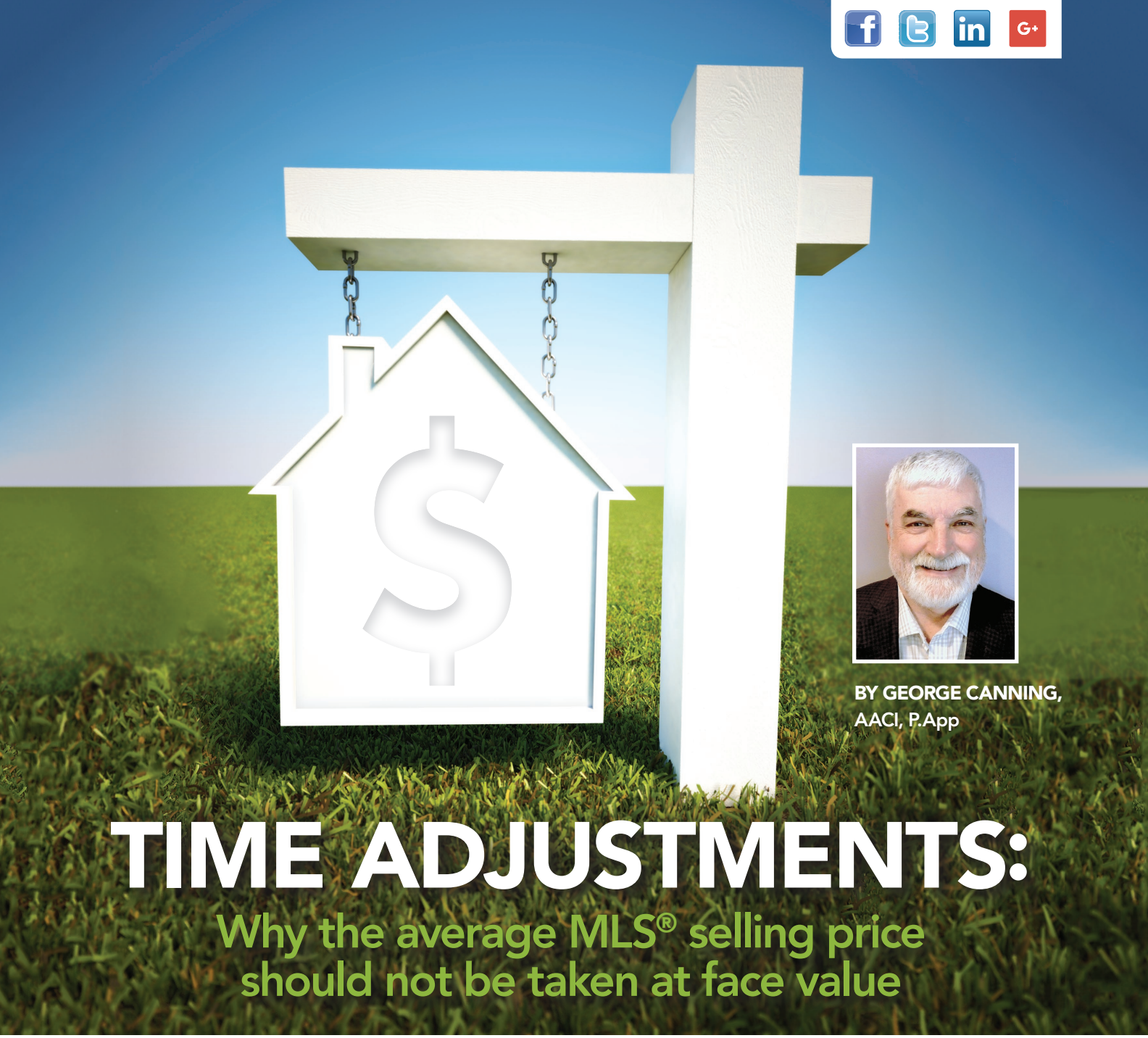

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TIME ADJUSTMENTS:

Why the average MLS® selling price should not be taken at face value

Although MLS® sales data is an important element of research used by appraisers, this article identifies the problems of using standard average MLS® board statistics to determine Time Adjustments in appraisal assignments.

A CASE STUDY

Below is a line of house sales for the years 2015 and 2016. This regression line (best fit) suggests that the houses are all the same. The average price of these identical homes was $150,000 in 2015 and $175,000 in 2016. Under this condition, we can say that this house type (two-storey with no garage) had a time increase of 16.6%. This is an acceptable conclusion under these conditions.

The analysis becomes more complicated by the reality that sales data drawn from a two-year period does not consist of identical house types. Taken from the London/St. Thomas MLS®, the following is data of two-storey houses from one year to the next, with the regression line representing the average sale price.

