Repeat Sales Index Report
Residential • August 2009

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**Summary**

The latest data for May 2009 reveals that house prices declined by 33 percent in the Phoenix metro area, which is slightly less than the 35 percent decline in April and 37 percent in both February and March (Table 1). The decline in the index which began in March 2007 has continued for 27 months compared to the 17 month decline in the early 1990s. Preliminary estimates for June and July have prices declining by 31 and 29 percent respectively. It is now clear that the worst is past in terms of the rate of decline in house prices and that prices were falling most rapidly back in February and March. In addition to the basic RSI, this month introduces indices calculated for houses that are both above and below the median or mid-point of all house prices. From May 2008 to May 2009 the decline for lower priced homes was 48 percent compared to an annual decline of 26 percent for higher priced homes. These statistics confirm and quantify market perceptions that prices are falling more rapidly for the less expensive houses that dominate the current market, many of which are foreclosures. However, it might be surprising that the rate of decline for the lower half was almost twice as fast as it was for higher priced houses. In addition, lower priced houses have declined 62 percent from their peak in mid-2006 compared to a total decline of 39 percent for higher priced houses. This is in contrast to the last major decline from 1989 to 1992 where the upper portion of the market declined much more (13 percent) than the lower portion (4 percent).

The preliminary, overall median price for June was $120,000, up from $119,000 in May and $117,500 in April, indicating that April was the bottom of the current cycle in terms of house prices. However, it must be remembered that the current housing market is still quite volatile so this conclusion must be tentative. The median price for the lower and higher priced houses in May was $82,000 and $244,000 respectively. Compared to their peak values in mid-2006, the May prices reflect declines of $153,000 and $224,000, respectively, for the two categories.

**TABLE 1**

DECLINE IN HOUSE PRICES, OVERALL AND BY PRICE CATEGORY

<table>
<thead>
<tr>
<th></th>
<th>OVERALL</th>
<th>LOWER PRICED</th>
<th>HIGHER PRICED</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2008 – May 2009</td>
<td>-33.1</td>
<td>-47.5</td>
<td>-25.7</td>
</tr>
<tr>
<td>April - May 2009</td>
<td>-1.1</td>
<td>-1.5</td>
<td>-0.8</td>
</tr>
<tr>
<td>1989 – 1992</td>
<td>-7.7</td>
<td>-3.9</td>
<td>-12.8</td>
</tr>
<tr>
<td>2006 – 2009</td>
<td>-48.9</td>
<td>-61.6</td>
<td>-38.9</td>
</tr>
<tr>
<td>Median Price - May 2009</td>
<td>$119,000</td>
<td>$82,000</td>
<td>$244,000</td>
</tr>
</tbody>
</table>
Regions

Annual rates of decline vary widely across the five regions as does the change in the rate of decline from April to May, which has moderated considerably from previous months. While all five regions showed similar dramatic increases in house prices from January 2004 to their 2006 peaks (74 – 81 percent), total price declines have varied widely. The Southwest is down the most since the peak, 60%, with the Central and Northwest regions down over 50 percent, presumably reflecting the severity of the foreclosure problem in those parts of the metro area. If coming months support the preliminary data that prices have bottomed out, the cumulative declines from region to region will result in a somewhat different pattern of house prices than existed prior to the housing boom. The good news is that the larger declines in Phoenix (Central) and on the west side should make housing relatively more affordable, further helping those housing submarkets to recover.

TABLE 2
ANNUAL, MONTHLY AND TOTAL PERCENT DECLINES IN HOUSE PRICES BY REGION
EARLY 1990s VS THE PRESENT

<table>
<thead>
<tr>
<th>REGION</th>
<th>CENTRAL</th>
<th>NORTHEAST</th>
<th>SOUTHEAST</th>
<th>NORTHWEST</th>
<th>SOUTHWEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2008 – May 2009</td>
<td>-42.7%</td>
<td>-23.1%</td>
<td>-27.1%</td>
<td>-33.8%</td>
<td>-35.4%</td>
</tr>
<tr>
<td>April - May 2009</td>
<td>-2.5%</td>
<td>-0.6%</td>
<td>-1.2%</td>
<td>-0.1%</td>
<td>-2.1%</td>
</tr>
<tr>
<td>2006 – 2009</td>
<td>-56.1</td>
<td>-33.9</td>
<td>-45.4</td>
<td>-53.3</td>
<td>-59.7</td>
</tr>
</tbody>
</table>

