Repeat Sales Index Report
Commercial • 2010 Quarter 2

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

Adam Nowak
Research Associate
This report introduces two new repeat sales indices (RSI), which are a complement to the residential ASU-RSI (RRSI) that has been produced by the W. P. Carey School of Business for several years. The first is a commercial index (CRSI) and the second is an index developed for two-fourplex residential units. Between the two reports, virtually all real estate sectors in Phoenix are now being tracked on a regular basis. Like the housing market, commercial real estate in Phoenix has been hard hit by the national recession and corresponding slowdown in the local economy and the related financial fallout. For this reason reliable information on commercial and two-fourplex real estate prices should prove useful to market participants. The first graphs compare the RRSI to the new CRSI and two-fourplex RSI while later graphs relate the new indices to forecasted earnings per share of corporations headquartered in Phoenix, changes in Phoenix employment and capitalization rates.

The commercial repeat sales methodology is the same as that used to estimate the residential indices except that it has been applied to sale pairs (sales and resales) of the same commercial properties, as explained later in the report. For purposes of the index, commercial real estate is defined as office, retail, industrial and multi-family (five + units) properties, ie. all transactions except those involving vacant land. A second RSI for small residential investment properties (two-fourplex units) has been estimated and is also included in this report. Both indices are considered commercial in contrast to the various indices contained in the residential report, which covers single-family detached houses. A townhouse/condominium RSI is also part of the residential RSI report. Since there are far fewer transactions involving commercial real estate, the graphs show considerably more volatility than typically is observed with the various residential indices. For this reason these commercial indices will be estimated using quarterly rather than monthly data and the ASU-CRSI report will be released on a quarterly basis. The data contained in this second quarter report is through June 30, 2010.

Figure 1 contains the values for the commercial and two-fourplex indices graphed along with the residential RSI for comparison purposes. The indices measure quarterly changes in prices indexed with 2000 Q1 =100. The residential RSI continued to rise during the 2001-2002 recession while the commercial index, reflecting economic fundamentals as well as conditions in the commercial market declined and didn't begin to increase until early 2003. The sharp run-up in house prices during 2004-2005 led the residential RSI to peak in mid-2006, almost two years before the prices peaked in the commercial market. Activity in the housing market moved in response to speculative forces, lax lending standards and low interest rates, etc. which led to affordability problems, the exodus of investors and a growing foreclosure problem. In contrast, the commercial market is tied more directly to economic fundamentals, which remained strong well into 2007, explaining why commercial prices lagged the residential market. The residential
index bottomed out in early 2009 but has been essentially flat since then. The commercial index began to decline dramatically by the end of 2008 and the decline accelerated throughout 2009. The first two quarters of 2010 show somewhat of a leveling off in the index but it is too early to state that commercial prices hit their low at the end of 2009 because of the large number of commercial properties that are in financial trouble. The decline in two-fourplex prices appears to have slowed significantly from the rapid declines in 2008 and 2009.

The volatility in the non-residential indices is magnified in Figure 2, which graphs the annual change in the Figure 1 indices. Commercial prices peaked at an annual rate of 28 percent in 2006, Quarter 3. The rapid increase in prices was not that unusual since there were several peaks in the commercial market at around 20 percent during the 1990s. In contrast residential prices typically change by single-digit rates over any twelve month period. What is unprecedented is the decline in commercial prices that occurred during 2009. By the end of 2009 the annual decline reached 40 percent, far more rapid than the 25 percent decline in 1990 during the Resolution Trust Corporation (RTC) era. Commercial price changes peaked several quarters after the residential market (Figure 2) and the same may be true on the downside where commercial prices appear to be bottoming out following the turnaround in the residential market. However, commercial prices in 2010 remain approximately 30 percent lower than the corresponding quarters in 2009, reflecting a market with significant problems. The good news is that the commercial market appears to be showing signs of stability rather than worsening declines. Annual price declines in the two-fourplex market were over 50 percent by the end of 2009 but price declines appear to be slowing as we move through 2010.

