Report On

Development of 2010
Time Adjustment Factors

By

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For

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Contents

1. STUDY OVERVIEW

The project developed time adjustment factors to reflect calendar 2010 price trends for stratum 1 and stratum 4 properties in all 67 Florida counties. In some cases, separate stratum 1 factors were developed for single-family detached (use code 01), mobile home (use code 02), and condominium (use code 04) properties. The factors can be used to adjust 2010 sales to January 1, 2011. They were also combined with factors previously developed for 2008-2009 so that sales over the three year period, January 2008 through December 2010, can all be adjusted to January 1, 2011. Thus, the Department at its discretion can use sales from all or part of the three year period to augment sample sizes and permit a more comprehensive evaluation of appraisal performance.

The study uses the sales ratio trend method of time analysis in which sales prices were compared against 2010 just values. An upward trend in sale-to-assessment ratios (SARs) indicates appreciation in property values; a downward trend indicates deflation[1].

Calendar 2010 represented a continuation of declining real estate prices in Florida. During this period most counties again experienced a decline in values. Although the market appeared to stabilize for the first three to five months in a number of counties, the rest of 2010 was largely marked by decreases and no counties experienced a measurable net increase in values over the calendar year. The average decline across all 67 counties over the full 12-month period was approximately -8% for stratum 1 and -9% for stratum 4. Over the last three years (2008 through 2010) the average decline was approximately -27% in stratum 1 and -30% in stratum 4. In addition, most counties had already experienced significant declines in 2006-2007 before the beginning of the current three year reporting period. Over the five year period, 2006-2010, we estimate that the average decline was 38% in stratum 1 and 42% in stratum 4.

Section 2 below explains the study methodology. Section 3 summarizes the results and section 4 takes the opportunity to advance several recommendations for future studies.

[1] For a more detailed explanation and discussion, see Robert J. Gloudemans, *Mass Appraisal of Real Property*, IAAO (1999), pages 263-268.

2. METHODOLOGY

2.1 Study Data

Data for the study came from the Department's sales data files and 2010 NAL (name, address, and legal) files. Sales from January 2010 through January 2011 were extracted from the sale files. Just values for 2010 were taken from NAL files.

Sales were considered for inclusion in the analysis if they had a qualification code of 1 or 2.[2] Stratum 1 sales were extracted if the sale was coded "I" (improved). Stratum 4 sales were extracted if the sale code was "V" (vacant). If a property sold more than once, the most recent sale was used. Any sales involving multiple parcels, public lands, a use code change, new construction, special assessments, a disaster code, or a very low price (which varied by county and stratum) were excluded.

2.2 Exploratory Data Analysis and Filters

When adequate sales were available, separate analyses were conducted for stratum 1 and stratum 4 properties. In some very small counties a combined analysis was conducted. Properties with atypically low or high sales prices were excluded, as were stratum 1 properties with more than two buildings or abnormally small or large living areas (e.g., less than 400 or greater than 7,500 square feet). Stratum 4 properties with improvements were also excluded.

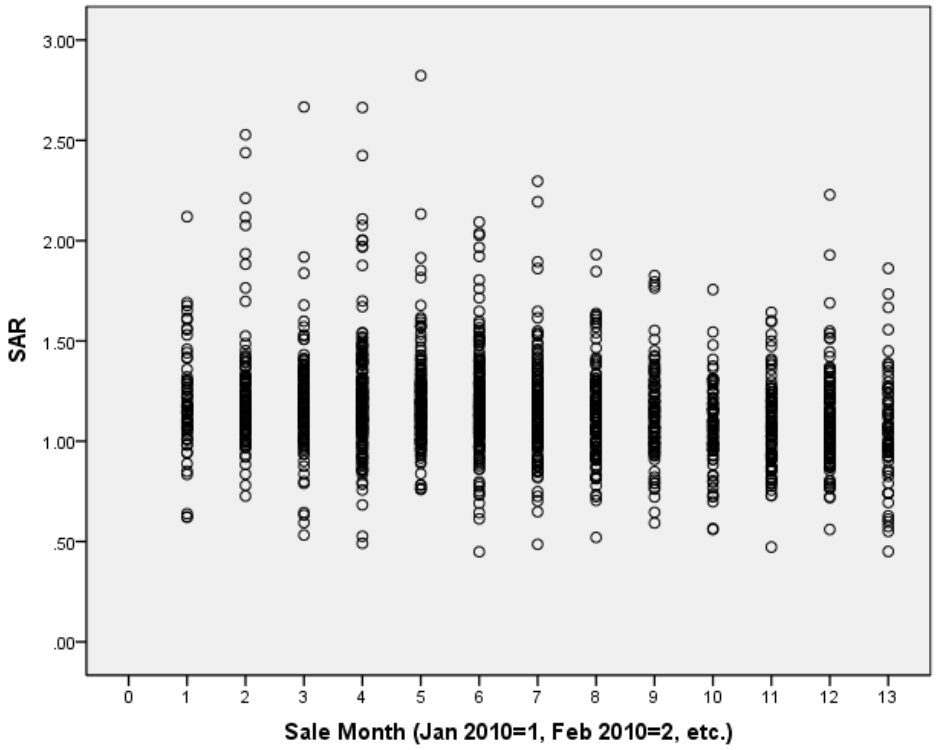
Sales with extreme ratios were excluded and ratios were evaluated for atypical patterns. In the past, analyses were sometimes compromised or even made impossible by the fact that just values for sold properties were based on sale price (e.g., at 85% or 100% of sale price) rather than on market-derived valuation schedules targeted to reflect the legal valuation date. This year we noted *no* such instances of "sales chasing" and thus were able to conduct analyses for all 67 counties.

