

Repeat Sales Index (RSI)

ASU - W. P. Carey School of Business

Center for Real Estate Theory and Practice

November 2007

The use of repeat sales is the most reliable way to estimate price changes in the housing market because the repeat sales approach obviates the need to deal with the many issues associated with the heterogeneous nature of housing. In essence, repeat sales measures the price change of the same housing units over time. In contrast, a statistical model such as regression analysis provides 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 averages would reflect not only changes in prices 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 many of those markets. Any differences that exist between the two indices are partly due to the use of a different house transactions database and possibly by 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 followed. 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 with sales within six months of each other. With the ASU - RSI, transactions with sale prices less than \$5,000 were dropped and pairs with more than 60 percent annual changes in price also were excluded.

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.

The graphs with this report show the annual rate of change in house prices for the Phoenix metropolitan area on a monthly basis. The ten graphs contained in this report cover two time periods. Five of the graphs present the price changes from January 1990 through June 2007 while the other five graphs cover the recent housing cycle beginning in January 2004. 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. An index has also been calculated for eight individual cities where there are a sufficient number of repeat sales for the index to be reliable. All repeat sales used in the metro index are included in one of the regional indices. A list of the cities included in each region is in Table 1.

Analysis

The extraordinary nature of the recent housing cycle is apparent when reviewing the metro Phoenix graph for the entire period beginning with January 1990. Housing price increases peaked in September 2005 at an annual rate of 43 percent. The rate of change continued to be positive but at a decreasing rate until February 2007. Beginning in March 2007, the annual change became negative and the rate of decline increased slightly each month through June. However, for the June through August period, the decline has been a fairly stable 3 to 4 percent compared to one year earlier. While the situations are not entirely comparable, the last time that housing prices declined for consecutive months on an annual basis was in the early 1990s. After peaking in July 1990, prices declined from the prior year for 17 consecutive months between August 1990 and December 1991. At that time, the Phoenix economy and all sectors of the real estate market suffered the consequences of market excesses, the Resolution Trust Corporation bailout of the savings and loan industry and the 1990-1991 recession.

The regional indices show interesting differences from the overall metro index. All regional appreciation rates peaked within a few months of each other in the second half of 2005. At their maximum, rates varied from 48 percent in the southeast to 39 percent in the northeast region. All regions except for the northeast exceeded the overall metro rate. While housing prices in the northeast had the lowest peak, it is the only region where prices have been essentially flat in 2007 compared to the same months in 2006. In August, prices actually increased slightly (0.49%) compared to August 2006. The housing market in the northeast appears to be in better balance than in other parts of the metro area.

TABLE 1

CITIES INCLUDED IN REGIONS

<u>REGION</u>	<u>CITIES</u>
<u>NORTHEAST</u>	CAREFREE CAVE CREEK FOUNTAIN HILLS PARADISE VALLEY SCOTTSDALE
<u>NORTHWEST</u>	EL MIRAGE GLENDALE PEORIA SUN CITY SUN CITY WEST SURPRISE YOUNGTOWN
<u>CENTRAL</u>	PHOENIX
<u>SOUTHEAST</u>	APACHE JUNCTION CHANDLER GILBERT HIGLEY MESA QUEEN CREEK SUN LAKES TEMPE
<u>SOUTHWEST</u>	AVONDALE BUCKEYE GOODYEAR LITCHFIELD PARK

Prices declined on an annual basis in four of the regions beginning in either January or February 2007 with the central region decline beginning in June. Prices are declining at a faster rate each month in the southeast and northwest regions with August declines of 6.77% and 7.71% respectively compared to 2006. In contrast, the rate of decline was fairly stable in the central and

