

# A Sales Comparison Approach Adjustment Technique: Converting Qualitative Analysis to a Quantitative Basis

by Stephen M. Rothweiler, MAI

## Abstract

This article introduces and describes an adjustment technique that can be applied in the appraisal of real property. The technique involves application of a qualitative adjustment process, based on an incremental scale, and conversion of the qualitative adjustments to a quantitative basis. This practical technique emphasizes reasonable judgment and recognizes the difficulties involved with supporting quantified adjustments from relatively small sample sizes. It also directs the appraiser to consider the magnitude of incremental differences associated with the qualitative adjustment process. This practical technique adds another tool for providing more reliable and credible appraisal assignment results.

## Introduction

The genesis of the idea for this technique of sales comparison analysis and adjustment comes from an Appraisal Institute–sponsored course entitled *Advanced Sales Comparison & Cost Approaches* in the 1990s. The course instructors were the late Nelson Bowes, MAI, and his wife Virginia Messick, MAI. In addition to the outstanding instructors, the students in attendance included many with ample background in real property appraisal. The content and interaction between the instructors and students provided an exceptional educational experience. The specific technique described in this article was developed shortly after that course and gained both interest and acceptance by review appraisers. Most of the initial appraisals prepared using this technique

had banks and institutional lenders as intended users with an intended use for lending decisions.

There are any number of ways to analyze and adjust comparable sales, and the technique suggested in this article is just one. Indeed, there may be appraisers who use techniques similar to the one described here in their everyday practices. It is the intent of this article to present a specific technique for qualitative adjustments that might be useful in providing more credible appraisal assignment results—which should be a goal of every appraisal. Articles in *The Appraisal Journal* have previously discussed the topic of qualitative adjustments being expressed quantitatively. The focus of those articles, however, was techniques of weighting and rating elements of comparison, which incorporates a quantitative aspect into the analyses.<sup>1</sup>

1. These previous articles provide excellent insight into alternative methods of adjustment. See Gene Rhodes, "Qualitative Analyses in the Sales Comparison Approach Revisited," *The Appraisal Journal* (Fall 2014): 281–294; David W. Childers and Gene Rhodes, "Comments on Qualitative Analyses in the Sales Comparison Approach Revisited," *The Appraisal Journal* (Winter 2015): 58–60; D. Richard Wincott, "An Alternative Sales Analysis Approach for Vacant Land Valuation," *The Appraisal Journal* (Fall 2012): 310–317.

The need for the technique presented in the current article is illustrated by the comments of one prominent Denver eminent domain attorney, who observed that in his experience incremental differences in qualitative adjustments were not being addressed in appraisals; he would question whether an inferior adjustment for time of sale/market conditions had the same (or similar) impact as an inferior adjustment for location.

## The Sales Comparison Approach

Of the three approaches to value (i.e., cost, sales comparison, and income capitalization), the sales comparison approach is widely viewed by appraisers, clients, and intended users as the most reliable valuation methodology when an adequate supply of sales is available. Since the definition of the sales comparison approach describes fundamental concepts discussed in this article, it is provided here as a basis for the discussion that follows.

**Sales comparison approach.** The process of deriving a value indication for the subject property by comparing sales of similar properties to the property being appraised, identifying *appropriate units of comparison*, and making *adjustments* to the sale prices (or unit prices, as appropriate) of the comparable properties based on relevant, market-derived *elements of comparison*. The sales comparison approach may be used to value improved properties, vacant land, or land being considered as though vacant when an adequate supply of sales is available. (Emphasis added.)<sup>2</sup>

Examples of “appropriate units of comparison” include price per square foot, price per acre, and price per dwelling unit, to name a few. “Adjustments” reflect differences between the comparable properties and the subject property. “Elements of comparison” are the characteristics of proper-

ties and transactions that help explain the variances in the prices paid for real properties.<sup>3</sup> The Appraisal Institute’s guidance on the sales comparison methodology suggests elements of comparison can be separated into two categories: transactional adjustments and property adjustments.<sup>4</sup> *The Appraisal of Real Estate*, fifteenth edition, lists the following common elements in these adjustment categories.

### Transactional Adjustments<sup>5</sup>

- Real property rights conveyed (e.g., fee simple estate, leased fee estate, leasehold)
- Financing terms (e.g., all cash, market financing, seller financing, special or atypical terms)
- Conditions of sale (e.g., short sale, bank-owned real estate [REO], private estate, relocation, 1031 tax-free exchange, or other atypical motivations)
- Expenditures made immediately after purchase (e.g., new roof, renovation costs)
- Market conditions (e.g., changes in supply and demand or other causes of price changes)

### Property Adjustments

- Location (e.g., neighborhood, interior lot, waterfront, arterial street)
- Physical characteristics (e.g., size, shape, soils, access, construction quality, condition)
- Economic characteristics (e.g., expense ratios, lease provisions, management, tenant mix)
- Legal characteristics (e.g., zoning / use requirements, environmental regulations, building codes, flood zones, differences in highest and best use)
- Non-realty components of value (e.g., personal property, furniture, trade fixtures, and equipment [FF&E], franchises, trademarks)

Other possible elements of comparison include governmental restrictions and off-site improvements required for the development of a vacant site. The differences in some of these elements of comparison can be so large or so significant that the property is no longer comparable.<sup>6</sup>

2. Appraisal Institute, *The Dictionary of Real Estate Appraisal*, 6th ed. (Chicago: Appraisal Institute, 2015), s.v. “sales comparison approach.”