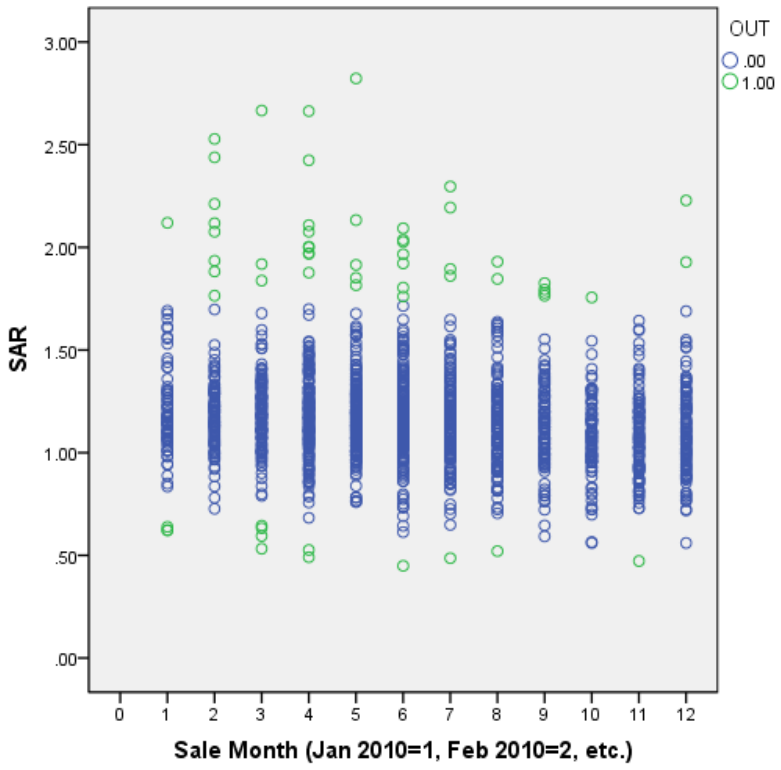
2.3 Time Trend Graphs

To help visualize trends, sale-to-assessment ratios (SARs) were plotted against time of sale over the 13-month study period (January 2010 – January 2011). The top half of figure 1 below displays one such graph. These graphs were scrutinized to eliminate outliers that could compromise quantification of underlying trends. The bottom portion of the figure shows the points coded and removed as outliers in the present example. This trimming process served to remove the most extreme cases; precisely where trim points are drawn has little effect on the bottom-line results as long as the worst outliers are removed. In all, 3.6% of SARs were tagged as outliers in this example.

[2] Sale qualification code 1 represents sales qualified as valid based on examination of the deed. Sale qualification code 2 represents sales qualified as a result of "qualified, verifiable, and documented evidence".

Figure 1. SAR Graphs and Outliers





With outliers removed, the graph was rerun, along with a line graph showing the median SAR for each month (see figure 2). A moving average trend is displayed on the scatter graph in the first half of figure 2. If these graphs displayed an approximately linear relationship, only a single trend line and time variable (namely, sale months coded 1-13) was needed to capture the relationship. If the trend appeared to soften or accelerate significantly over the 13-month period, two time variables were defined. In this case, a single time variable was used. A close inspection of the line graph in figure 2 indicates that the net change over the time frame was approximately -12%.