Figure 3 contains the commercial and two-fourplex RSI along with total forecasted earnings per share (TFEPS) estimated for all companies in the Bloomberg Arizona Index (BAZX) that are headquartered in Phoenix. There is some evidence that the TFEPS series serves as a leading indicator of changes in the CRSI. The series would be related to the extent that changes in a company’s expected earnings, as reflected in financial forecasts, would be associated with changes in their demand for real estate, either through acquisition or leasing. The resulting effect on commercial real estate prices would subsequently be reflected in the CRSI. The changes in TFEPS for Phoenix based companies may also proxy for broader changes in economic conditions that subsequently impact the Phoenix commercial real estate market in either a positive or negative way. Data on TFEPS comes from the Institutional Brokers’ Estimation System (IBES) accessed through Wharton Research Data Services. Additional information about the data and methodology is included later in this report.

A careful comparison of TFEPS and the CRSI (Figure 3) during the recent cycle shows that TFEPS led the CRSI by several quarters. A similar pattern can be observed in early 2002
where TFEPS began to increase at least one year prior to the CRSI. The peak in TFEPS toward by the end of 2006 was an early signal that economic activity and, hence, the commercial real estate market were headed for a slowdown. TFEPS began to increase in early 2009 and the trend since then has been positive. If the historical pattern is followed, the bottom in commercial real estate prices occurred at the end of 2009 and the limited data for 2010 would indicate the beginning of an upward trend. However, with the weak Arizona economy and financial problems affecting many commercial properties, the recovery is likely to occur very slowly, much like the recovery in the housing market.

As was the case in Figure 2, the volatility in the indices in Figure 3 is magnified when their annual rates of change are calculated (Figure 4). The change in TFEPS typically has been more volatile than even the CRSI but historically a significant upward trend in TFEPS has been a good leading indicator of improvement in commercial real estate prices. This pattern can be observed starting in the early 1990s and should provide valuable information about the likely trend of commercial real estate prices in Phoenix. While the latest turnaround in TFEPS suggests that commercial prices should begin improving, what cannot be predicted is the speed and magnitude of any improvement.

Figure 5 shows how closely changes in both the CRSI and Phoenix employment are related. This should not be too surprising since the demand for commercial space is dependent on the level of economic activity locally. While TFEPS is a leading indicator of changes in commercial prices, the relationship between employment and prices is more mixed. Changes in employment very often lead to changes in commercial prices both during expansions and contractions but in some cases the relationship is reversed or the turning points occur concurrently. Regardless of which data series changes direction first, the other typically follows in less than a year. What makes this interesting is that commercial prices reflect rents, vacancy rates and cap rates, etc., in other words complex supply and demand factors in the commercial market. In spite of conditions in the market at any point in time, changes in commercial prices are closely related to the local economy as measured by changes in Phoenix employment.

Figure 6 compares the CRSI to average capitalization rates. Cap rates relate the expected income produced by a property to its price or value and are calculated from all transactions in the CoStar and Real Capital Analytics databases, not just from those sale pairs used to estimate the commercial and two-fourplex RSIs. Even so, only a small proportion of transactions contain cap rate information, which explains the unusually high volatility in the cap rate data, especially in the early 1990s.

The expected inverse relationship between the CRSI and cap rates is readily apparent in the graph. Cap rates had been gradually decreasing from the early 1990s through the end of
2002 while commercial prices as reflected in the CRSI increased almost 50 percent over the same time period. The increase in prices during these years primarily reflected rising operating income since cap rates were declining only marginally. This is what would be expected in a growing economy such as Phoenix. Beginning in early 2003 cap rates started a dramatic decline and went from 9.3 to 6.7 percent by early 2005. This decline reflected the low interest rate environment but especially the growing optimism that commercial prices were on an upward trajectory. The growing expectation of substantial price increases per se was in contrast to the steady growth in rental income that had caused prices to increase prior to 2003. Cap rates remained fairly stable from early 2005 through mid-2008 but then began to rise as dramatically as they had fallen.