Cities

Variations similar to those observed in the regional data are also apparent in the city data. Declines in house prices from May 2008 to May 2009 slowed from the April data in all regions except Tempe where the decline increased for the second straight month to -24.2 percent. Price changes from April to May also moderated substantially with Peoria and Sun City / Sun City West being the first cities to show slight increases in house prices rather than declines. Prices have declined by over 50 percent in Glendale and Peoria since they peaked in 2006 with substantial declines in excess of 30 percent in all other cities including Scottsdale / Paradise Valley.
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANDLER</td>
<td>-24.3%</td>
<td>-1.1</td>
<td>-7.6</td>
<td>-41.9</td>
</tr>
<tr>
<td>GILBERT</td>
<td>-19.6%</td>
<td>-1.9</td>
<td>na</td>
<td>-44.1</td>
</tr>
<tr>
<td>GLENDALE</td>
<td>-38.6%</td>
<td>-1.4</td>
<td>-19.6</td>
<td>-56.4</td>
</tr>
<tr>
<td>MESA</td>
<td>-32.0%</td>
<td>-2.2</td>
<td>-10.9</td>
<td>-49.1</td>
</tr>
<tr>
<td>PEORIA</td>
<td>-30.0%</td>
<td>0.6</td>
<td>-7.3</td>
<td>-51.8</td>
</tr>
<tr>
<td>SCOTTSDALE/</td>
<td>-22.1%</td>
<td>-0.7</td>
<td>-9.7</td>
<td>-33.2</td>
</tr>
<tr>
<td>PARADISE VALLEY</td>
<td>-16.5%</td>
<td>0.5</td>
<td>-10.5</td>
<td>-35.1</td>
</tr>
<tr>
<td>SUN CITY/</td>
<td>-24.2%</td>
<td>-1.7</td>
<td>-1.9</td>
<td>-36.7</td>
</tr>
<tr>
<td>TEMPE WEST</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Methodology**

The use of repeat sales is the most reliable way to estimate price changes in the housing market because the repeat sales approach eliminates the need to deal with the many issues associated with the heterogeneous nature of housing. Repeat sales can be used to measure the price change of the same housing unit over time. A large number of repeat sales over many years can be analyzed to develop a repeat sales index. In contrast, indices developed using regression analysis provide estimates of price changes over time while simultaneously attempting to control for differences in house characteristics, location, demographics and market conditions, etc. within the model. Regression analysis can and does produce meaningful estimates of price changes but the results are not as reliable as those produced using repeat sales data. An even less rigorous approach would be to simply average sale prices by zip code or some other geographic area where the mix of housing sizes and ages, etc. would be different each month. The percent changes based on medians or averages would reflect not only price changes but also differences in the sizes, ages and other characteristics of the houses sold each month.

The W.P. Carey School of Business – Repeat Sales Index (RSI) tracks very closely to the S&P/Case - Shiller index for Phoenix since the same methodology is employed for calculating both indices. The S&P/ Case-Shiller index has been developed for 20 metropolitan areas and is being used as a basis for trading housing futures contracts in 10 of those markets. Any differences that exist between the two indices are probably due to the way the data has been cleaned prior to the
calculation process. The S&P/Case-Shiller index is proprietary so the cleaning procedure used in connection with that index could not be completely duplicated. However, following S&P/Case-Shiller, the cleaning process used with the ASU - RSI excludes pairs where the first sale involved new construction and pairs where sales occurred within six months of each other. Sale pairs with extremely high or low annual rates of price change are excluded since at least one of the transactions may involve a data error. The same justification is used to drop sales with extremely high or low prices or prices per square foot prior to matching the sale pairs. A more detailed explanation of the data cleaning and calculation process is contained in the ASU-RSI Methodology Report.

The house price data used in the S&P/Case-Shiller index starts in January 1989. Beginning with January 1990, the percent change from the same month in the previous year is reported. The ASU – RSI also begins with January 1989 data so the same percent change calculation also begins in January 1990 and is reported for each month since then. There is seasonality in house price data so month to month changes may not accurately reflect changes in market conditions and would cover a very short time period. Calculating a percent change from the same month in the previous year controls for whatever seasonality may be present in the data. Annual rates of change typically are thought of applying to a calendar year but in this report the annual rates that are reported would be measuring change over the preceding twelve months. To smooth the index, data is included in calculations for the current month and the next two months before it is reported. This means that the rate of return calculated from each sale pair is included in calculations for a total of three months before it is published, which accounts for the difference between the date on the report and the ending date on the graphs.