Figure 2. SAR Graphs with Outliers Removed

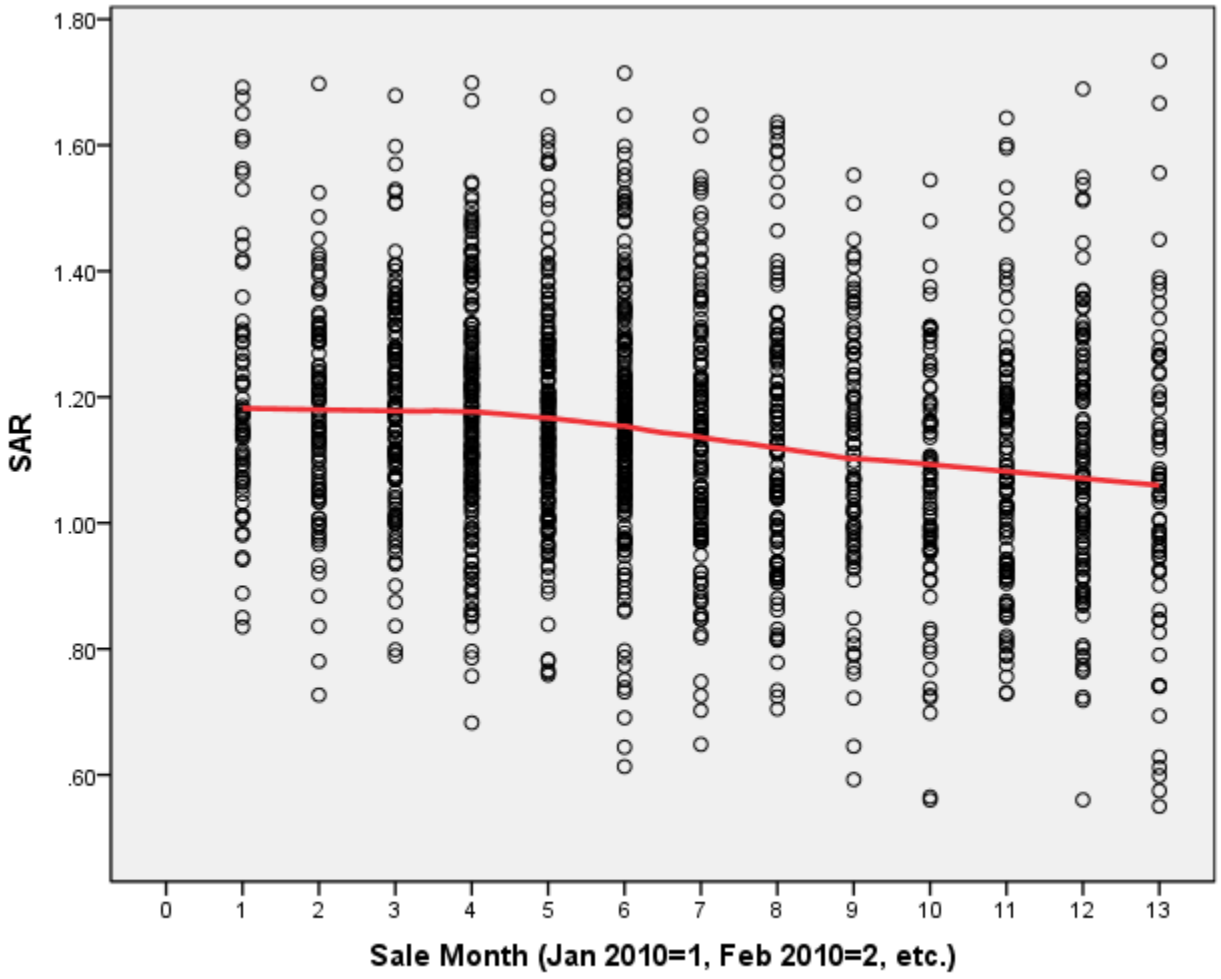
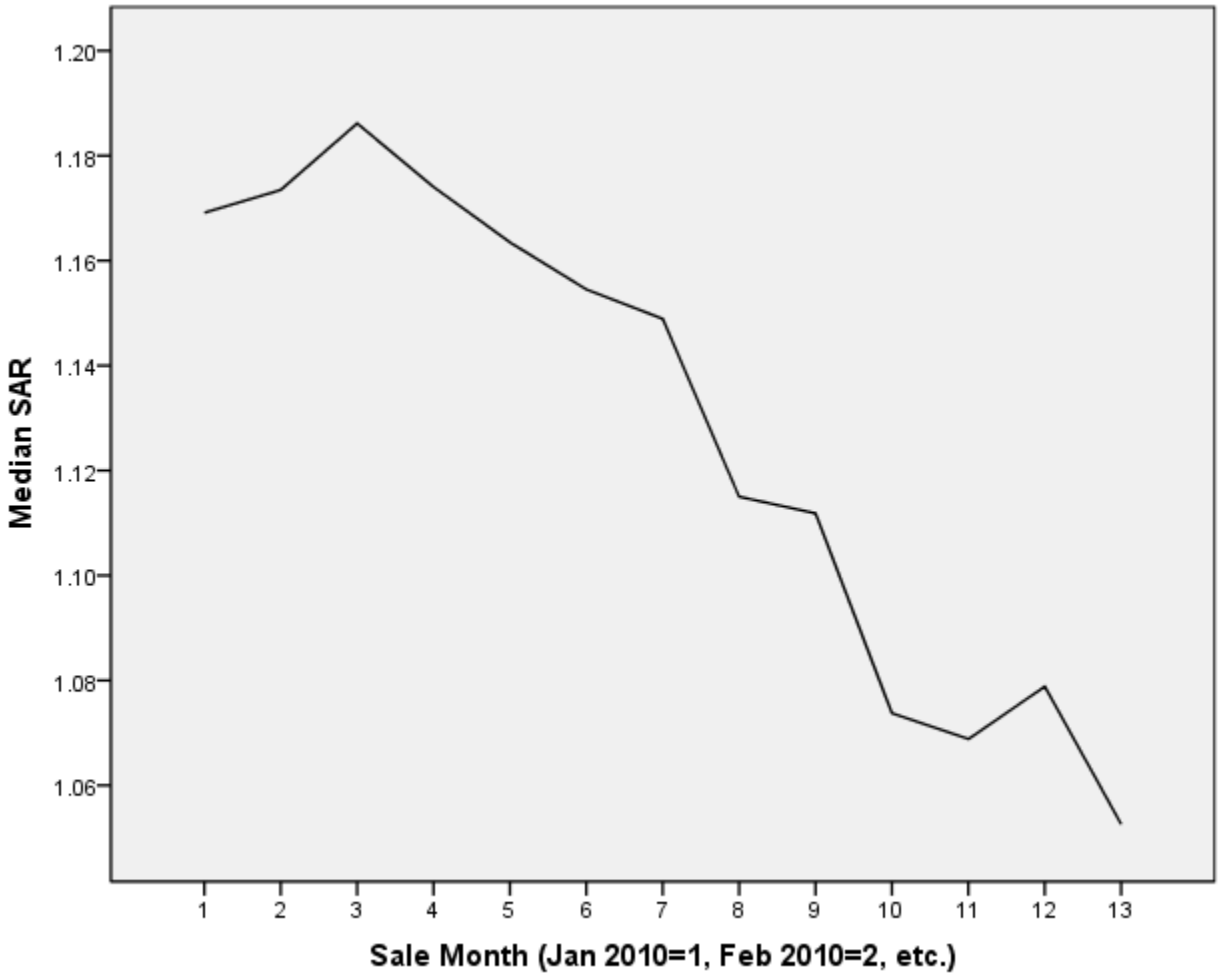