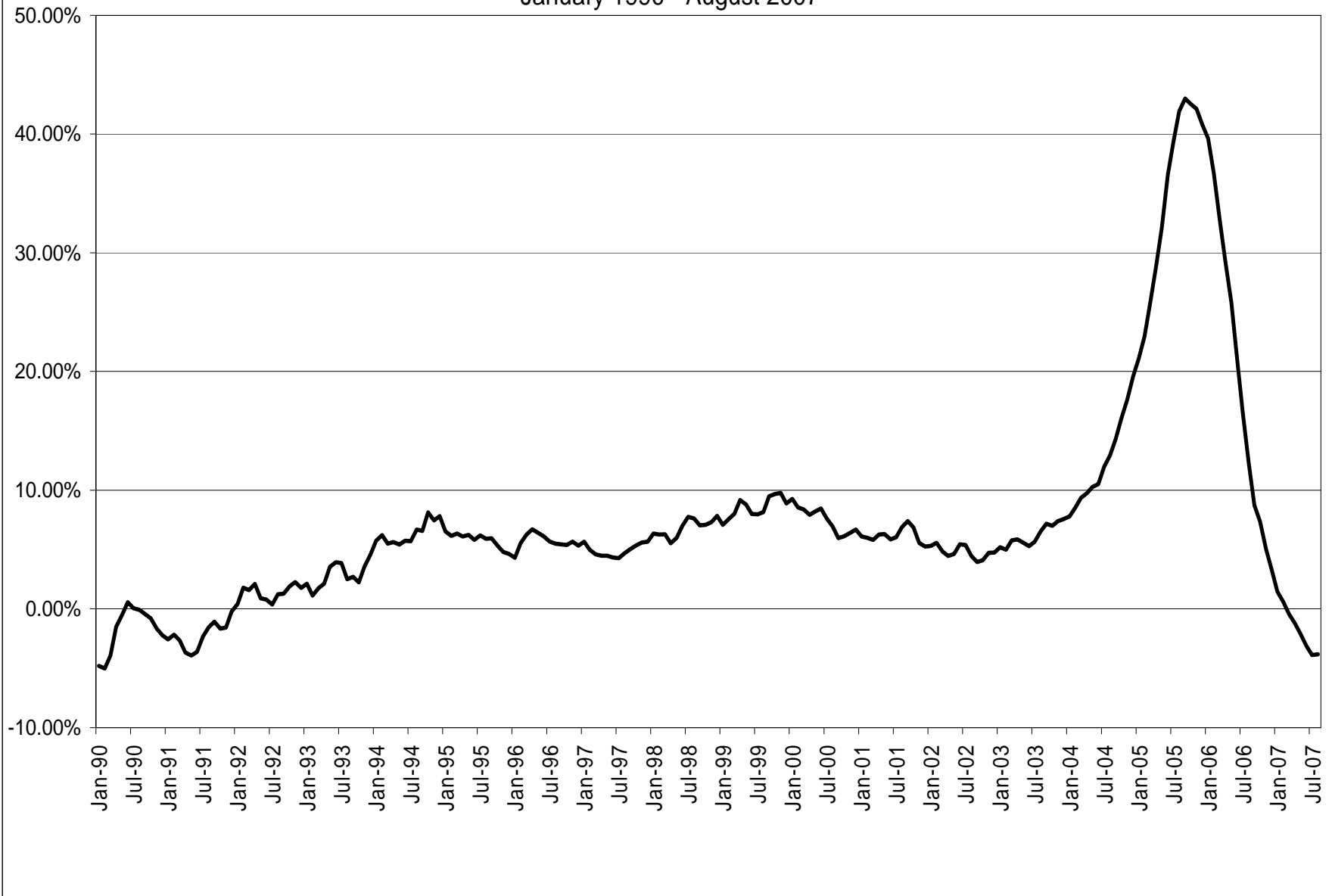
southwest regions from June through August 2007. Housing prices in the central region declined at a slight 2 to 3 percent annual rate over the summer while the decline in the southwest region was considerably higher at a 7 to 8 percent rate.

Indices have been calculated for eight cities where there are enough repeat sales to develop reliable estimates of price changes. Although indices have been calculated, an examination of the city graphs reveals the higher variability associated with these estimates compared to the overall index. To make the comparisons more useful, the eight city indices have been grouped into three graphs based on the location of the cities within the Phoenix metro area. The graph containing Chandler, Mesa and Tempe shows that Chandler had the highest annual rate of appreciation at close to 48 percent for the twelve months ending in September 2005 but it now has the fastest rate of decline with August prices 8.55% below August 2006. Appreciation rates for all three cities peaked in August or September 2005 and they have declined steadily since then. By February 2007, housing prices in all three cities were lower than they had been a year earlier and through at least August, the rate of decline was accelerating.

Cities in the northwest region show a somewhat different pattern of housing price changes than southeast cities. Prices are declining on an annual basis in Glendale, Peoria and Sun City/ Sun City West but the rate of decline was fairly stable rather than accelerating over the summer in Peoria and Sun City / Sun City West. The rate of decline in Sun City / Sun City West was approximately 5 to 6 percent per month compared to 2006 for the June-August period, while for Peoria the decline ranged from 5 to almost 8 percent per month. In contrast, the rate of decline accelerated slightly in Glendale where housing prices were 7.01 percent lower than in August 2006. The apparent volatility in the index for Sun City / Sun City West, especially in the early 1990s, reflects the limited number of repeat sales for some months rather than variations in house prices.

Phoenix (central region) has been paired with Scottsdale / Paradise Valley for comparison purposes. While prices declined in Phoenix from June through August, housing prices in Scottsdale / Paradise Valley continued to show slight appreciation compared to 2006. Except for a 0.60 percent decline in January 2007, the Scottsdale / Paradise Valley market is the only one where housing prices are appreciating from 2006 levels. From February through August, the increase has been at an annual rate slightly over 1 percent. At the height of the housing market frenzy in late 2005, the Scottsdale / Paradise Valley index was increasing at close to 37 percent annually, which was considerably slower than the 40+ percent rate in almost every other city. However, while prices in other cities are now declining at annual rates ranging from 2 to 9 percent, prices continue to appreciate in Scottsdale / Paradise Valley. The good news for the housing market is that where prices are declining, the rates of decline are still in the single digit range compared to the double digit rates of increase observed for over two years throughout the entire Phoenix housing market.

