Repeat Sales Index Report
Residential • December 2010

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

Adam Nowak
Research Associate
The preliminary data for November shows that housing prices declined for another month with the annual rate accelerating slightly to -7 percent on a year-to-year basis. Given the pattern that is emerging, it is likely that declines will continue for at least the next several months. The recent improvement in Phoenix employment is an important step in getting the housing market back to normal but the process will continue through 2011 and beyond. Markets don’t move smoothly in one direction so perhaps it should not be surprising that another period of price declines has begun. To put things in perspective, in November 2008 prices had declined by 32 percent from the prior year and by November 2009 they had declined another 17 percent. Those declines reflected the depressed condition of the Phoenix housing market and the Great Recession. With the economy gradually recovering and the foreclosure problem past its peak, the odds are good that the housing market will end 2011 a lot better than it will be beginning it.

Foreclosure prices also declined again with November prices taking a big drop of 11 percent compared to November 2009. Last month the decline had been only 3 percent so this reflects serious deterioration in a segment of the market that had been doing better than all but lower priced housing. Non-foreclosure prices have been declining at an annual rate of 9-13 percent since March with the exception of October’s 6 percent drop. However, the November decline is back to 9 percent but that is still within the same narrow range that has been observed recently.

The decline for lower priced houses also accelerated in the preliminary November data (-8 percent) compared to November 2009 but the prices of more expensive houses dropped at the same rate (6 percent) compared to a 5 percent decline in September. Higher priced house prices have been declining at single digit rates since February but never got into positive territory. Townhouse/condos prices have been declining at the much higher rate of around 20 percent per year since March and they declined by 21 percent rate in the preliminary November data.

The overall median price for sales that were included in the November index was $122,300 compared to $125,000 in October and $124,900 in September. Since June 2009, prices have fluctuated between $122,000 and $135,000 reflecting the instability that characterizes the current market and recent median prices are still within that range in spite of indications that the market is softening. The preliminary median price for foreclosed houses in November was $106,000 compared to $110,000 in September. For the past twelve months, the foreclosed house median price has been between $110,000 and $120,000 so this represents a new low for 2010 (Figure 7). In contrast, the non-foreclosure median in November was $155,000 compared to a September figure of $155,500. Median prices have fluctuated within a fairly narrow range for over a year and the preliminary November price is within that range (Figure 7). Similar statements about median prices could be made for the lower priced segment of the market (Figure 3) until the preliminary November data which has prices below $90,000 for the first time in over a year. However, the median for higher priced houses is
still similar to what it has been for most of 2010. The median price for townhouse/condos was $63,000 in November, the fourth month with prices below $70,000.

### TABLE 1

<table>
<thead>
<tr>
<th></th>
<th>OVERALL</th>
<th>LOWER PRICED</th>
<th>HIGHER PRICED</th>
<th>TOWNHOUSE / CONDO</th>
<th>FORECLOSURES</th>
<th>NON-FORECLOSURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 2009 –</td>
<td>-4.0</td>
<td>-2.0</td>
<td>-5.0</td>
<td>-20.0</td>
<td>-5.0</td>
<td>-9.0</td>
</tr>
<tr>
<td>Sept. 2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aug. 2010 -</td>
<td>-2.0</td>
<td>-3.0</td>
<td>-1.0</td>
<td>-4.0</td>
<td>-0.5</td>
<td>-3.0</td>
</tr>
<tr>
<td>Sept. 2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1989–1992</td>
<td>-7.7</td>
<td>-3.9</td>
<td>-12.8</td>
<td>-3.9</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>2006– Sept. 2010</td>
<td>-51.0</td>
<td>-61.0</td>
<td>-43.0</td>
<td>-60.0</td>
<td>-57.0</td>
<td>-46.0</td>
</tr>
</tbody>
</table>

Median Price - $124,900 $92,500 $270,000 $62,000 $110,000 $155,500
Sept. 2010

**Regions**

Regional price changes in September were weaker than in August meaning that increases were a little smaller while declines were a little larger, which follows the pattern observed last month. The Southwest is the still only region with an increase in prices from one year ago while declines in the other regions were 3.7 percent or larger. With the August data the Southeast region now shows the largest decline (Table 2) instead of the Northeast region where prices have weakened the most in recent months. In terms of total declines from the 2006 peak, every region is down at least 38 percent with the Southwest down the most at almost 58 percent.