"The shape of our data is important because it tells the appraiser about the distribution of the sale prices that make up the data."

2015

$150,000

2016

$175,000

In this instance, it is incorrect to say that the average selling price of a two-storey house has increased 16.6% by calculating the year-over-year percentage variance. Yet, that is often the interpretation and the application made by real estate practitioners.

The problem stems from two areas. First, the data from each group is not of identical properties. Second, the selling properties are different to the year of comparison.

SHAPING OUR DATA TO PROVIDE MORE INSIGHT

The shape of our data is important because it tells the appraiser about the distribution of the sale prices that make up the data. One option is to use a histogram to see the distribution of the sales. In a perfect world, our data would have the shape/ distribution as shown below.

Normal distribution

If the data is normally distributed, the mean, mode and median are the same and one can make sound predictions, correlations and reconciliations. It is perfection. However, the following diagram (or left-skewed distribution depending on the market) is likely how the sales data would appear.

Right-skewed distribution

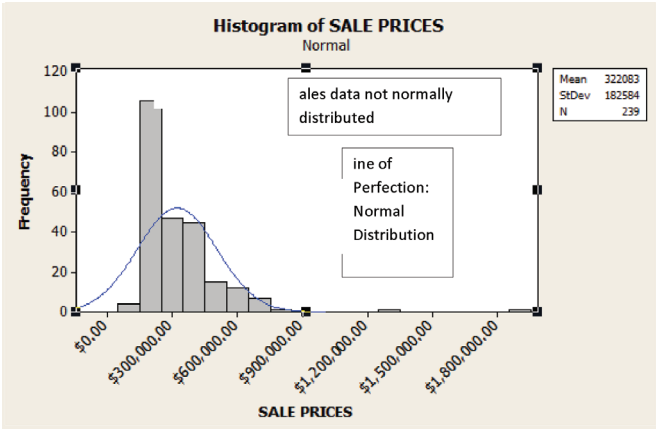
This data shows a skewed distribution to the left. If this reflected the sales data for 2015, we would see an abundance of low to middle-priced sales and a long tail of higher-end priced homes selling. When we complete a histogram of the sales data for 2016, perhaps the data is shaped like below.

Plateau distribution

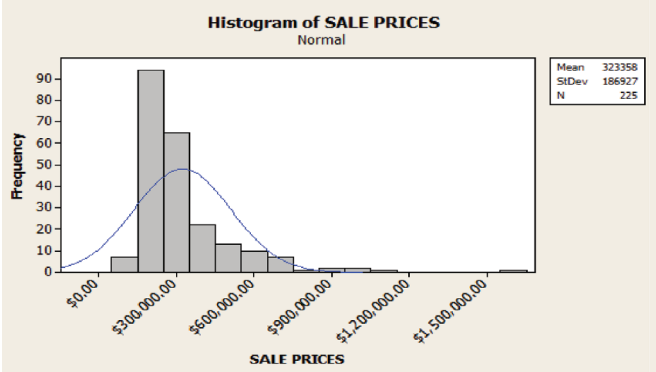
By doing a histogram, the data tells a different story, whereby the data sets are not showing a high level of comparability. Obtaining a true Time Adjustment from groups of data with different shapes would be like trying to push a chain.

USING ACTUAL DATA TO PROVE THE POINT

Let's examine more closely the distribution of actual data taken from sales data published by the London/St. Thomas Real Estate Board of one-floor houses selling in 2014 and 2015. Below are the sales of one-floor houses sold in 2014.



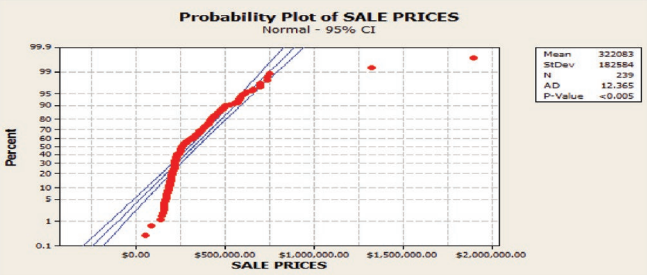
The following are the sales of one-floor houses that sold in 2015.



