Repeat Sales Index Report

Commercial • 2010 Quarter 4

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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 so that 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 serious 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 reached a bottom in early 2009 and remained essentially flat for several quarters before declining slightly in 2010 Q 4. The commercial index began to decline dramatically by the end of 2008 with the decline accelerating throughout 2009. After bottoming out in 2009, Q4 the index has moved in a narrow range indicating that commercial prices have stabilized but at approximately where they were prior to the expansion that began in 2004. The decline in the two-fourplex index leveled out in 2010 Q2 and has remained flat since then. Based on the quarterly data, commercial and two-fourplex prices were fairly stable throughout most of 2010 in contrast to residential prices which were declining by year’s end.

The annual changes in the residential, commercial and two-fourplex indices in Figure 1 are graphed in Figure 2. Commercial prices peaked at an annual rate of 28 percent in 2006, Q3. 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 and 2010. By the end of 2009 prices were declining at an annual rate of almost 40 percent, far more rapid than the 25 percent decline in 1990 during the Resolution Trust Corporation (RTC) era. As of 2010, Q4 prices have rebounded to almost a 13 percent annual rate of increase. The decline was dramatic but lasted a relatively short five quarters in contrast to the residential market where the decline lasted almost 40 months.

When comparing the annual changes in Figure 2 to the index values in Figure 1, a different picture of the commercial and two-fourplex markets emerges. While commercial prices have been essentially flat since mid-2009, the year-to-year changes for 2009 and 2010 relative to 2008 and 2009 reflect sharp price declines as the market deteriorated followed by recoveries
into positive territory by mid-2010. A similar pattern can be seen for the two-fourplex index although the price changes in Figure 2 have still not turned positive.

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 evidence that the TFEPS series serves as a leading indicator of changes in the CRSI. TFEPS would be related to commercial real estate prices 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 even considering the volatility in both indices. 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 the end of 2006 was an early signal that economic activity and, hence, the commercial real estate market were headed for a downturn. TFEPS began to increase in early 2009 and the overall trend since then has been essentially positive. The low point in commercial prices lagged TFEPS by approximately one year and if the historical pattern is followed, which appears to be the case, 2011 should see an improvement in commercial prices from their 2004-2005 levels.

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 annual changes in 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 appears to be holding true from the bottom in early 2009 through 2010 Q 4. Even considering the short-term volatility in the data series, the positive change in TFEPS is leading the increase in commercial prices.

Figure 5 shows how annual changes in the CRSI are closely related to changes in Phoenix employment. This should not be too surprising since the demand for commercial space is dependent on the level of economic activity in Phoenix. While TFEPS is a leading indicator of changes in commercial prices, the relationship between employment and prices is more mixed. Changes in employment often lead to changes in commercial prices both during
expansions and contractions but that is not always the case. 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 the change in Phoenix employment. By mid-2010, both the Phoenix economy and commercial prices are back in positive territory which is a favorable sign for 2011.

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 Figure 6. 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 with a couple of distinct jumps followed by periods of relative stability. Through 2010, cap rates continued their upward trend reflecting only a slowly improving local economy and an overbuilt and risky commercial real estate market.

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 is unusual is the volatility in commercial prices from 2005 through 2008 as cap rates remained essentially flat. Cap rates that show relatively small changes over time while prices first rise and then fall dramatically reflect the changing outlook for net operating income over that time period. During the expansion from 2004 to 2007, higher prices reflected the strong Phoenix economy and higher expected rents while the opposite occurred as the economy went into recession. Cap rates are still adjusting toward
more traditional levels reflecting a greater appreciation for the risk associated with real estate investments. Figure 8 graphs the same data used in Figure 7 except beginning with 2000 to emphasize the current decade.

**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 3

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 3

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 3

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 3

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 3

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 3

* 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 3

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

*Average of Commercial and Two-Fourplex Properties
Figure 8
Capitalization Rates* and Change in the Commercial RSI
2000 Qtr 1 - 2010 Qtr 3

*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.