Figure 2 (Continued). SAR Graphs with Outliers Removed



2.4 Quantifying Trends

Regression analysis was used to quantify the trends. The dependent variable is the logarithm of SAR (logarithms were taken to yield percentage changes) and the independent variables are the time variables created as described above. In the current example there was only one time variable. However, often two time variables were used: one for the first four to six months and a second for the remaining months (time variables were never attempted for a period of three months or less).

In some case, where there were adequate sales and trends appeared to differ by stratum 1 use code, separate analyses were conducted for each use code. If the trends appeared similar but SAR ratios were clearly lower or higher for different use codes, a binary variable was included to allow the model to distinguish the difference and thus develop a more accurate price trend. In the present example, a binary variable was included for use code 4 (condominiums) and the model yields the following results.

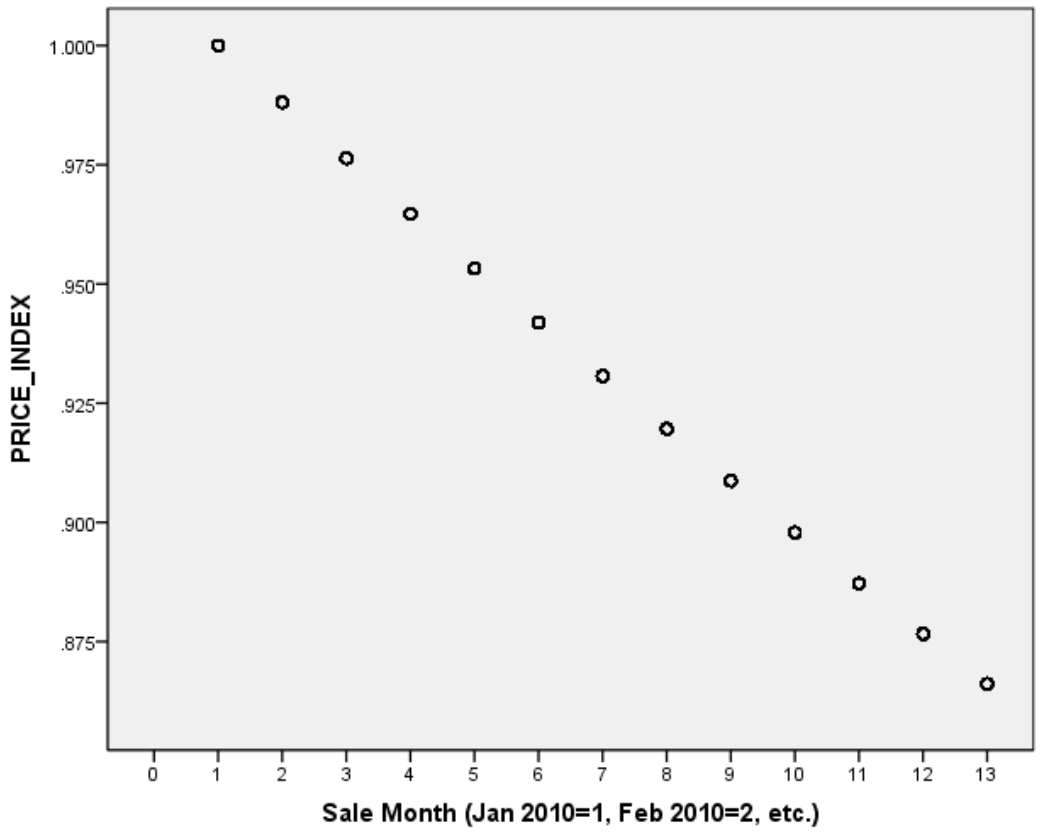
Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.217	.009		23.289	.000
	MONTHS Sale Month (Jan 2010=1, Feb 2010=2, etc.)	-.012	.001	-.224	-9.635	.000
	CONDO	-.139	.012	-.270	-11.596	.000