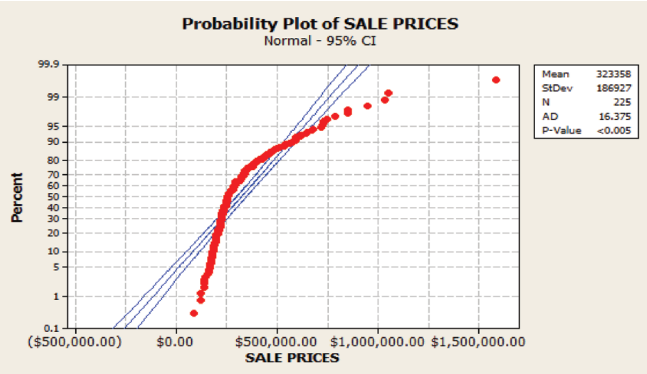
We see that the sales distribution for 2015 is different in 'shape' to the sales in 2014. This should be a big flag that one cannot compare the average sale prices for 2014 and 2015 and conclude with a Time Adjustment of 'x' amount of percentage.

Let's assume the data is perfectly distributed from one year to the next. Does that qualify for a simple calculation of taking the difference of the mean prices from one year to the next? The short answer is no. The appraiser still has to deal with the differences in the physical and location aspects of the house sales from each group. Until those differences are dealt with, trying to determine a Time Adjustment, even when the data is evenly distributed, remains a challenge.

ANOTHER WAY OF EXAMINING THE DISTRIBUTION OF DATA



Above is the same histogram of sales, except that it is shown on a graph known as a Distribution Graph. One can see the shape of the sales much better than on a histogram. The blue line in the middle is the regression line and the two other blue lines are the 'field goals' known as Confidence Intervals (CI). They are generally constructed at the 95% CI. This means that, if the same population were sampled on different occasions, the resulting intervals would bracket the true population parameter in 95% of the cases.



Above is the Distribution Graph of the other sales data set. Look how sharp the curve is in the sales of the data. Most of the sales are not even on the regression line. Therefore, no appraiser can take the average of this grouping of data ($323,358) and the average of the other group ($322,083) and draw any meaningful conclusions.

So the appraiser has a problem. The mean of the different groups of data from one year to the next does not make sense from one group to another, and the data is curved, which raises more questions. In addition, all sales in both groups differ from one another and from each group. So how does the appraiser determine a Time Adjustment?

THE SOLUTION

There are a couple of solutions to dealing with time when it comes to real estate data. One way is to run a Regression Analysis. Regression Analysis is the only tool that will hold constant all your selected variables such as lot size, house size, garage, house age, and date of sale (typically expressed in days) and allocate a coefficient or answer to the effect of the variable on your unit of measure (e.g., selling price per square foot (or square meter) of the dwelling). It does not need to have the data normally distributed in perfect fashion in order to make a prediction about time and that is because of the 'least squares' aspect of regression. The regression line is the line of the best fit. Obviously, if we can re-express our data or get it more uniform (normally distributed), then we would have a better prediction.

The second option to see the effect of time on one's sales data is in the quality point analysis found in the Direct Comparison Approach (DCA). Here, time is not considered to be an adjustment 'before' any of the traditional adjustments such as lot size, building size, age, zoning, location, etc. Rather, time becomes a 'trial and error' process to determine its effect on the Coefficient of Variance (COV) of the adjusted selling prices of the unit of measure. Let's assume the COV 'before' any Time Adjustments is 6%. After applying a 1% per year adjustment to the sales, the COV decreases to 5%. We apply a 2% per year Time Adjustment and the COV decreases to 4%. A 3% adjustment per year is completed to the sales and the COV moves back up to 5%. Then we know that the best Time Adjustment is 2% per year. This sensitivity analysis is best utilized in the QP format because any changes in time are quickly observed, since the mathematics is built into the QP model.

Our final notes about a Time Adjustment would suggest that, if the appraiser ran a regression model and found that time was 3%, it does not mean that every other property value rose by 3%. It is for that particular data set.

We think time is a strata, in that different house price ranges have different Time Adjustments. When we extract out 4-6 sales in order to complete a DCA, this author is not convinced that every house sale is subject to a Time Adjustment. We have gotten this sense when using QP. When the appraiser gets the coefficient down to 1% without a Time Adjustment, there is not much left. The reason is that real estate markets are so imperfect that we cannot extricate such fine detail about time despite all that is read in the local newspaper about the rising average house prices in different markets.

Another favoured tool is a Time Series Graph. Here, the sale dates are placed in the graph along with the selling prices or the unit of measure. The time series will tell you the general direction of time, but you are still confronted with the issue of the physical differences among the sales. However, if you were fortunate to have houses of a certain age group, house size, house lot size, etc., your Time Series Graph would most likely give you a better trend line that you can point to in your DCA for a Time Adjustment. It is better than nothing, but not quite as good as running a regression.

WHAT DOES THIS ALL MEAN?

We know that using the average sale price has its limitations unless you know its distribution around the mean and the shape of the data. However, the physical aspects of each of the sales need to be dealt with. At the end of the day, the key to a reliable opinion or conclusion lies in the quality and the analysis of your data.