The S&P/Case-Shiller index is published only for the entire Phoenix metro area. One major advantage to the ASU-RSI is that in addition to the overall index, indices have been calculated for higher and lower priced houses and for smaller geographic areas. For each month the data are divided into two groups based on that month’s median price. Sales are then paired within each of the two data sets and a repeat sales index is calculated for each. The metro area has also been divided into five regions and an index has been calculated for each. All repeat sales used in the metro index are included in one of the regional indices. Indices have also been calculated for eight individual cities where there are a sufficient number of repeat sales for the index to be reliable. A list of the cities included in each region is in Table 4.

The graphs contained in this report show the annual rate of change in house prices for the Phoenix metropolitan area on a monthly basis. Figure 1 compares the change in the overall, lower and higher priced indices to the trend where the trend is based on data through December 2003. Figure 2 makes the same type of comparison using the median price of sales that were used to form sale pairs for the current month, not the median price of all sales that occurred during the month.
Since each index is a moving three month average, preliminary estimates of the index and future median prices for the entire market are included for the next two months (June and July) in Figures 1 and 2. The next ten graphs cover two time periods. Five of the graphs present the price changes from January 1990 through May 2009 while the other five graphs cover the current housing cycle beginning in January 2004. Due to data limitations, a reliable index for Gilbert could not be calculated until January 1999 so the annual change for Gilbert in Figures 7 and 8 starts in January 2000.

TABLE 4
CITIES INCLUDED IN REGIONS

<table>
<thead>
<tr>
<th>REGION</th>
<th>CITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORTHEAST</td>
<td>CAREFREE</td>
</tr>
<tr>
<td></td>
<td>CAVE CREEK</td>
</tr>
<tr>
<td></td>
<td>FOUNTAIN HILLS</td>
</tr>
<tr>
<td></td>
<td>PARADISE VALLEY</td>
</tr>
<tr>
<td></td>
<td>SCOTTSDALE</td>
</tr>
<tr>
<td>NORTHWEST</td>
<td>EL MIRAGE</td>
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<tr>
<td></td>
<td>GLENDALE</td>
</tr>
<tr>
<td></td>
<td>PEORIA</td>
</tr>
<tr>
<td></td>
<td>SUN CITY /</td>
</tr>
<tr>
<td></td>
<td>SUN CITY WEST</td>
</tr>
<tr>
<td></td>
<td>SURPRISE</td>
</tr>
<tr>
<td></td>
<td>YOUNGTOWN</td>
</tr>
<tr>
<td>CENTRAL</td>
<td>PHOENIX</td>
</tr>
<tr>
<td>SOUTHEAST</td>
<td>APACHE JUNCTION</td>
</tr>
<tr>
<td></td>
<td>CHANDLER</td>
</tr>
<tr>
<td></td>
<td>GILBERT</td>
</tr>
<tr>
<td></td>
<td>HIGLEY</td>
</tr>
<tr>
<td></td>
<td>MESA</td>
</tr>
<tr>
<td></td>
<td>QUEEN CREEK</td>
</tr>
<tr>
<td></td>
<td>SUN LAKES</td>
</tr>
<tr>
<td></td>
<td>TEMPE</td>
</tr>
</tbody>
</table>
SOUTHWEST
AVONDALE
BUCKEYE
GOODYEAR
LITCHFIELD PARK
Figure 1
Trend and Annual Percent Change in Phoenix House Prices
Overall, Lower and Upper Halves
January 1990 - July 2009

Trend
Overall
Lower Half
Upper Half

June and July are Preliminary

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 2
Median Trend, Actual and Projected Phoenix House Prices
Overall, Lower and Upper Halves
January 1989 - June 2009

Trend
Overall
Lower Half
Upper Half

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 3

Metro Phoenix Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 1990 - May 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 4

Metro Phoenix Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 2004 - May 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 5
Regional Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 1990 - May 2009

Central
Northeast
Southeast
Northwest
Southwest
Metro Area

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 6
Regional Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 2004 - May 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 7
Chandler, Gilbert, Mesa, & Tempe Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 1990 - May 2009

Chandler
Gilbert
Mesa
Tempe
Metro Area

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 8
Chandler, Gilbert, Mesa & Tempe Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 2004 - May 2009

Chandler
Gilbert
Mesa
Tempe
Metro Area

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 9
Glendale, Peoria, & Sun City/Sun City West Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 1990 - May 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 10
Glendale, Peoria, & Sun City/Sun City West Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 2004 - May 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 11
Scottsdale/Paradise Valley, & Phoenix Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 1990 - May 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express
Figure 12
Scottsdale/Paradise Valley, & Phoenix Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 2004 - May 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data Express