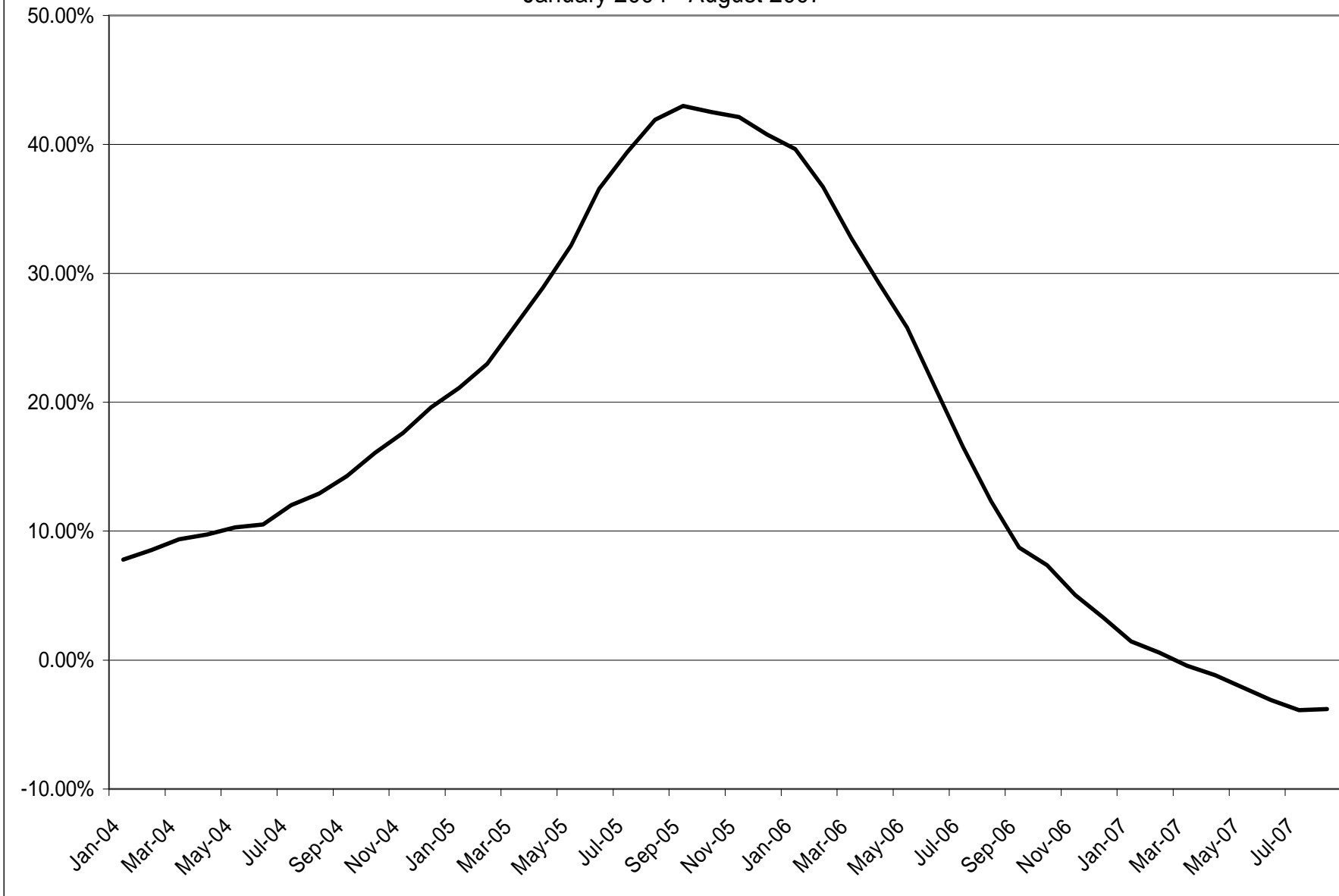
Metro Phoenix Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 1990 - August 2007