a. Dependent Variable: LN_SAR

Thus, the indicated price trend is -1.2% per month. The "t-values" provide a confidence index for the indicated trend (values above 2.00 are significant at the 95% confidence level). In this case the trend is significant at the 99.9% confidence level. In general, confidence measures increase with number of sales and the consistency of indicated trends. Figure 3 below shows a graph of the indicated trends.

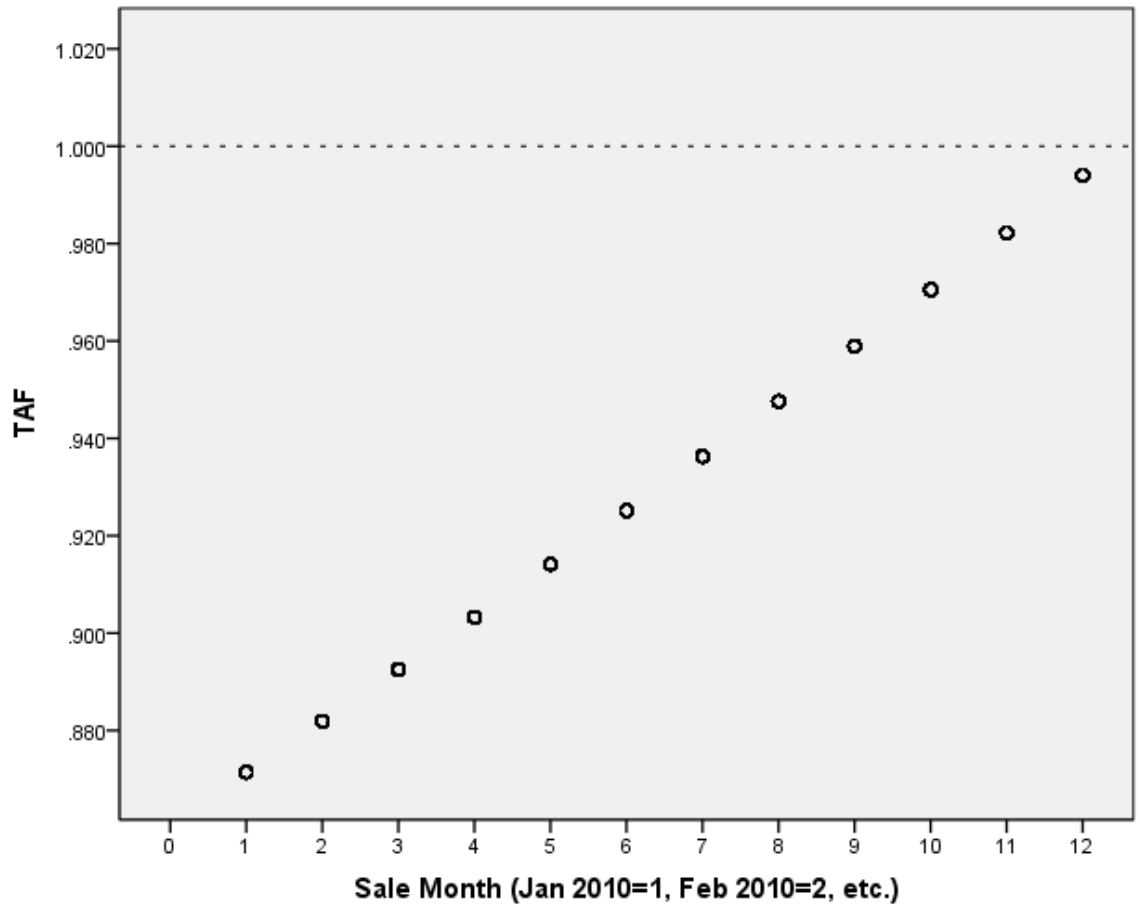
Figure 3. Graph of Indicated Time Trend



2.5 Time-Adjustment Factors

The final step is to convert the indicated trend in values to time-adjustment factors, that is, the factors by which individual sale prices must be multiplied to obtain equivalent prices as of January 1, 2011. Of course, older sales require greater adjustments than more recent sales[3]. Figure 4 shows a graph of the indicated time-adjustment factors (TAFs) in our present example.

Figure 4. Graph of Time-Adjustment Factors



Finally, when two time variables were used, time-adjustment factors were summarized as a single factor that, if applied for all 12 months, would yield the same total percentage change as the individual factors. For example, if no trend were indicated for the first six month and a trend of -1.0 percent per month were indicated for the second six months, the average monthly trend would be -0.5%. Average monthly changes provide a convenient way of summarizing changes over the full year and comparing results among counties.