The average capitalization rate series is graphed again in Figure 7 but this time along with the annual change in the CRSI. Prices increased at a fairly steady rate of around 10 percent from 2003 through early 2005. What was unusual was the volatility of commercial prices in the years after 2005 as cap rates remained essentially flat. Prices were rising at their fastest rate (28 percent) by late 2006 but the rate slowed sharply before turning negative in early 2008. By the end of 2009 prices were declining at an unprecedented 40 percent annual rate, which exceeded the declines during the early 1990s associated with the collapse of the thrift industry and the commercial / land markets in Phoenix. In 2010 the rate of decline has slowed to around 30 percent which may indicate that the worst is past for commercial price declines. However, with the weak Phoenix economy a turnaround in the market is likely to occur very slowly.

**Methodology**

The use of repeat sales is the most reliable way to estimate price changes in real estate markets because the repeat sales approach eliminates the need to deal with the many issues associated with the heterogeneous nature of real estate. Repeat sales can be used to measure the price change of the same property over time and a large number of repeat sales over many years can be combined to develop a repeat sales index. This would be analogous to the use of same store sales in retail for stores open at least one year to measure performance. 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 property 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 properties sold each month.

The W.P. Carey School of Business – Commercial Repeat Sales Index (CRSI) and the
two-fourplex RSI use the same methodology as used in the S&P/Case - Shiller index, which has
been developed for the housing markets in 20 metropolitan areas and is being used as a basis
for trading housing futures contracts in 10 of those markets. Following S&P/Case-Shiller, the
cleaning process 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 per square
foot prior when matching the sale pairs.

The indices begin with January 1989 data so the percent change calculations start as of
January 1990 and are reported for each quarter since then. Since sales and resales occur at
various times for individual properties, the estimated rate of price change for a given month is
estimated statistically and used to develop the indices. To reduce volatility in the indices the
values are a three month moving average and the quarterly index is an average of final monthly
values. Annual rates of change may be thought of applying to a calendar year but in this report
the annual rates measure change in the CRSI or two-fourplex RSI from the same quarter last
year.

Data on employment is from the Bureau of Labor Statistics for the Phoenix metropolitan
statistical area (MSA). Reported monthly, the data includes non-seasonally adjusted values for
the number of employed individuals. The calculation of total forecasted earnings per share
(TFEPS) begins with current earnings per share from the Thompson Reuters database. The
earnings per share forecasts come from the Institutional Brokers’ Estimation System (IBES) for
all companies headquartered in Phoenix that are in the Bloomberg Arizona Index (BAZX). The
BAZX contains companies headquartered in Arizona with a market capitalization greater than
$15 million. The IBES forecasts are for varying durations from one month ahead to five years
ahead. The forecast with the highest correlation (.22) to the CRSI is the one year forecast and it
is used in Figures 3 and 4.
Figure 1
Residential, Commercial and Two-Fourplex RSI
1990 Qtr 1 - 2010 Qtr 2

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data, CoStar Group and Real Capital Analytics.
Figure 2
Residential, Commercial and Two-Fourplex RSI
Annual Change
1990 Qtr 1 - 2010 Qtr 2

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data, CoStar Group and Real Capital Analytics.
Figure 3
Total Forecasted Earnings Per Share and Commercial and Two-Fourplex RSI
1990 Qtr 1 - 2010 Qtr 2

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data, CoStar Group and Real Capital Analytics.
Figure 4
Total Forecasted Earnings Per Share, Commercial and Two-Fourplex RSI
Annual Change
1990 Qtr 1-2010 Qtr 2

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data, CoStar Group and Real Capital Analytics.
Figure 5
Commercial RSI and Phoenix Employment
Annual Change
1990 Qtr1 - 2010 Qtr 2

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data, CoStar Group and Real Capital Analytics.
Figure 6
Capitalization Rates* and the Commercial RSI
1990 Qtr 1 - 2010 Qtr 2

* Average of Commercial and Two-Fourplex Properties

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data, CoStar Group and Real Capital Analytics.
Figure 7
Capitalization Rates* and Change in the Commercial RSI
1990 Qtr 1 - 2010 Qtr 2

*Average of Commercial and Two-Fourplex Properties

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data, CoStar Group and Real Capital Analytics.
Figure 8
Capitalization Rates* and Change in the Commercial RSI
2000 Qtr 1 - 2010 Qtr 2

Source: ASU W.P. Carey School of Business
Data Provided by Ion Data, CoStar Group and Real Capital Analytics.