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

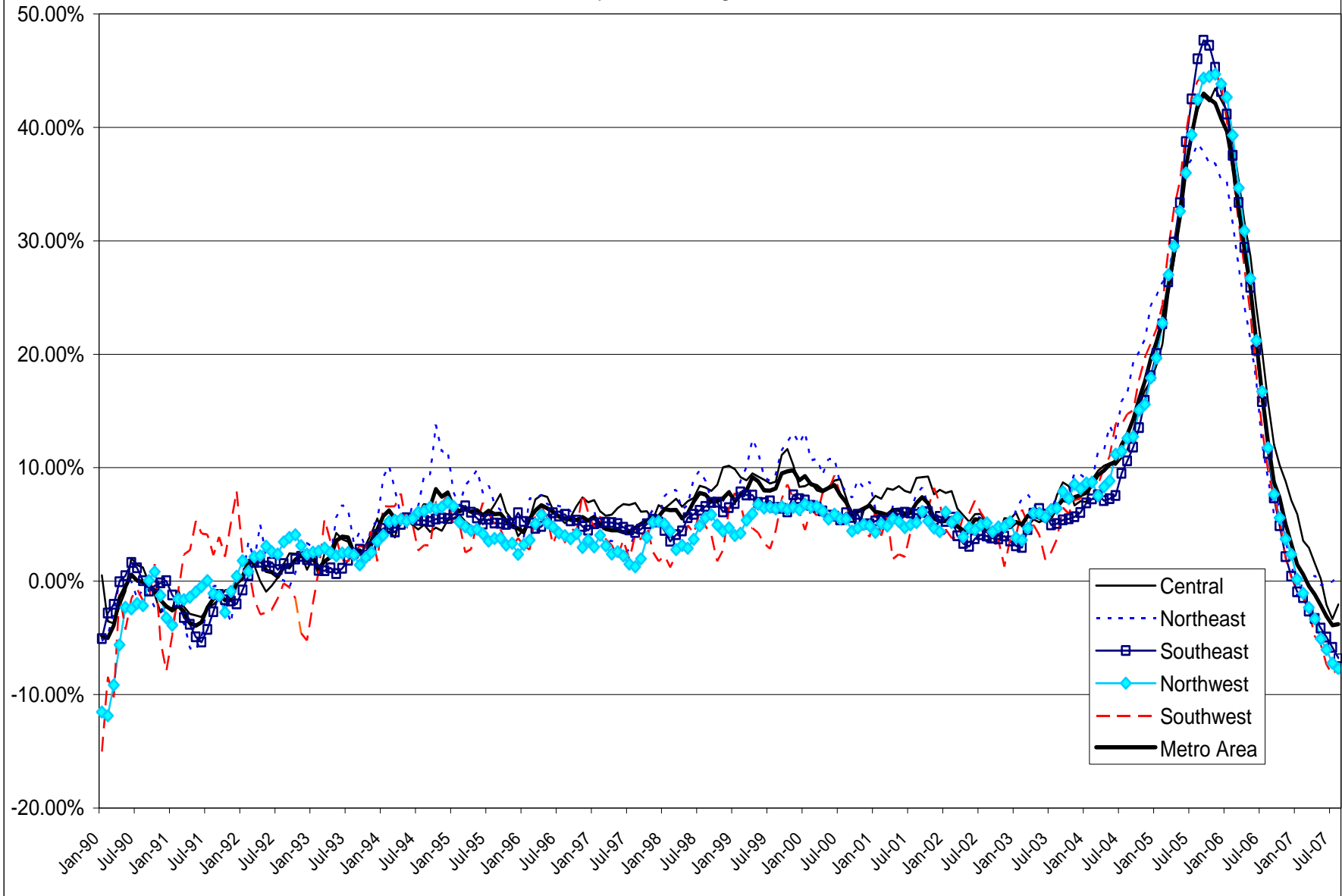
Data Provided by Ion Data

Metro Phoenix Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 2004 - August 2007



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

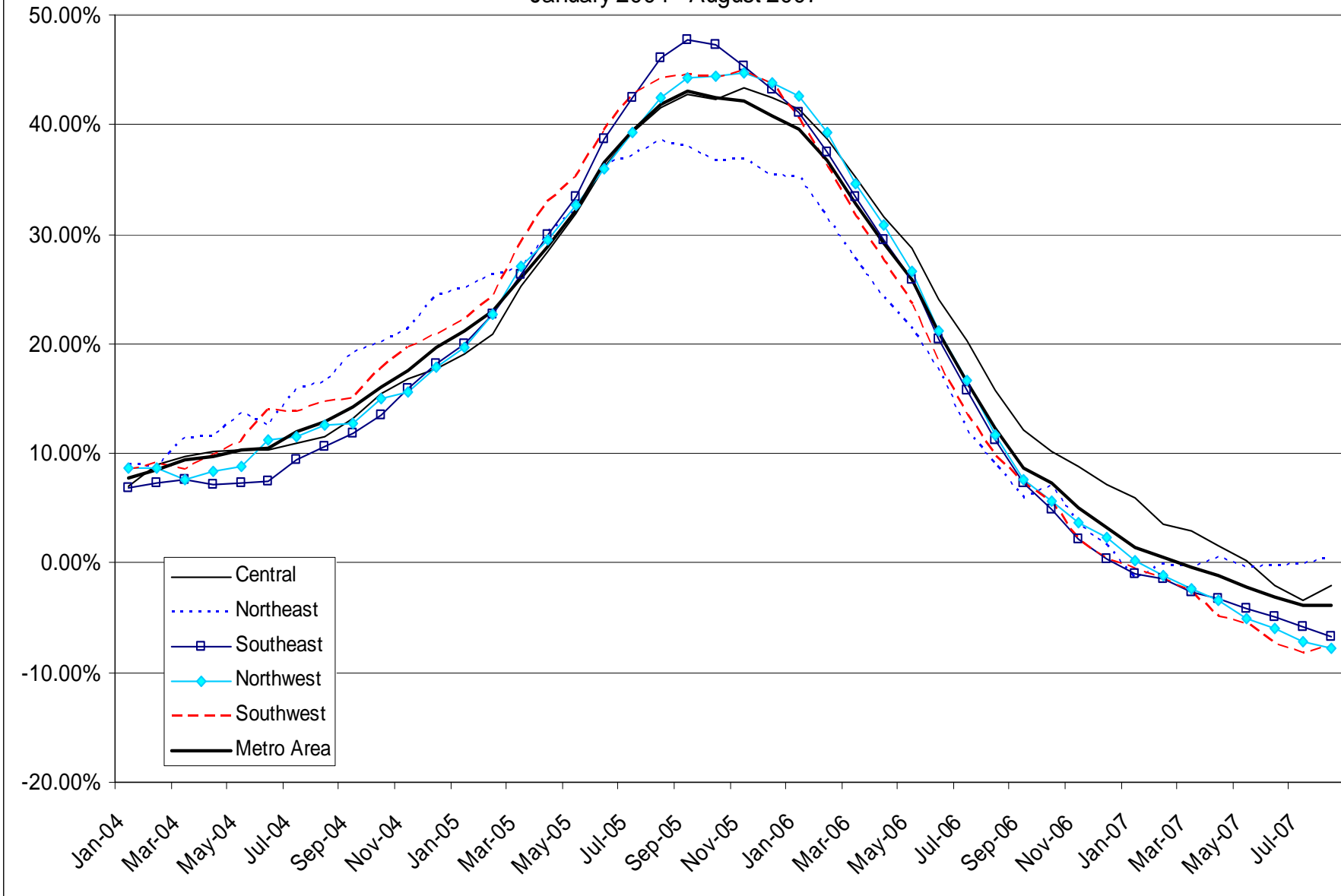
Regional Repeat Sales Index (RSI)
 Percent Change from Same Month Previous Year
 January 1990 - August 2007