[3] Sales in December 2009 received a half-month adjustment.

3. Results

The final results were complied in an Excel spreadsheet that contains the time-adjustment factors for each month, along with number of sales used and a summary of time segments, rates of change, t-values, and average rates of change. In addition, results from the 2010 study were combined with results for 2008 and 2009 and summarized in a combined spreadsheet.

In the past, and to a lesser extent this year, time trends were made more difficult or, in several cases, impossible because of missing or otherwise unusable data. "Caution codes" were developed to flag these conditions. The table below explains the codes used in past studies.

Caution Code	
1	Atypical ratio distribution (results may not be valid)
2	Possible limited or isolated sales chasing (time trend still valid)
3	Probable sales chasing (time trend not reliable)
4	Definite sales chasing (time trend not possible)
5	Virtually all sales not qualified
6	Many sales records cannot be matched to NAL file by parcel IDs
7	40% of "Improved Res" parcels had Land Ratio of 100% (and are excluded)
8	Bimodal ratio distribution (analysis not possible); adopted stratum 1 trend

Caution codes 2-4 relate to "sales chasing", the practice of setting values to match sales prices rather than by applying mass appraisal tables and algorithms. The practice is often revealed by a concentration of assessment ratios of approximately 1.00 or some other targeted number. Although observed in prior studies in several counties, happily no instances of the practice were observed in the 2010 study. In fact, the only caution code necessary in the present study was caution code "1", which was assigned to several counties with unusual ratio distributions (e.g., a usual concentration of low or high ratios). Thus, results this year are more complete and reliable than in prior years. As always, however, the reliability of results is limited by the number of available sales, which remained depressed in 2010.

The average rates of change for all 67 counties were -0.70% per month for stratum 1 and -0.78% per month for stratum 4. Both figures are little changed from the 2009 study. Figure 5 below summarizes the distribution of average rates of change for 2010. "Not significant" means either that there was no trend or that there was insufficient data to determine a trend.

The appendix contains thematic maps showing the percentage change in values in each stratum during 2010 and during the three year period, January 2008 through December 2010.

Figure 5. Summary of Average Value Changes

Count

	STRATUM		
	1	4	Total
Not Significant	15	20	35
-.0001 to -.0049	1	1	2
-.0050 to -.0099	32	16	48
-.0100 to -.0149	19	23	42
-.0150 to -.0199	0	6	6
-.0200 or more	0	1	1
Total	67	67	134

4. Conclusions and Recommendations

Even when property values are changing substantially and at different rates or even directions, sales prices can be successfully adjusted to a common valuation date when there are adequate sales to determine trends.

The sales ratio trend method provides an efficient method of time adjustment that allows the analyst to plot the data and view trends over the time period of interest in order to identify appropriate time variables for capturing the underlying trends. Regression analysis provides a powerful tool for quantifying the trends. Of course, time trends are easier to develop and more reliable for stratum 1, for which sales are more plentiful and trends clearer. Still, reasonable trends can usually be developed for stratum 4 properties, and stratum 1 trends provide a guide to likely trends in stratum 4 when stratum 4 sales are few and far between.

Going forward we recommend that the Department continue to develop time trends using the sales ratio trend method. This year for the first time separate trends were developed by use code in stratum 1 for a number of counties. This increased the accuracy of adjustments and we recommend that separate adjustments by use codes continue to be considered in the future. Where SAR graphs show no discernable difference among use codes, a consolidated analysis remains appropriate. In the larger counties with well-defined market areas, it should also be possible to test for differences in time trends among market areas. This could be pursued on a pilot basis in selected counties.

We applaud the Department and counties for apparently ending altogether the isolated practice of sales chasing, in which values for sold properties were set based on sale price. Although the most serious consequence of the practice is inequitable assessments, it also renders sales ratio studies and time trend studies based on the sales ratio trend method meaningless. Happily, we noted no instances of the frowned-on practice this year.

