Repeat Sales Index Report
Residential • October 2009

Karl L. Guntermann
Fred E. Taylor Professor of Real Estate

Adam Nowak
Research Associate
Summary

The latest data for July 2009 reveals that house prices declined by 28 percent in the Phoenix metro area, which is slightly less than the 31 percent decline in June and 33 percent in May (Table 1). The decline in the index which began in March 2007 has continued for 29 months compared to the 17 month decline in the early 1990s. Preliminary estimates for August and September have prices declining at progressively slower rates, 25 and 23 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 contrast to the overall 28 percent annual decline, the July to July decline for lower priced homes was 41 percent compared to 21 percent for more expensive houses. However, for the first time since March 2007 the change in the index indicates that prices increased, if only slightly, from the previous month in all regions and most cities. The market wide increase from June to July was 2 percent and houses in the lower and higher priced segments of the market also increased by an average of 2 percent. The total decline in prices from the mid-2006 peak is 48 percent, which breaks down to 60 and 37 percent declines for the lower and higher priced houses, respectively. 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 overall median price for sales that were included in the July index was $125,000, up from $122,000 in June. Preliminary median prices for August and September were $126,500 and $130,000, respectively. While the median price has increased from the April bottom, $117,500, it must be remembered that the current housing market is still quite volatile. The increased prices primarily reflect foreclosed houses that have been purchased by investors and first-time buyers taking advantage of the federal tax credit. However, the large number of foreclosures that are likely to hit the market through 2010 makes it difficult to predict the direction of house prices with any certainty. The median price for lower and higher priced houses in July was $90,000 and $252,000, respectively.

October introduces a significant change to the monthly report with the addition of data and graphs for the townhouse / condominium segment of the market. Until now the ASU/RSI has been estimated using data only for single-family, detached houses, which is consistent with the S&P Case/Shiller index. Attached units represent a significant portion of the housing market and data for townhouse / condo sales back to January 1989 has been used to estimate an index using the same repeat sales methodology. Unlike in the single-family market, prices in the townhouse / condo market have continued to decline at an increasing rate, reaching a -36 percent annual rate by July 2009 (Table 1). The decline from June to July 2009 was 4 percent, the same as the decline from May to June. The median price of townhouse / condo units was $98,500 in July with August and September preliminary estimates at $99,000 and $93,800, respectively. The single-family and townhouse / condo indices are graphed in Figures 4 and 5 and track fairly closely as might be
expected. Because attached units represent a much smaller segment of the market than detached, single-family houses, there are fewer paired sales and considerably more volatility in the townhouse / condo RSI as can be seen in Figure 4.

TABLE 1
CHANGE IN RESIDENTIAL PRICES
(Percent)

<table>
<thead>
<tr>
<th></th>
<th>OVERALL</th>
<th>LOWER PRICED</th>
<th>HIGHER PRICED</th>
<th>TOWNHOUSE / CONDO</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2008 – July 2009</td>
<td>-27.8</td>
<td>-40.9</td>
<td>-20.8</td>
<td>-35.6</td>
</tr>
<tr>
<td>June - July 2009</td>
<td>1.6</td>
<td>2.1</td>
<td>2.1</td>
<td>-4.2</td>
</tr>
<tr>
<td>2006 – July 2009</td>
<td>-47.7</td>
<td>-60.3</td>
<td>-37.3</td>
<td>-46.4</td>
</tr>
<tr>
<td>Median Price - July 2009</td>
<td>$125,000</td>
<td>$90,000</td>
<td>$252,000</td>
<td>$98,500</td>
</tr>
</tbody>
</table>

Regions
Annual rates of decline vary widely across the five regions as does the change from June to July (Table 2). The index declined by over 20 percent in the Northeast from July 2008 to July 2009 but by 37 percent in the central region. The July decline in the hard hit central region was actually 3 percent less than was reported last month. Compared to June, the index was actually up in all regions led by a 3 percent increase in the central region. While all five regions showed similar dramatic increases in house prices from January 2004 to their 2006 peaks (74 – 81 percent), total price declines through June have varied widely. The Southwest is down the most since the peak, 59%, with the Central and Northwest regions also down over 50 percent, reflecting the severity of the foreclosure problem in those parts of the metro area. Even in the Northeast, which has been the least affected, prices have declined by over 33 percent.