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

Data Provided by Ion Data

Regional Repeat Sales Index (RSI) Percent Change from Same Month Previous Year January 2004 - August 2007



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

Data Provided by Ion Data

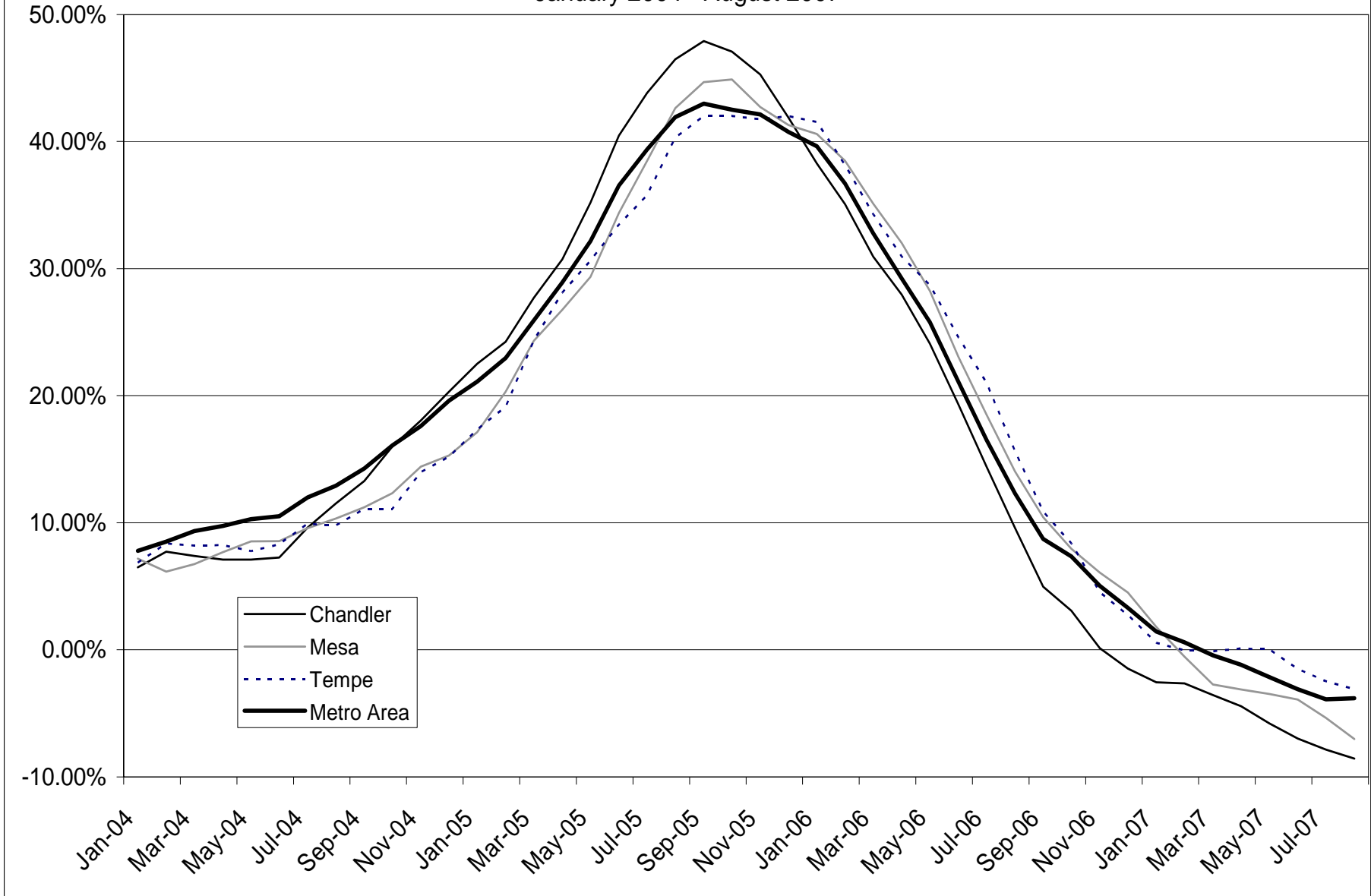
Chandler, Mesa, & Tempe Repeat Sales Index (RSI)
Percent Change from Same Month Previous Year
January 1990 - August 2007



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

Data Provided by Ion Data

Chandler, Mesa & Tempe Repeat Sales Index (RSI)
 Percent Change from Same Month Previous Year
 January 2004 - August 2007



