Repeat Sales Index Report
Residential • April 2009

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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. The ten graphs cover two time periods. Five of the graphs present the price changes from January 1990 through January 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. An index has 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>
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<tbody>
<tr>
<td>CITIES INCLUDED IN REGIONS</td>
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</table>

<table>
<thead>
<tr>
<th>REGION</th>
<th>CITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORTHEAST</td>
<td>CAREFREE, CAVE CREEK, FOUNTAIN HILLS, PARADISE, VALLEY, SCOTTSDALE</td>
</tr>
<tr>
<td>NORTHWEST</td>
<td>EL MIRAGE, GLENDALE, PEORIA, SUN CITY, SUN CITY WEST, SURPRISE, YOUNGTOWN</td>
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</table>
Summary

The latest data for January 2009 reveals that house prices declined by 35 percent in the Phoenix metro area. This is an increase from the December decline of 33 percent and the November 2007 to November 2008 decline of 32 percent. Uncertainty in the financial markets last fall and the accelerating decline in the U.S economy are being reflected in recent large declines in the RSI. The rapid, double-digit rates of decline that began in March 2008 have extended for 23 months compared to 17 months in the early 1990s. However, for the first time, preliminary estimates of the index for March show prices declining at a slower rather than a faster rate. The preliminary figures are for declines of 37 percent for February and 36 percent for March. While preliminary and subject to change, these figures suggest that at least the rate of decline may be turning around. 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.

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 approximately $139,000 in December 2008 while for January the median dropped to $130,000. The January figure puts prices back to the level of January 2001, well prior to the start of the current cycle. The preliminary estimates for February, $121,000 and March, $120,000 would put prices back to the levels of April and March 1999, respectively. While inflation is often a problem, it is now possible to buy houses at 1999 prices. Prices at these levels are a major factor in the recent increase in selling activity in the housing market. Since it peaked, the ASU-RSI has declined by over 42 percent in total.
Regions

Annual rates of decline vary widely across the five regions as does the change in the rate of decline from December to January 2009. The decline increased in all five regions with the Central and Southwest regions at over -40 percent for the preceding twelve months. At the other end, prices declined by 25 percent in the Northeast and 29 percent in the Southeast regions. The most dramatic monthly change was in the Central region (Phoenix) where prices declined by another 6 percent following a 10 percent decline from November to December. The price decline slowed to 1 percent in the Northeast region from almost 5 percent in December.

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<thead>
<tr>
<th></th>
<th>CENTRAL</th>
<th>NORTHEAST</th>
<th>SOUTHEAST</th>
<th>NORTHWEST</th>
<th>SOUTHWEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 2008 – Jan. 2009</td>
<td>-41.4%</td>
<td>-25.1%</td>
<td>-28.9%</td>
<td>-35.7%</td>
<td>-43.4%</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 (over 53%) with the Central and Northwest regions close behind. 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 January 2008 to 2009 ranged from 16 percent in Tempe to 36 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 to -17 percent in the most recent
data. A pattern may be emerging in the city data with Chandler, Glendale and Tempe showing
slightly slower rates of decline for the past two to three months, which is becoming apparent in
Figures 8 and 10. In contrast the rate of decline increased slightly in Mesa, Peoria, Scottsdale /
Paradise Valley and Sun City / Sun City West in January. Total declines since the 2006 peak are
approaching 50 percent in Glendale and Peoria and are over 40 percent in Mesa. Tempe has now
replaced Scottsdale / Paradise Valley with the smallest total decline at just over 25 percent.

<table>
<thead>
<tr>
<th>TABLE 3</th>
<th>ANNUAL AND TOTAL DECLINES IN HOUSE PRICES BY CITY</th>
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<tbody>
<tr>
<td></td>
<td>EARLY 1990s VS THE PRESENT</td>
</tr>
<tr>
<td>CHANDLER</td>
<td>GLENDALE</td>
</tr>
<tr>
<td>Jan. 2008-</td>
<td>-24.4%</td>
</tr>
<tr>
<td>Jan. 2009</td>
<td></td>
</tr>
<tr>
<td>Dec. 2007-</td>
<td>-25.0%</td>
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<tr>
<td>Dec. 2008</td>
<td></td>
</tr>
<tr>
<td>1989 – 1992</td>
<td>-7.6</td>
</tr>
<tr>
<td>2006 – 2008</td>
<td>-35.0</td>
</tr>
</tbody>
</table>

Preliminary Estimates

The extraordinary nature of the housing cycle that began in January 2004 compared to the
prior history of the market back to 1989 is apparent in Figure 1. The graph is based on the trend in
the annual rate of change in Phoenix house prices calculated from the ASU-RSI beginning in
January 1990 through the end of 2003. This trend shows a gradual increase in the annual rate of
price change reaching approximately 7 percent by 2002-2003. The trend is then projected out to the
day of 2009 and compared to the actual and estimated changes in the RSI through March 2009. Not
surprisingly, the peak appreciation rate of 44 percent in September 2005 was not sustainable. The
preliminary decline for March, 36 percent is slightly less than the estimate for February, 37 percent,
and can be seen as an uptick in the graph. This may be the long awaited signal that the housing
market may be beginning to change course.
Perhaps the most important question that homeowners have relates to how much further house prices are likely to fall. While it is impossible to predict where prices will level off, Figure 2 contains a comparison of the trend in median house prices used in the ASU-RSI with actual and estimated median prices through March 2009. The trend was estimated using the RSI database from January 1989 through the end of 2003 and it is then projected through December 2009. As difficult as the market correction has been, the data show that by July 2008, median house prices had returned to their long-term trend at approximately $191,000. The January 2009 median price was $130,000 compared to the peak at approximately $262,500 in mid-2006. The preliminary figure for March ($120,000) reflects only a slight decrease from February ($121,000) suggesting that house prices may be close to their bottom.
Figure 1
Trend and Annual Percent Change in Phoenix House Price
January 1990 - March 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 - March 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 - January 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 - January 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 - January 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 - January 2009

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 - January 2009

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 - January 2009

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 - January 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 - January 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 - January 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 - January 2009

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