Cities
Variations similar to those observed in the regional data are also apparent in the city data (Table 3). The declines in house prices from July 2008 to July 2009 slowed compared to the June data for all
### TABLE 2
CHANGE IN HOUSE PRICES BY REGION
(Percent)

<table>
<thead>
<tr>
<th></th>
<th>CENTRAL</th>
<th>NORTHEAST</th>
<th>SOUTHEAST</th>
<th>NORTHWEST</th>
<th>SOUTHWEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2008 – July 2009</td>
<td>-36.5</td>
<td>-20.3</td>
<td>-24.0</td>
<td>-29.7</td>
<td>-28.6</td>
</tr>
<tr>
<td>June – July 2009</td>
<td>2.6</td>
<td>1.8</td>
<td>0.5</td>
<td>0.8</td>
<td>0.9</td>
</tr>
<tr>
<td>2006 – July 2009</td>
<td>-54.2</td>
<td>-33.0</td>
<td>-45.5</td>
<td>-53.3</td>
<td>-58.8</td>
</tr>
</tbody>
</table>

Cities. In hard hit Glendale the annual decline was 34 percent compared to 38 percent in the last report. Prices increased from June to July in all reported cities with the exception of Mesa (-1 percent) and Sun City / Sun City West (-0.2 percent). 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 3
CHANGE IN HOUSE PRICES BY CITY
(Percent)

<table>
<thead>
<tr>
<th>City</th>
<th>CHANDLER</th>
<th>GILBERT</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>July 2008 – July 2009</td>
<td>-20.1</td>
<td>-18.5</td>
<td>-34.0</td>
<td>-29.4</td>
<td>-27.2</td>
<td>-19.5</td>
<td>-15.2</td>
<td>-23.8</td>
</tr>
<tr>
<td>June - July 2009</td>
<td>0.6</td>
<td>0.0</td>
<td>1.6</td>
<td>-1.0</td>
<td>0.0</td>
<td>2.1</td>
<td>-0.2</td>
<td>2.2</td>
</tr>
<tr>
<td>1989 – 1992</td>
<td>-7.6</td>
<td>na</td>
<td>-19.6</td>
<td>-10.9</td>
<td>-7.3</td>
<td>-9.7</td>
<td>-10.5</td>
<td>-1.9</td>
</tr>
<tr>
<td>2006 – July 2009</td>
<td>-41.5</td>
<td>-45.0</td>
<td>-56.0</td>
<td>-50.2</td>
<td>-52.0</td>
<td>-32.3</td>
<td>-35.2</td>
<td>-35.6</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 (regions and selected cities). Price changes for the attached portion of the housing market (townhouse / condominiums) are also presented in a repeat sales index using the same methodology and an index is also estimated for higher and lower priced single-family detached houses. The monthly data are divided into two groups based on the median price of all single-family houses sold. Sales are then paired within each of the two data sets and a repeat sales index is calculated. 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 five regional indices. Indices have also been calculated for eight individual cities where there are a sufficient number of repeat sales a reliable index to be estimated. 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 as well as median single-family house prices. Figures 1 and 2 compare the change in the overall, lower and higher priced indices to the overall trend in the index, where the trend was estimated based on the index from January 1989 through December 2003. Figure 3 makes the same type of comparison using the median price of single-family 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 (August and September) in Figures 1 and 2. Figures 4 and 5 include the new townhouse / condominium RSI and the single-family RSI presented earlier in Figures 1 and 2. Figures 6-13 contain eight graphs that cover two time periods. Four of the graphs present the price changes from January 1990 through July 2009 while the other four 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 8 and 9 starts in January 2000.
<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>
</tr>
<tr>
<td>CENTRAL</td>
<td>PHOENIX</td>
</tr>
<tr>
<td>SOUTHEAST</td>
<td>APACHE JUNCTION, CHANDLER, GILBERT, HIGLEY, MESA, QUEEN CREEK, SUN LAKES, TEMPE</td>
</tr>
<tr>
<td>SOUTHWEST</td>
<td>AVONDALE, BUCKEYE, GOODYEAR, LITCHFIELD PARK</td>
</tr>
</tbody>
</table>
Figure 1
Phoenix Single-Family Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 1990 - September 2009

Trend
Metro Area
Upper Range¹
Lower Range²

August and September are Preliminary

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
1: Median Price $252,000  2: Median Price $90,000
Figure 2
Phoenix Single-Family Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 2004 - September 2009

August and September are Preliminary

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

1: Median Price $252,000  2: Median Price $90,000
Figure 3
Phoenix Median Single-Family House Prices
January 1989 - September 2009

Thousands of Dollars

August and September are Preliminary

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 4
Phoenix Single-Family and Townhouse/Condominium Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 1990 - September 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 5
Phoenix Single-Family & Townhouse/Condominium Repeat Sales Index (RSI)
Percentage Change Same Month, Previous Year
January 2004 - September 2009

August and September are Preliminary

Single-Family
TH/Condo

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 6
Regional Single-Family Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 1990 - July 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 7
Regional Single-Family Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 2004 - July 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 8
Chandler, Gilbert, Mesa, & Tempe Single-Family Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 1990 - July 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 9
Chandler, Gilbert, Mesa & Tempe Single-Family Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 2004 - July 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 Single-Family West Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 1990 - July 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 11
Glendale, Peoria, & Sun City/Sun City West Single-Family Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 2004 - July 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 Single-Family Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 1990 - July 2009

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 13
Scottsdale/Paradise Valley & Phoenix Single-Family Repeat Sales Index (RSI)
Percent Change Same Month, Previous Year
January 2004 - July 2009

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