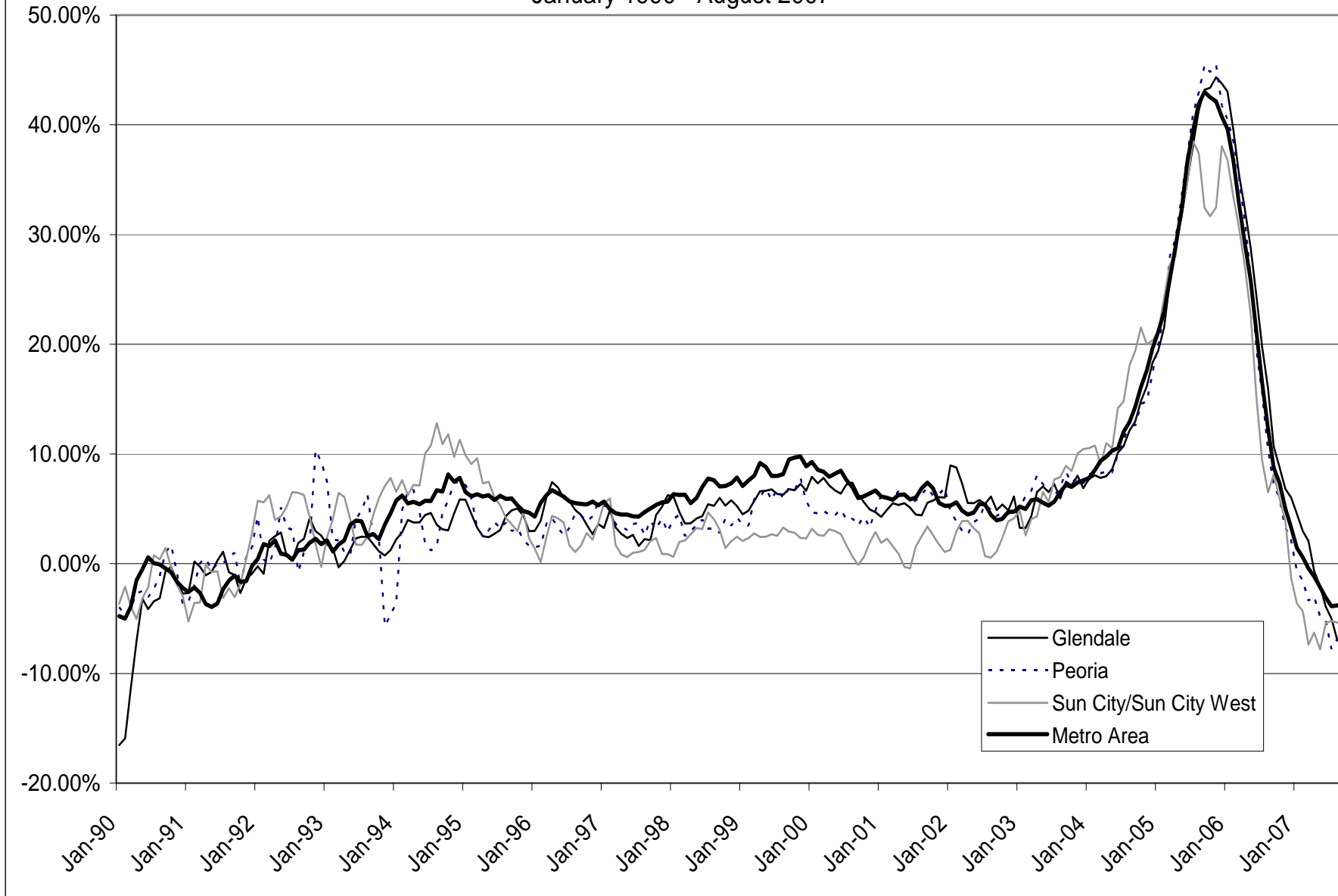
Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice

Data Provided by Ion Data

Glendale, Peoria, & Sun City/Sun City West Repeat Sales Index (RSI)