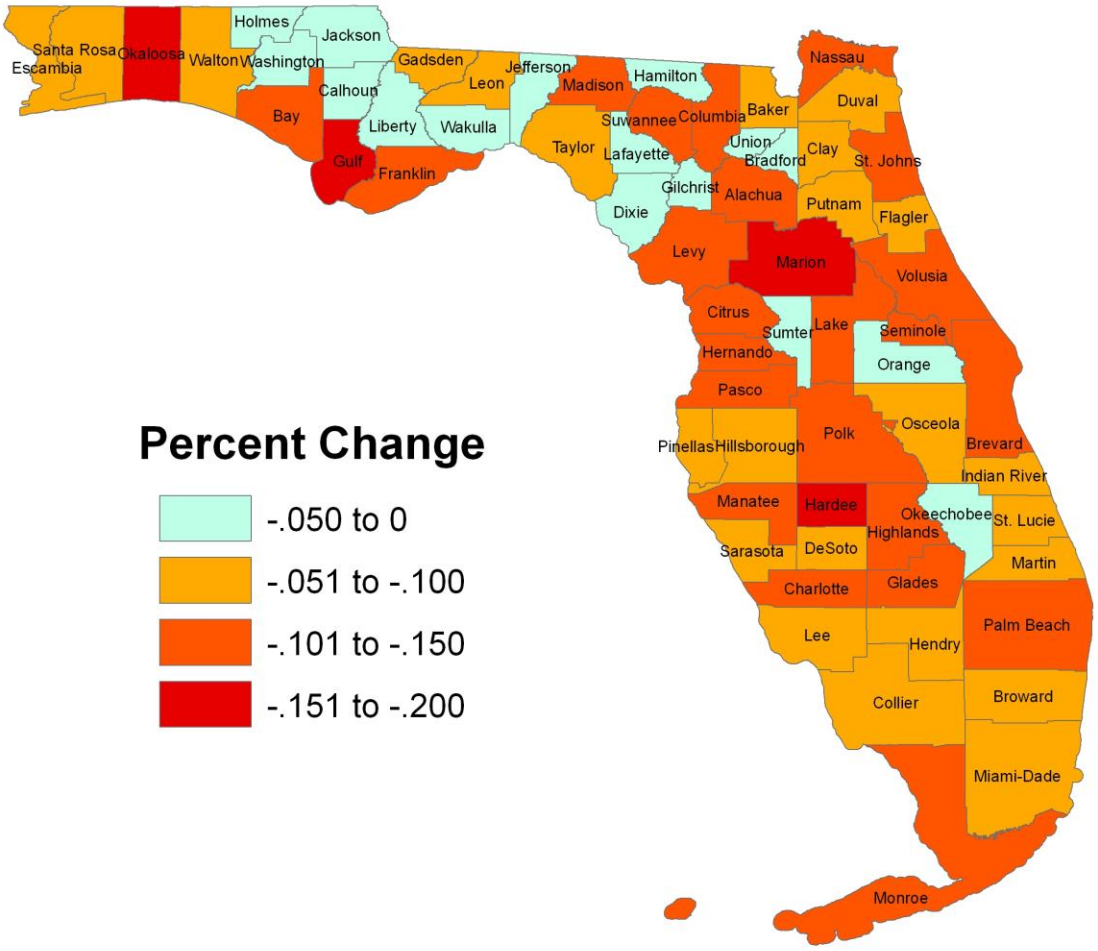
Finally, we recommend that the Department continue to work with counties to foster an increasing understanding of time trend methods and how they can be used to increase sample sizes and thus the stability and reliability of mass appraisal methods.

Florida has been through a difficult real estate market with values falling for over four years. We hope that time trends methods have aided in tracking the market and adjusting assessments to current market levels as required by law through this difficult journey. We also hope that the frustrating downtrends soon end and the real estate market begins to chart a period of stable growth.

