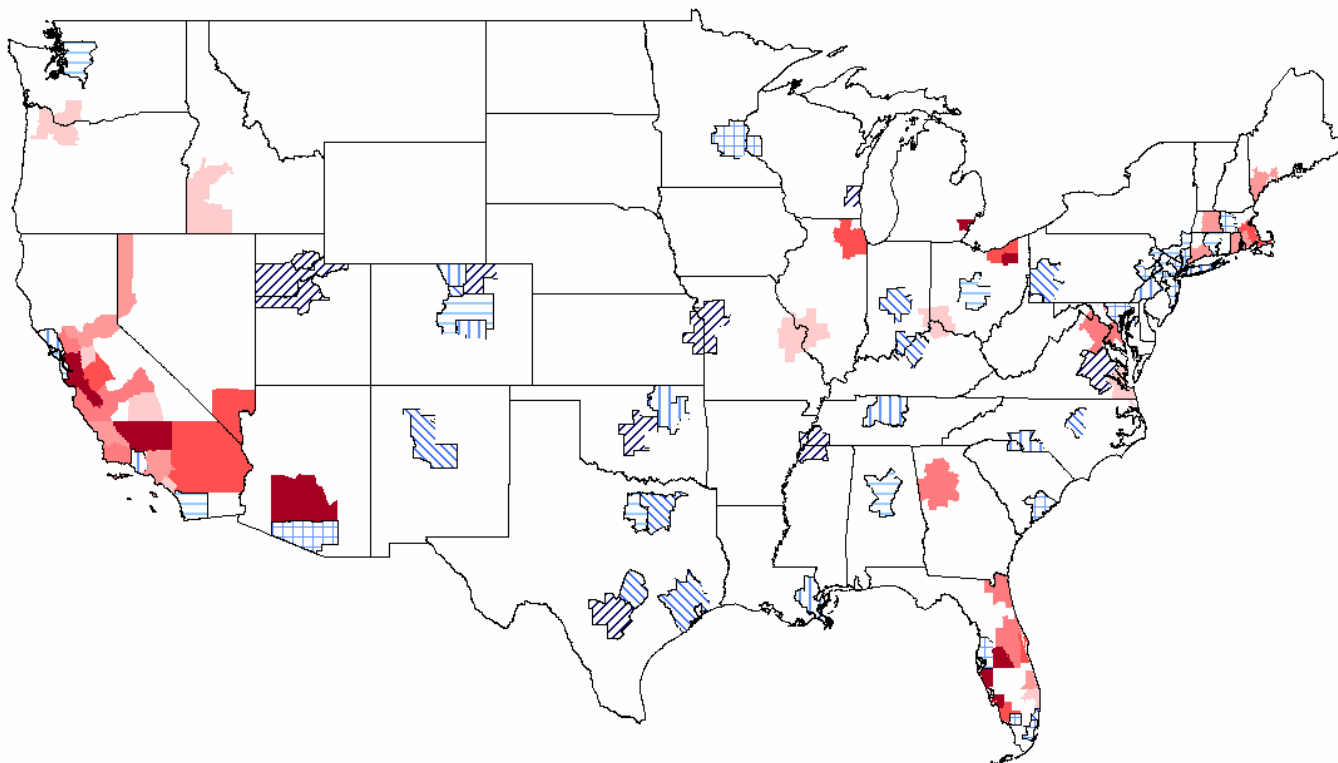
**Figure 15: Home price trends are highly self-perpetuating—downward movement begets more downward movement, and vice versa when prices are increasing (Cont'd)**









Santa Barbara-Santa Maria, CA	-13.8	8
Santa Cruz-Watsonville, CA	-17.2	10
Santa Rosa-Petaluma, CA	-4.7	3
Sarasota-Bradenton-Venice, FL	-19.5	10
Seattle-Bellevue-Everett, WA MSAD	-5.6	4
Springfield, MA	-10.5	7
St. Louis, MO-IL	-8.8	6
Stockton, CA	-9.2	6
Tampa-St. Petersburg-Clearwater, FL	-8.3	5
Tucson, AZ	-7.4	5
Tulsa, OK	-4.3	3
Vallejo-Fairfield, CA	-13.5	8
Virginia Beach-Norfolk-Newport News, VA-NC	-9.9	6
Visalia-Porterville, CA	-8.6	6
West Palm Beach-Boca Raton-Boynton Beach, FL MSAD	-9.4	6
Worcester, MA	-7.0	5

\* House Price Index (HPI) measures the median sale prices for existing single-family homes sold in the U.S.