Percent Change from Same Month Previous Year

January 1990 - August 2007



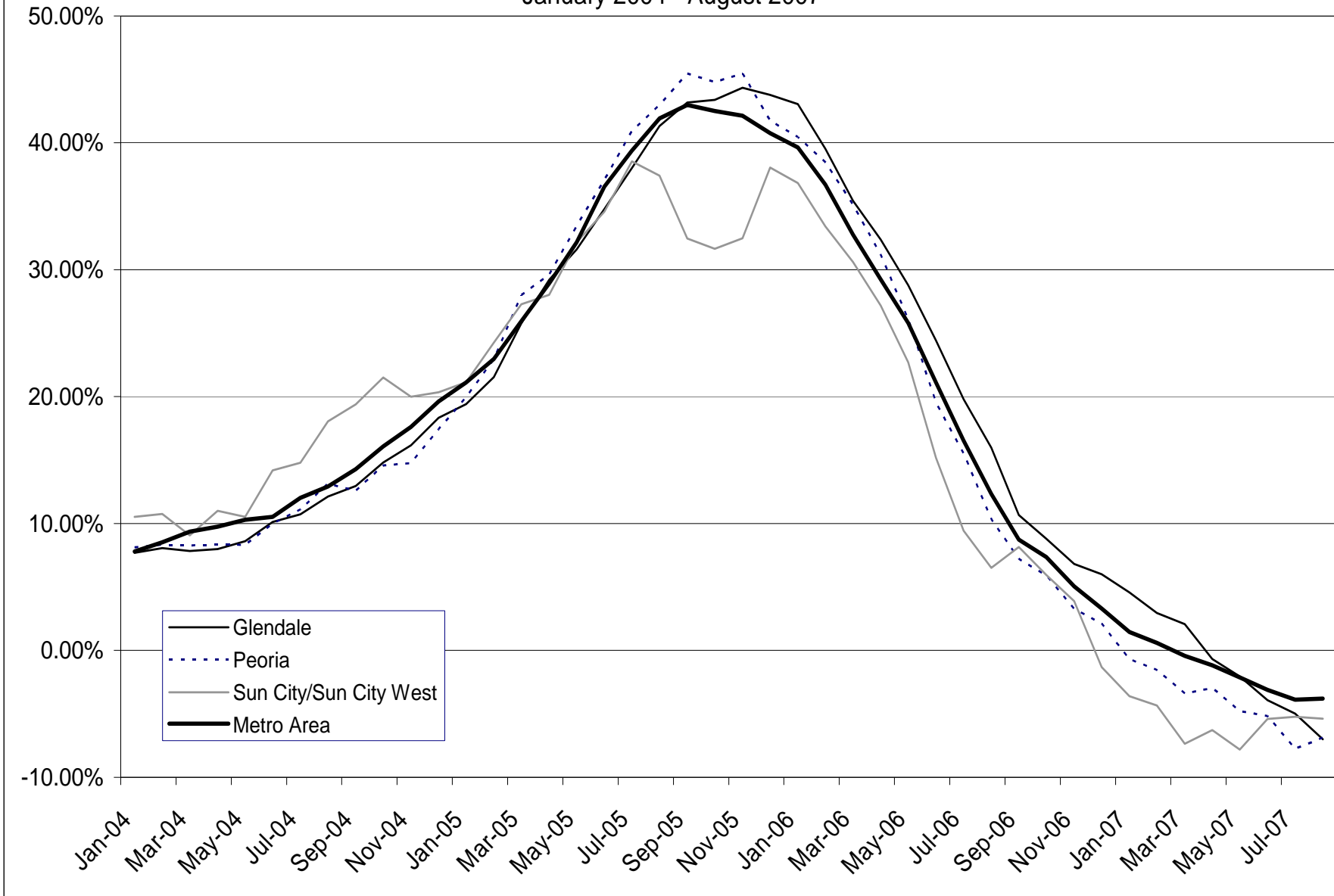
Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice

Data Provided by Ion Data

Glendale, Peoria, & Sun City/Sun City West Repeat Sales Index (RSI)

Percent Change from Same Month Previous Year

January 2004 - August 2007



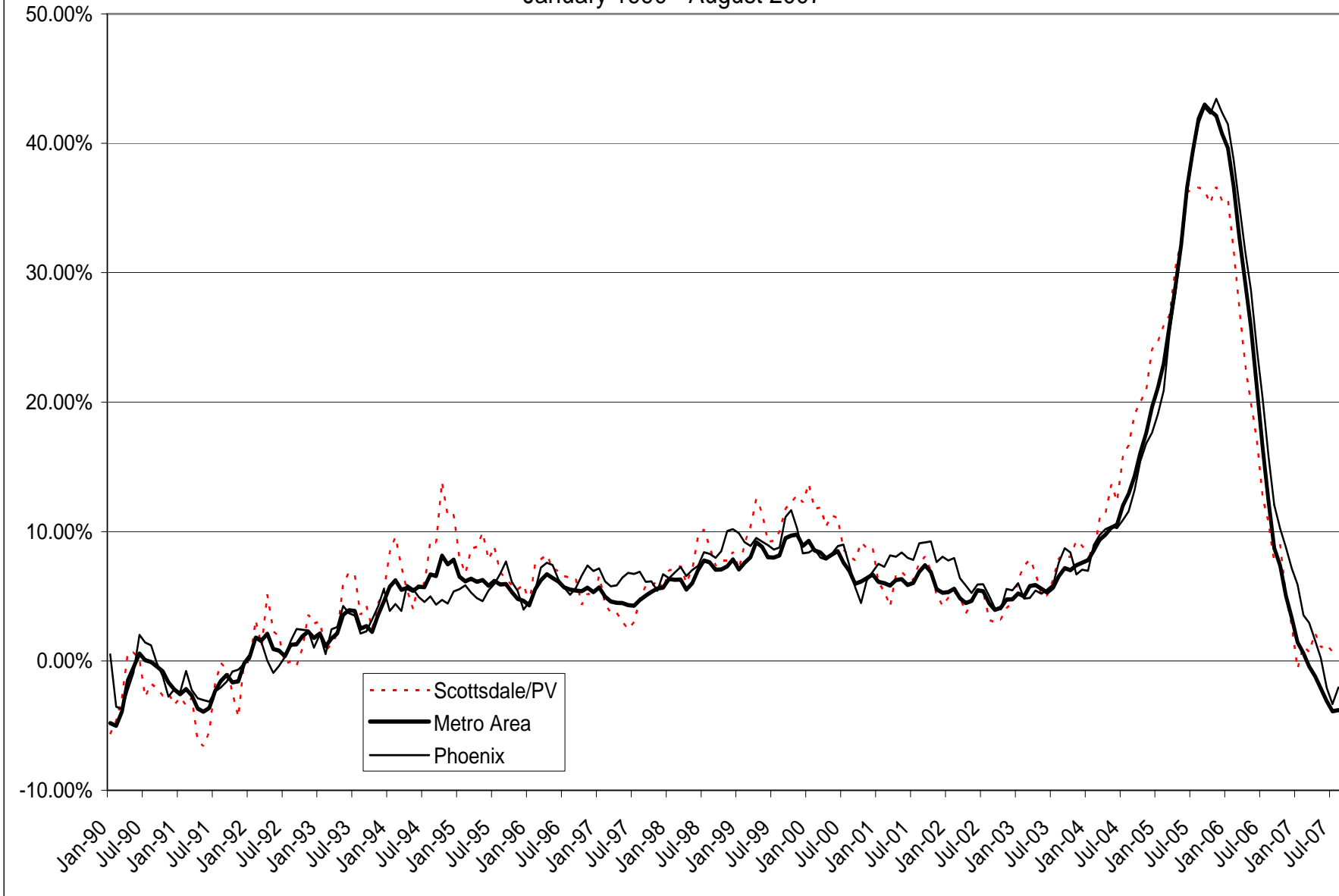
Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice

