Repeat Sales Index Report
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ASU
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 partly due to the use of different house transactions databases and possibly by the way the data has been cleaned prior to the calculation process. For example, the ASU-RSI database provided by Ion Data includes For Sale by Owner (FSBO) sales, which are not included in the S&P/Case-Shiller index since it uses MLS data. 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 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 index to the trend 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 the index is a moving three month average, preliminary estimates of the index and future median prices are included for the next two months in Figures 1 and 2 (through April 2009). The next ten graphs cover two time periods. Five of the graphs present the price changes from January 1990 through February 2009 while the other five graphs cover the recent housing cycle beginning in January 2004. 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, the metro area has been divided into five regions and an index has been calculated for each region. All repeat sales used in the metro index are included in one of the regional indices. Indices have also been calculated for seven 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 1.

<table>
<thead>
<tr>
<th>TABLE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>CITIES INCLUDED IN REGIONS</td>
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</table>

<table>
<thead>
<tr>
<th>REGION</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORTHEAST</td>
</tr>
<tr>
<td>CAREFREE</td>
</tr>
<tr>
<td>CAVE CREEK</td>
</tr>
<tr>
<td>FOUNTAIN HILLS</td>
</tr>
<tr>
<td>PARADISE VALLEY</td>
</tr>
<tr>
<td>SCOTTSDALE</td>
</tr>
<tr>
<td>NORTHWEST</td>
</tr>
<tr>
<td>EL MIRAGE</td>
</tr>
<tr>
<td>GLENDALE</td>
</tr>
<tr>
<td>PEORIA</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>
Summary

The latest data for February 2009 reveals that house prices declined by 37 percent in the Phoenix metro area compared to 35 percent in January and 33 percent in December 2008. The decline in the index which began in March 2007 has now continued for 24 months compared to 17 months in the early 1990s. Preliminary estimates of the index for March show prices declining at virtually the same rate as in February while the preliminary decline for April is 34 percent. While preliminary and subject to change, the April figure suggest that prices soon may be declining at a slower rather than a faster rate compared to the previous month. In this market, that would be considered good news. The rate of appreciation for the overall metro area peaked in September 2005 at a 44 percent annual rate with house prices increasing by 76 percent from January 2004 to July 2006. As of February the total decline from the peak is 44 percent, which would put prices at a level not seen since April 1999.

An important factor for both home owners and prospective purchasers is the median price of housing. Based on the sales reflected in the index, the median price was $121,000 in February compared to $130,000 in January. The preliminary estimates for March, $119,000 and April, $117,500 would put prices back to the levels of March 1999 and November 1998, respectively.
While there is some evidence that the rate of decline is turning around, prices continue to decline but by much smaller amounts than in the past 18 months.

Regions

Annual rates of decline vary widely across the five regions as does the change in the rate of decline from January to February 2009. The decline increased in all five regions with the Central and Southwest regions at over -40 percent for the preceding twelve months and the Northwest close behind. At the other end, prices declined by 27 percent in the Northeast and 30 percent in the Southeast regions. While there are still substantial differences between the regions, the range is narrowing. In all but the Northeast region, the decline from January to February was smaller than the preceding month.

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>ANNUAL, MONTHLY AND TOTAL DECLINES IN HOUSE PRICES BY REGION</th>
<th>EARLY 1990s VS THE PRESENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTRAL</td>
<td>NORTHEAST</td>
<td>SOUTHEAST</td>
</tr>
<tr>
<td>Feb. 2008 – Feb. 2009</td>
<td>-44.3%</td>
<td>-26.5%</td>
</tr>
<tr>
<td>Jan. – Feb. 2009</td>
<td>-4.4%</td>
<td>-3.4%</td>
</tr>
<tr>
<td>2006 – 2009</td>
<td>-49.9</td>
<td>-30.5</td>
</tr>
</tbody>
</table>

While all five regions showed similar dramatic increases in house prices from January 2004 to their 2006 peaks (74 – 81 percent), total price declines vary widely. The Southwest is down the most since the peak (55%) with the Central and Northwest regions close behind and even the Northeast down by over 30 percent. The early 1990s saw a recession and fallout from the excesses of the 1980s in the real estate market. The current weakness in the housing market has not only exceeded the duration experienced in the early 1990s but the magnitude of the declines far exceeds those from the 1989 - 1992 period in all regions.
Cities

Variations similar to those observed in the regional data are also apparent in the city data. Rates of decline in house prices from February 2008 to 2009 ranged from 16 percent in Tempe to 40 percent in Glendale (Table 3). In Sun City/Sun City West the annual decline in the index had been in the range of -13 to -15 percent for over a year but increased for the second month in a row to -18 percent. The January to February decline was larger in all cities except Mesa and Peoria compared to the previous month reflecting the continued deterioration in the market over the winter. Prices have declined by 50 percent in Glendale and Peoria since the 2006 peak and the declines are over 40 percent in Mesa. Tempe has now replaced Scottsdale / Paradise Valley with the smallest total decline at just over 27 percent.

| TABLE 3 |
| ANNUAL, MONTHLY AND TOTAL DECLINES IN HOUSE PRICES BY CITY |
| EARLY 1990s VS THE PRESENT |

<table>
<thead>
<tr>
<th>CHANDLER</th>
<th>GLENDALE</th>
<th>MESA</th>
<th>PEORIA</th>
<th>SCOTTSDALE/ PARADISE VALLEY</th>
<th>SUN CITY/ SUN CITY WEST</th>
<th>TEMPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 2008-Feb. 2009</td>
<td>-25.8%</td>
<td>-39.5%</td>
<td>-34.8%</td>
<td>-36.7%</td>
<td>-25.5%</td>
<td>-18.4%</td>
</tr>
<tr>
<td>Jan. – Feb. 2009</td>
<td>-2.4%</td>
<td>-5.5%</td>
<td>-3.1%</td>
<td>-4.9%</td>
<td>-3.3%</td>
<td>-4.0%</td>
</tr>
<tr>
<td>1989 – 1992</td>
<td>-7.6</td>
<td>-19.6</td>
<td>-10.9</td>
<td>-7.3</td>
<td>-9.7</td>
<td>-10.5</td>
</tr>
<tr>
<td>2006 – 2008</td>
<td>-36.5</td>
<td>-50.3</td>
<td>-44.2</td>
<td>-49.6</td>
<td>-29.5</td>
<td>-33.9</td>
</tr>
</tbody>
</table>
Figure 1
Trend, Actual and Preliminary Percent Change in Phoenix House Price
January 1990 - April 2009

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

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 3
Metro Phoenix Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 1990 - February 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 4
Metro Phoenix Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 2004 - February 2009

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

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 6
Regional Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 2004 - February 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
Figure 7
Chandler, Mesa, & Tempe Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 1990 - February 2009

Chandler
Mesa
Tempe
Metro Area

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

Chandler
Mesa
Tempe
Metro Area

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

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

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

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

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