Source: National Association of Realtors (NAR), Deutsche Bank

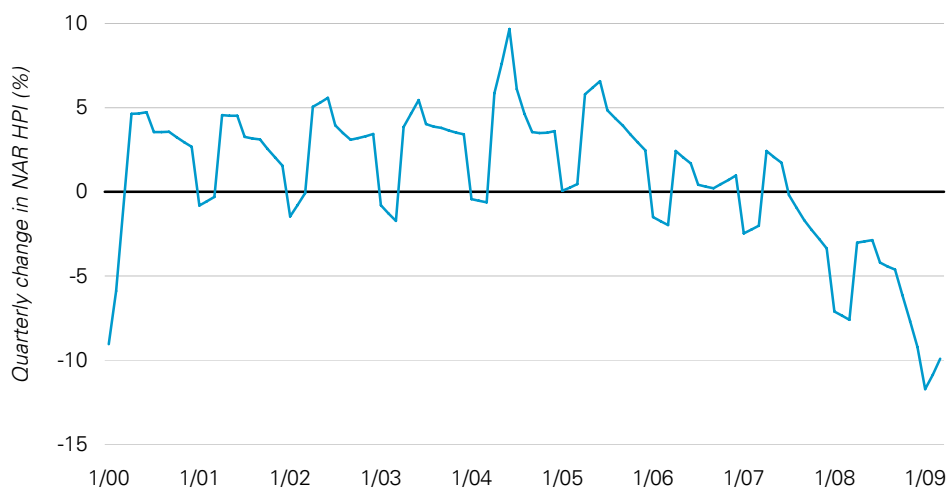
**Figure 16: MSAs sorted by QoQ change in home prices (HPI), with the largest change in home prices in bucket #10, and the smallest change in home prices in bucket #1**



HPI score:  1 (Smallest)  2  3  4  5  6  7  8  9  10 (Largest)

Source: National Association of Realtors (NAR), Census Bureau, Deutsche Bank

**Figure 17: Quarterly change in NAR HPI among top 100 MSAs**



Source: National Association of Realtors (NAR), Deutsche Bank

# Appendix I

## Excess distressed inventory

The excess distressed inventory percent is calculated based on estimated current delinquency rates vs. historical averages. Please see our commentary on page 13 in the 29 March 2009 issue of Update: The Outlook for U.S. Home Prices, where we discuss the excess distressed inventory score in more detail.

**Figure 18: The level of distressed (or foreclosure-related) sales has been an important driver of the recent sharp home price depreciation in many areas of the country**

MSA name	Projected excess distressed inventory percent (%)	DB HPA model excess distressed inventory score
Akron, OH	14.7%	5
Albuquerque, NM	10.6	3
Allentown-Bethlehem-Easton, PA-NJ	17.0	6
Atlanta-Sandy Springs-Marietta, GA	14.7	5
Austin-Round Rock, TX	6.2	1
Bakersfield, CA	32.0	10
Baltimore-Towson, MD	14.6	5
Barnstable Town, MA	16.5	6
Birmingham-Hoover, AL	11.9	4
Boise City-Nampa, ID	17.8	6
Boston-Quincy, MA	18.0	7
Boulder, CO	5.8	1
Bridgeport-Stamford-Norwalk, CT	11.5	3
Cape Coral-Fort Myers, FL	39.3	10
Charleston-North Charleston, SC	10.4	3
Charlotte-Gastonia-Concord, NC-SC	9.7	2
Chicago-Naperville-Joliet, IL MSAD	21.4	8
Cincinnati-Middletown, OH-KY-IN	11.2	3
Cleveland-Elyria-Mentor, OH	13.0	4
Colorado Springs, CO	10.0	2
Columbus, OH	11.6	3
Dallas-Plano-Irving, TX MSAD	8.1	1
DC Metro Washington-Arlington-Alexandria, DC-VA-MD-WV MSAD	17.4	6
Deltona-Daytona Beach-Ormond Beach, FL	29.0	9
Denver-Aurora, CO	9.3	2
Detroit-Livonia-Dearborn, MI	18.8	7
Edison, NJ MSAD	16.5	6
Fort Collins-Loveland, CO	8.6	1
Fort Lauderdale-Pompano Beach-Deerfield Beach, FL MSAD	33.7	10
Fort Worth-Arlington, TX MSAD	8.8	1
Fresno, CA	27.5	9
Greeley, CO	10.3	2
Hartford-West Hartford-East Hartford, CT	16.1	5
Honolulu, HI	13.4	4
Houston-Sugar Land-Baytown, TX	9.6	2

**Figure 18: The level of distressed (or foreclosure-related) sales has been an important driver of the recent sharp home price depreciation in many areas of the country (Cont'd)**