**Cities**

The only city to show appreciation from September 2009 to 2010 was Avondale and prices there were up only 1.6 percent in September. In every city but Sun City / Sun City West the September decline was greater than that reflected in the August data. Total declines from the peak are still very large in all cities (Table 3), ranging from 37 percent in Scottsdale/Paradise Valley to almost 65 percent in Avondale.
### 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>Sept. 2009 – Sept. 2010</td>
<td>-3.7</td>
<td>-6.6</td>
<td>-7.3</td>
<td>-4.6</td>
<td>1.8</td>
</tr>
<tr>
<td>Aug. 2010 – Sept. 2010</td>
<td>-2.5</td>
<td>-1.0</td>
<td>-2.2</td>
<td>-0.4</td>
<td>-1.6</td>
</tr>
<tr>
<td>2006 – Sept. 2010</td>
<td>-55.1</td>
<td>-38.2</td>
<td>-49.0</td>
<td>-54.8</td>
<td>-57.8</td>
</tr>
</tbody>
</table>

### TABLE 3
CHANGE IN HOUSE PRICES BY CITY
(Percent)

<table>
<thead>
<tr>
<th></th>
<th>CHANDLER</th>
<th>GILBERT</th>
<th>GLENDALE</th>
<th>MESA</th>
<th>PEORIA</th>
<th>SCOTTSDALE/ PARADISE VALLEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 2009 – Sept. 2010</td>
<td>-9.4</td>
<td>-6.6</td>
<td>-5.8</td>
<td>-5.2</td>
<td>-5.3</td>
<td>-6.6</td>
</tr>
<tr>
<td>Aug. 2010 – Sept. 2010</td>
<td>-1.1</td>
<td>-0.8</td>
<td>0.7</td>
<td>-3.3</td>
<td>0.1</td>
<td>-0.4</td>
</tr>
<tr>
<td>2006 – Sept. 2010</td>
<td>-46.5</td>
<td>-47.6</td>
<td>-56.9</td>
<td>-53.0</td>
<td>-54.3</td>
<td>-37.2</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 change in price of the same housing units 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 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 last 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, the rate of return calculated from each sale pair is included in calculations for a total of three months before it is published. Results using data for the two newest months are labeled as preliminary.

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, smaller geographic areas (regions and selected cities) and for the housing market segmented in various ways. Price changes for the attached portion of the housing market (townhouse / condominiums) are presented as a repeat sales index using the same methodology and indices are also estimated for higher and lower priced single-family detached houses and for foreclosure and non-foreclosure sales. 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 for each. The foreclosure sale pairs are formed using two foreclosure sales or with a foreclosure sale paired with an earlier non-foreclosure sale of the house. 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 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 using data 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 (October and November) in Figures 1-7. Figures 4 and 5 include the townhouse / condominium RSI compared to the single-family RSI presented earlier in Figures 1 and 2. The foreclosure and non-foreclosure RSIs are in Figure 6 while Figure 7 has median prices for foreclosure and non-foreclosure houses and townhouse / condo units. Figures 8-17 contain graphs for the regions and cities for two different time periods. Five of the graphs present the price changes from January 1990 through September 2010 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 changes for Gilbert in Figures 10 and 11 start in January 2000.

Limited historical data has prevented Goodyear, Avondale and Surprise from being included in the monthly reports. However, the methodology used to calculate the indices has been modified and applied to those cities, resulting in enough data to calculate a reliable index for each one. Very simply, if a sale in one of those cities cannot be paired with a prior sale of the same house, the sale is paired with the prior sale of a house that is the same model and in the same subdivision. While model pairing is not ideal, this technique allows these cities to be included in the report. When the model pairing methodology was applied to the existing cities in the report, the index values correlated almost perfectly with those calculated from the traditional sale pair methodology. However, even with the modified pairing technique, fewer pairs are available to calculate the monthly index so the indices for Goodyear, Avondale and Surprise are somewhat more volatile than those for the other eight cities.