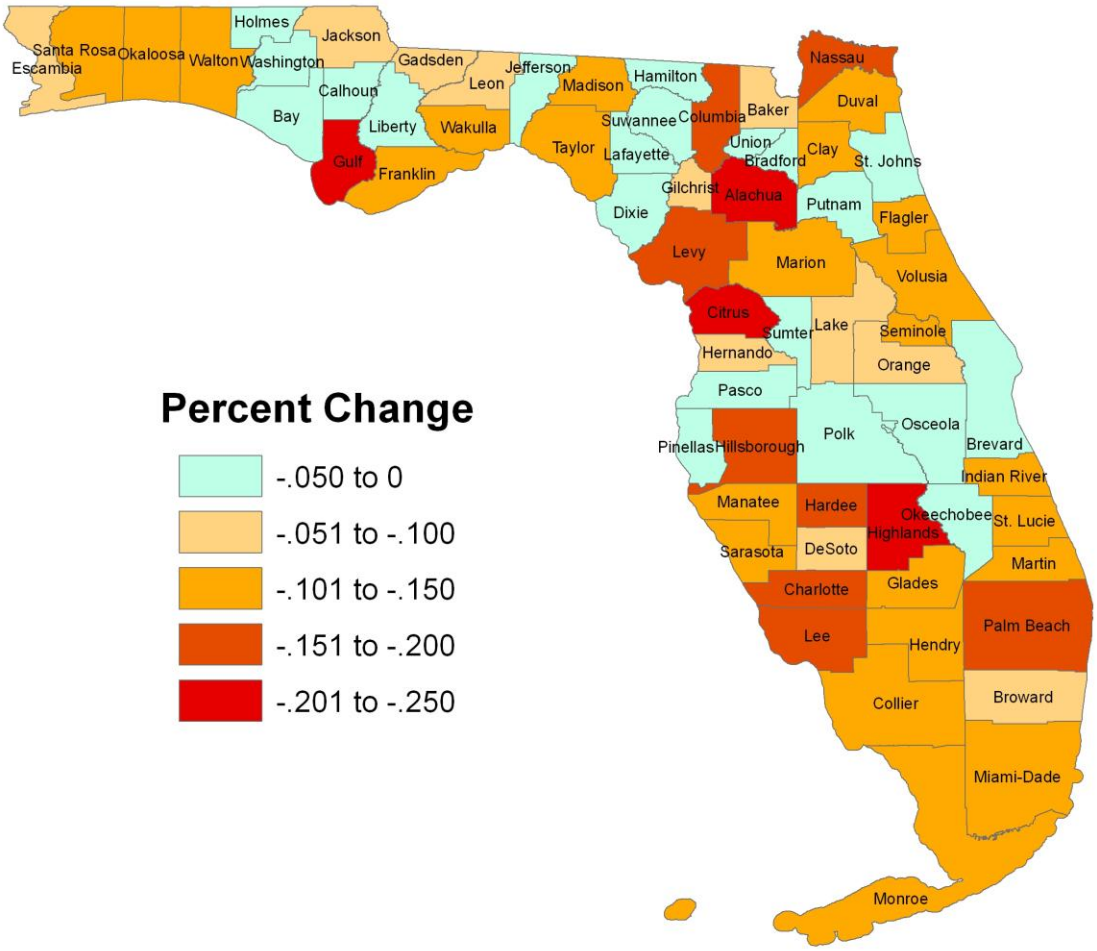
Appendix

Value Change Maps

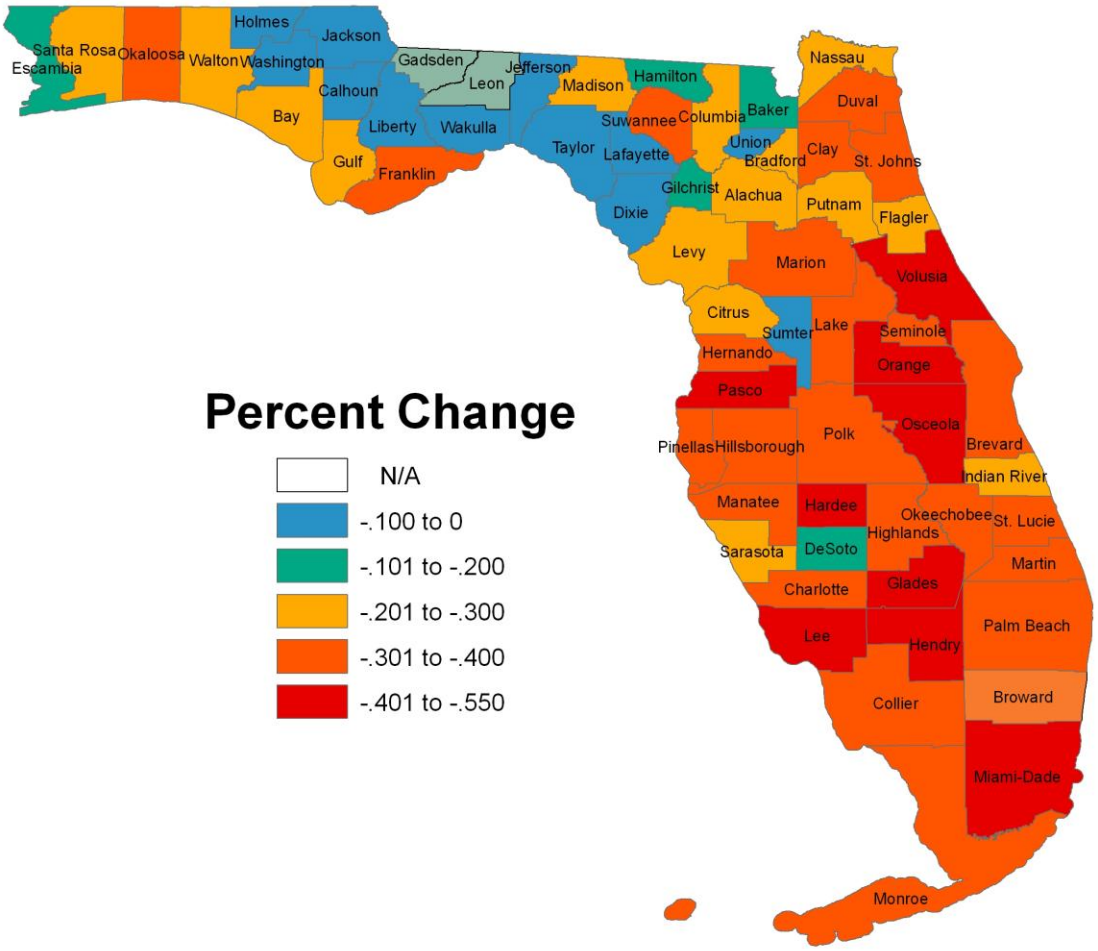
Percentage Change in Stratum 1 Values 2010



Percentage Change in Stratum 4 Values 2010



Percentage Change in Stratum 1 Values 2008 - 2010



Percentage Change in Stratum 4 Values 2008 - 2010