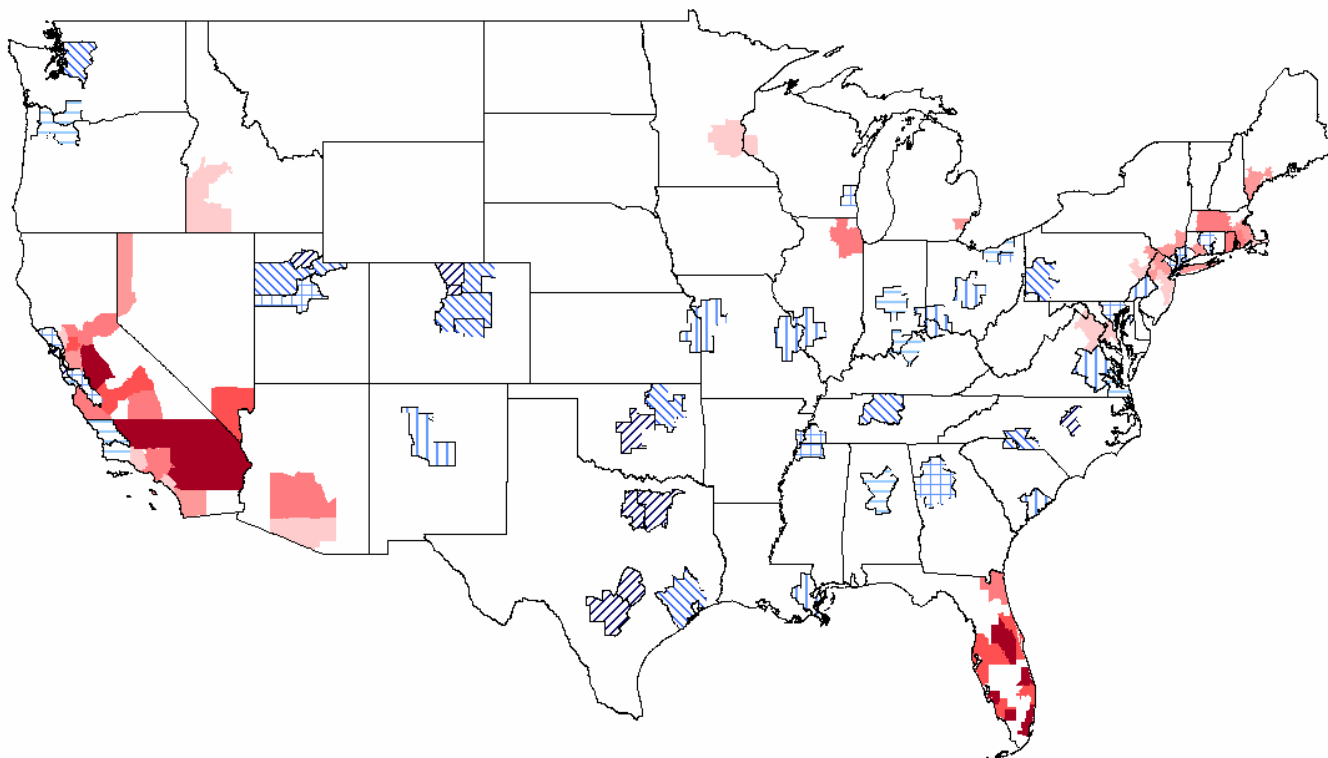
Indianapolis-Carmel, IN	12.6	4
Jacksonville, FL	20.8	8
Kansas City, MO-KS	10.6	3
Lakeland, FL	30.7	9
Las Vegas-Paradise, NV	29.8	9
Long Island Nassau-Suffolk, NY MSAD	18.9	7
Los Angeles-Long Beach-Glendale, CA MSAD	21.0	8
Louisville, KY-IN	12.2	4
Memphis, TN-MS-AR	13.8	5
Merced, CA	40.7	10
Miami-Miami Beach-Kendall, FL MSAD	35.4	10
Milwaukee-Waukesha-West Allis, WI	15.4	5
Minneapolis-St. Paul-Bloomington, MN-WI	17.1	6
Modesto, CA	36.0	10
Napa, CA	16.2	6
Naples-Marco Island, FL	30.1	9
Nashville-Davidson-Murfreesboro, TN	9.2	2
New Haven-Milford, CT	19.4	7
New Orleans-Metairie-Kenner, LA	10.9	3
New York-White Plains-Wayne, NY-NJ MSAD	16.1	5
Newark-Union, NJ-PA MSAD	20.4	7
Oakland-Fremont-Hayward, CA MSAD	18.9	7
Ogden-Clearfield, UT	8.6	1
Oklahoma City, OK	9.1	1
Orange County Santa Ana-Anaheim-Irvine, CA MSAD	16.6	6
Orlando-Kissimmee, FL	33.9	10
Oxnard-Thousand Oaks-Ventura, CA	17.2	6
Palm Bay-Melbourne-Titusville, FL	27.5	9
Philadelphia, PA	10.4	3
Phoenix-Mesa-Scottsdale, AZ	26.2	8
Pittsburgh, PA	9.9	2
Port St. Lucie-Fort Pierce, FL	37.1	10
Portland-South Portland-Biddeford, ME	17.9	7
Portland-Vancouver-Beaverton, OR-WA	12.4	4
Poughkeepsie-Newburgh-Middletown, NY	19.6	7
Providence-New Bedford-Fall River, RI-MA	22.3	8
Provo-Orem, UT	15.5	5
Raleigh-Cary, NC	8.4	1
Reno-Sparks, NV	20.1	7
Richmond, VA	11.4	3
Riverside-San Bernardino-Ontario, CA	33.8	10
Sacramento-Arden-Arcade-Roseville, CA	24.2	8
Salinas, CA	25.5	8
Salt Lake City, UT	9.5	2
San Antonio, TX	7.9	1
San Diego-Carlsbad-San Marcos, CA	17.9	7
San Francisco-San Mateo-Redwood City, CA MSAD	7.2	1











