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 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 (May and June) 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 April 2009 while the other five graphs cover the recent 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. 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 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 1.

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

<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>
</tr>
<tr>
<td></td>
<td>GLENDALE</td>
</tr>
<tr>
<td></td>
<td>PEORIA</td>
</tr>
</tbody>
</table>

2
The latest data for April 2009 reveals that house prices declined by 35 percent in the Phoenix metro area, which is slightly less than the 37 percent decline in both February and March. The decline in the index which began in March 2007 has continued for 26 months compared to 17 months of decline in the early 1990s. Preliminary estimates for May and June have prices declining by 33 and 31 percent respectively. April is the first month with a slower annual rate of decline and the progressively smaller declines the next two months is pretty good evidence that the worst of the price declines is in the past. In addition, the preliminary median price for June is $119,000, up from $115,000 in May and $117,000 in April. While the housing market is still quite volatile, it may turn out that the low point in terms of price occurred in May, almost three years after prices peaked in July 2006. Prices increased by 76 percent from January 2004 to July 2006 and as of April the total decline was 48 percent. The June median would put prices back to a level not seen since March 1999. While prices may be at or close to a market bottom, the large number of foreclosed properties being sold at distressed prices suggests that the median price is unlikely to increase significantly in the near future.

Summary

The latest data for April 2009 reveals that house prices declined by 35 percent in the Phoenix metro area, which is slightly less than the 37 percent decline in both February and March. The decline in the index which began in March 2007 has continued for 26 months compared to 17 months of decline in the early 1990s. Preliminary estimates for May and June have prices declining by 33 and 31 percent respectively. April is the first month with a slower annual rate of decline and the progressively smaller declines the next two months is pretty good evidence that the worst of the price declines is in the past. In addition, the preliminary median price for June is $119,000, up from $115,000 in May and $117,000 in April. While the housing market is still quite volatile, it may turn out that the low point in terms of price occurred in May, almost three years after prices peaked in July 2006. Prices increased by 76 percent from January 2004 to July 2006 and as of April the total decline was 48 percent. The June median would put prices back to a level not seen since March 1999. While prices may be at or close to a market bottom, the large number of foreclosed properties being sold at distressed prices suggests that the median price is unlikely to increase significantly in the near future.
Annual rates of decline vary widely across the five regions as does the change in the rate of decline from March to April. However, the annual rates of decline are slightly smaller than they were last month across all regions, indicating that the moderating declines are market wide. The biggest improvement was in the hard hit Southwest region where the 37.1 percent decline in April compares to -42.7 percent in March, leaving only the Central region with a 40+ percent annual decline. The instability in the housing market is reflected in the price declines from March to April. Not only do they vary widely across regions but the change in most cases is considerably different than it was from February to March. For example, prices declined 4.6 percent in the Northeast region compared to a 0.2 percent increase the previous month. The decline in the Southeast was 2.5 percent compared to -4.2 percent in March. The large number of foreclosed houses on the market makes continued instability almost a certainty in the near term.

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

<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>April 2008 –</td>
<td>-43.2%</td>
<td>-24.2%</td>
<td>-28.4%</td>
<td>-36.3%</td>
<td>-37.1%</td>
</tr>
<tr>
<td>April 2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>March - April</td>
<td>-4.3%</td>
<td>-4.6%</td>
<td>-2.5%</td>
<td>-3.4%</td>
<td>-2.2%</td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006 – 2009</td>
<td>-54.9</td>
<td>-33.5</td>
<td>-44.8</td>
<td>-53.3</td>
<td>-58.8</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 have varied widely. The Southwest is down the most since the peak, 59%, with the Central and Northwest regions close behind, presumably reflecting the severity of the foreclosure problem in those parts of the metro area. If data in coming months supports the preliminary evidence that prices have bottomed out, the cumulative declines will result in a very 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 there relatively more affordable, further helping those housing submarkets to recover.

Cities

Variations similar to those observed in the regional data are also apparent in the city data. Rates of decline in house prices from April 2008 to 2009 ranged from 18 percent in Sun City Sun / Sun City West to 40 percent in Glendale (Table 3). The annual declines were slightly less in all cities except Glendale, which was unchanged and Tempe where there was a surprising acceleration in the rate of decline from 18 percent in March to the current -22 percent. This is the first month that Gilbert has been included in the report and its annual decline is the slowest in the East Valley at -21 percent. Price changes from March to April varied widely as they did across regions with the individual declines varying considerably from the previous month reflecting instability in the housing market. Prices have declined by over 50 percent in Glendale and Peoria since the 2006 peak with substantial declines in all other cities.

<table>
<thead>
<tr>
<th>Cities</th>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARLY 1990s VS THE PRESENT</td>
<td></td>
</tr>
<tr>
<td>CHANDLER</td>
<td>-26.2%</td>
</tr>
<tr>
<td>GILBERT</td>
<td>-20.9%</td>
</tr>
<tr>
<td>GLENDALE</td>
<td>-40.3%</td>
</tr>
<tr>
<td>MESA</td>
<td>-32.5%</td>
</tr>
<tr>
<td>PEORIA</td>
<td>-33.2%</td>
</tr>
<tr>
<td>SCOTTSDALE/</td>
<td>-23.2%</td>
</tr>
<tr>
<td>SUN CITY/</td>
<td>-18.2%</td>
</tr>
<tr>
<td>TEMPE</td>
<td>-22.1%</td>
</tr>
<tr>
<td>PARADISE</td>
<td>-36%</td>
</tr>
<tr>
<td>VALLEY</td>
<td>-20%</td>
</tr>
<tr>
<td>SUN CITY/</td>
<td>-34%</td>
</tr>
<tr>
<td>WEST</td>
<td>-23%</td>
</tr>
</tbody>
</table>

April 2008- April 2009:
-26.2%  -20.9%  -40.3%  -32.5%  -33.2%  -23.2%  -18.2%  -22.1%

March - April 2009:
-3.6    -0.5    -6.3    -1.8    -0.8    -4.9    -1.0    -6.8

1989 – 1992:
-7.6    na     -19.6  -10.9  -7.3  -9.7  -10.5  -1.9

2006 – 2008:
-41.3  -43.0  -55.7  -47.9  -52.1  -32.7  -35.4  -35.6
Figure 1
Trend and Annual Percent Change in Phoenix House Prices
January 1990 - June 2009

May and June 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
January 1989 - June 2009

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 - April 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 - April 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 - April 2009

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 - April 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 - April 2009

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 - April 2009

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 - April 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 - April 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 - April 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 - April 2009

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