TABLE 4
CITIES INCLUDED IN REGIONAL INDICES

<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>
</tbody>
</table>
NORTHWEST
EL MIRAGE
GLENDALE
PEORIA
SUN CITY /
SUN CITY WEST
SURPRISE
YOUNGTOWN

CENTRAL
PHOENIX

SOUTHEAST
APACHE JUNCTION
CHANDLER
GILBERT
HIGLEY
MESA
QUEEN CREEK
SUN LAKES
TEMPE

SOUTHWEST
AVONDALE
BUCKEYE
GOODYEAR
LITCHFIELD PARK
Figure 1
Phoenix Single-Family Repeat Sales Index (RSI)
Annual Change
January 1990 - November 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data

October and November are Preliminary

September: 1, Upper -5%  2, Lower -2%
Figure 2
Phoenix Single-Family Repeat Sales Index (RSI)
Annual Change
January 2004 - November 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data

October and November are Preliminary

September: 1, Upper -5%  2, Lower -2%
Figure 3
Phoenix Median Single-Family House Prices
January 1989 - November 2010

Trend
Metro Area
Upper Range¹
Lower Range²

October and November are Preliminary

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data

September: 1, Upper $270,000  2, Lower $92,500
Figure 4
Phoenix Single-Family and Townhouse/Condominium Repeat Sales Index (RSI)
Annual Change
January 1990 - November 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data

October and November are Preliminary

September: Single-Family -4%; TH/Condo -20%
Figure 5
Phoenix Single-Family & Townhouse/Condominium Repeat Sales Index (RSI)
Annual Change
January 2004 - November 2010

October and November are Preliminary

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data

September: Single-Family -4%; TH/Condo -20%
Figure 6
Phoenix Single-Family Foreclosure and Non-Foreclosure Repeat Sales Index (RSI)
Annual Change
January 2001 - November 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data

October and November are Preliminary
Figure 7
Phoenix Foreclosures, Non-Foreclosures and Townhouse/Condominium Median Prices
January 1989 - November 2010

October and November are Preliminary

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data

September: 1, TH/Condo $62,000  2, Foreclosure $110,000  3, Non-Foreclosure $155,500
Figure 8
Regional Single-Family Repeat Sales Index (RSI)
Annual Change
January 1990 - September 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data
Figure 9
Regional Single-Family Repeat Sales Index (RSI)
Annual Change
January 2004 - September 2010

Central
Northeast
Southeast
Northwest
Southwest
Metro Area

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data
Figure 10
Chandler, Gilbert, Mesa, & Tempe Single-Family Repeat Sales Index (RSI)
Annual Change
January 1990 - September 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data
Figure 11
Chandler, Gilbert, Mesa & Tempe Single-Family Repeat Sales Index (RSI)
Annual Change
January 2004 - September 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data
Figure 12
Glendale, Peoria, Surprise & Sun City/Sun City Single-Family West Repeat Sales Index (RSI)
Annual Change
January 1990 - September 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data
Figure 13
Glendale, Peoria, Surprise & Sun City/Sun City West Single-Family Repeat Sales Index (RSI)
Annual Change
January 2004 - September 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data
Figure 14
Scottsdale/Paradise Valley & Phoenix Single-Family Repeat Sales Index (RSI)
Annual Change
January 1990 - September 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data
Figure 15
Scottsdale/Paradise Valley & Phoenix Single-Family Repeat Sales Index (RSI)
Annual Change
January 2004 - September 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data
Figure 16
Avondale and Goodyear Single Family Repeat Sales Index (RSI)
Annual Change
January 1990 - September 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data
Figure 17
Avondale and Goodyear Single-Family Repeat Sales Index (RSI)
Annual Change
January 2004 - September 2010

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data