**Figure 18: The level of distressed (or foreclosure-related) sales has been an important driver of the recent sharp home price depreciation in many areas of the country (Cont'd)**

San Jose-Sunnyvale-Santa Clara, CA	14.9	5
San Luis Obispo-Paso Robles, CA	13.2	4
Santa Barbara-Santa Maria, CA	12.6	4
Santa Cruz-Watsonville, CA	13.7	4
Santa Rosa-Petaluma, CA	14.6	5
Sarasota-Bradenton-Venice, FL	29.6	9
Seattle-Bellevue-Everett, WA MSAD	9.7	2
Springfield, MA	22.1	8
St. Louis, MO-IL	11.5	3
Stockton, CA	34.5	10
Tampa-St. Petersburg-Clearwater, FL	26.8	9
Tucson, AZ	16.6	6
Tulsa, OK	10.0	2
Vallejo-Fairfield, CA	28.9	9
Virginia Beach-Norfolk-Newport News, VA-NC	11.7	4
Visalia-Porterville, CA	24.9	8
West Palm Beach-Boca Raton-Boynton Beach, FL MSAD	30.3	9
Worcester, MA	22.7	8

Source: National Association of Realtors (NAR), First American CoreLogic, LoanPerformance, Deutsche Bank

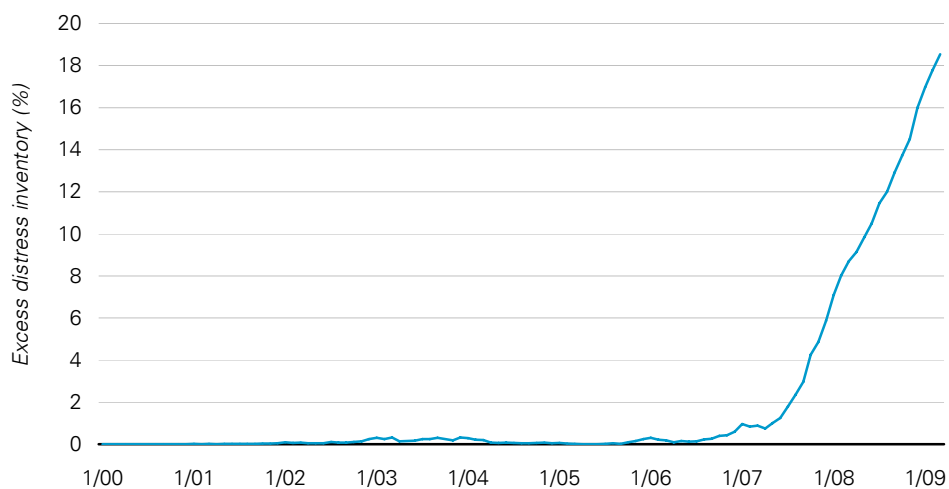
**Figure 19: MSAs sorted by excess distressed inventory percentages, with the worst conditions in bucket #10, and the areas of least concern in bucket #1**



Excess distressed score:  1 (Best)  2  3  4  5  6  7  8  9  10 (Worst)

Source: Census Bureau, National Association of Realtors (NAR), First American CoreLogic, LoanPerformance, Deutsche Bank

**Figure 20: Excess distress inventory among top 100 MSAs**



Source: National Association of Realtors (NAR), First American CoreLogic, LoanPerformance, Deutsche Bank

# Appendix 1

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