Data Provided by Ion Data

Scottsdale/Paradise Valley, & Phoenix Repeat Sales Index (RSI)

Percent Change from Same Month Previous Year

January 1990 - August 2007



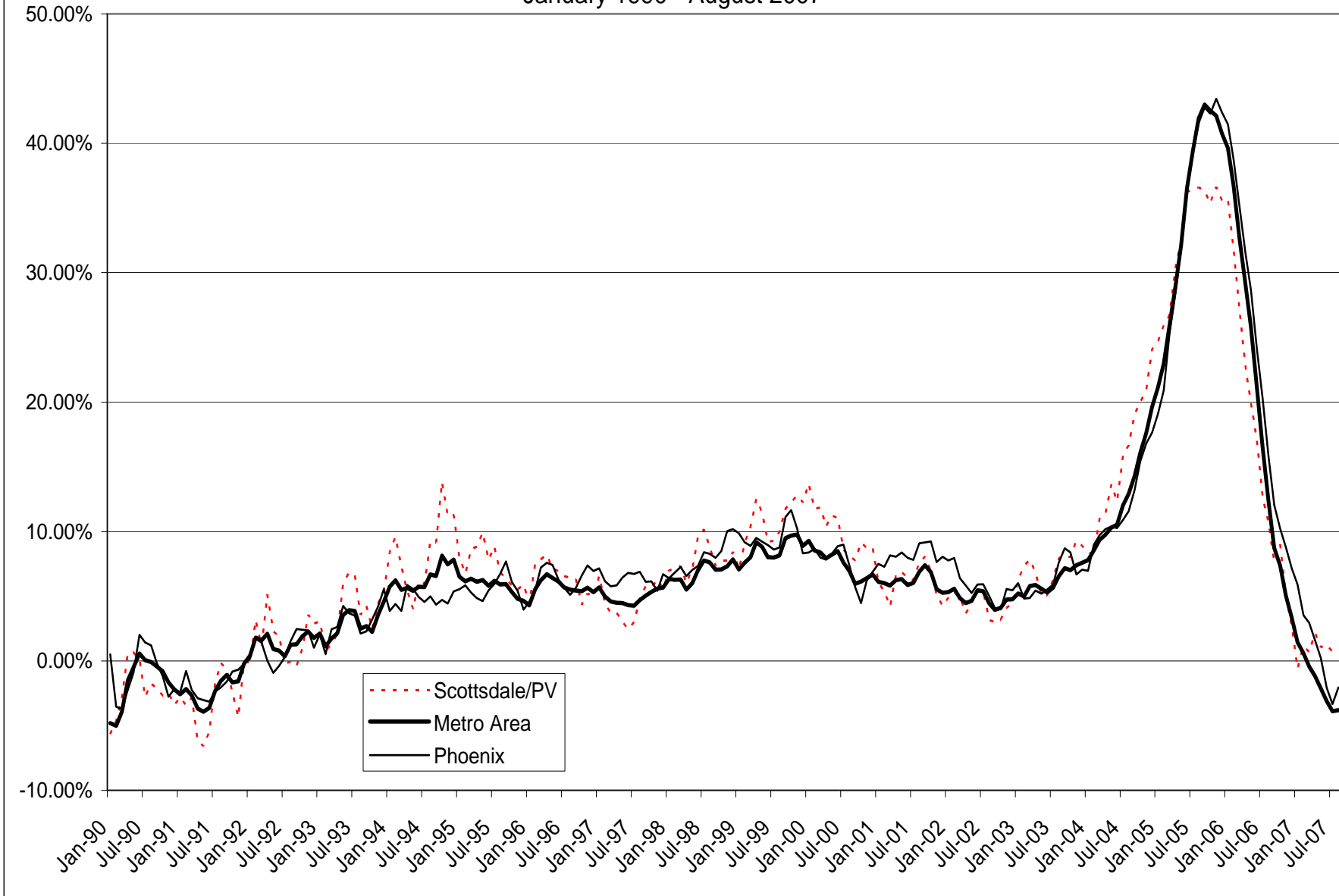
Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice

Data Provided by Ion Data

Scottsdale/Paradise Valley, & Phoenix Repeat Sales Index (RSI)

Percent Change from Same Month Previous Year

January 1990 - August 2007



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

Data Provided by Ion Data