3. Appraisal Institute, *The Appraisal of Real Estate*, 15th ed. (Chicago: Appraisal Institute, 2020), 362.

4. *The Appraisal of Real Estate*, 15th ed., 362–363.

5. Transactional adjustments are generally applied in the order shown in this list. *The Appraisal of Real Estate*, 15th ed., 365.

6. *The Appraisal of Real Estate*, 15th ed., 363–364.

### Adjustment Techniques

Appraisers adjust for differences in the elements of comparison between each comparable sale and the subject property. The process of adjustment can include a variety of analysis types. Generally, the types of analyses can be categorized as being either *quantitative techniques* or *qualitative analysis*, which *The Dictionary of Real Estate Appraisal*, sixth edition, defines as shown below.

**Quantitative techniques.** Techniques used to drive quantitative adjustments to comparable sale prices in the sales comparison approach; also used in the development of adjustments in other valuation approaches and techniques. Quantitative techniques include data analysis techniques (paired data analysis, grouped data analysis, and secondary data analysis), statistical analysis, graphic analysis, trend analysis, cost analysis (cost-to-cure, depreciated cost), and capitalization of rent differences.<sup>7</sup>

**Qualitative analysis.** The process of accounting for differences (such as between comparable properties and the subject property) that are not quantified; may be combined with quantitative techniques.<sup>8</sup>

In many appraisals the sole method of adjustment used is qualitative analysis. One possible pitfall, however, is the use of a three-point scale where each element of comparison is categorized as either “inferior,” “similar,” or “superior.” The three-point scale is not the issue, but rather when the overall adjustment is concluded the number of incremental adjustments is not aggregated, and the overall adjustment is reported adherent to the three-point scale, with no regard to how many adjustments were applied for specific elements of comparison.

The non-incremental qualitative adjustment grid in Exhibit 1 illustrates this type of adjustment technique. As shown, the overall adjustment does not represent an aggregated number of adjustments but rather indicates a general direction. The report user is left with little understanding of the overall impact of the adjustments

applied to specific elements of comparison. Such analysis falls short of providing the intended user with insight into both the adjustment process and the appraiser’s judgment. The example in Exhibit 1 underscores the importance of defining the *magnitude* of each increment of qualitative adjustment, which is the goal of the technique being covered in this article.

### Technique for Converting Qualitative Analysis to Quantitative Basis

The focus of this technique is to carry qualitative analysis one step further, by applying an incremental scale and converting adjustments to a quantitative basis. Before introducing the technique’s details, it is important to emphasize that the definition of *qualitative analysis* as it applies in appraisals explicitly states that qualitative analysis *may be combined with quantitative techniques*. This concept is central to the qualitative-to-quantitative conversion technique discussed here; the underlying premise of this article is that quantitative techniques, supported by market evidence, are the preferred method of analysis. When combined with a qualitative analysis of elements of comparison that are not easily quantifiable in the market, quantitative techniques can bolster and provide additional support for the increments of difference inferred or implied in a qualitative analysis.

Appraisers often work with statistically small sample sizes, which are not conducive to quantitative techniques such as regression analyses. Further, even though quantified techniques such as paired- and grouped-data analyses are effective, they may involve extrapolation of conclusions outside the range supported by the actual data. For these reasons, the generalizations afforded by qualitative analysis combined with an incremental scale can provide a more supportable adjustment process. Standardizing the impact of each increment of qualitative adjustment based on a specified scale allows the appraiser to convert the magnitude of the total qualitative adjustments into a quantitative basis.

7. *The Dictionary of Real Estate Appraisal*, 6th ed., s.v. “quantitative techniques.”

8. *The Dictionary of Real Estate Appraisal*, 6th ed., s.v. “qualitative analysis.”

**Exhibit 1** Non-Incremental Qualitative Adjustment Grid

Elements of Comparison	Subject	Sale 1	Sale 2	Sale 3	Sale 4
<b>TRANSACTIONAL</b>					
Real Property Rights Conveyed <i>Adjustment</i>	Fee simple	Fee simple	Fee simple	Fee simple	Fee simple
Financing Terms <i>Adjustment</i>	Cash -	Cash	Cash	Cash	Cash
Conditions of Sale <i>Adjustment</i>	Arm's-length -	Arm's-length	Arm's-length	Arm's-length	Arm's-length
Expenditures Made Immediately <i>Adjustment</i>	None	None	None	None	None
Market Conditions (Date of Sale) <i>Adjustment</i>	Feb-20	Dec-19	Oct-19	Aug-19	May-19
<b>PROPERTY</b>					
Location <i>Adjustment</i>	Good -	Good	Fair <b>Inferior</b>	Good	Excellent <b>Superior</b>
Size (Acres/ Square Feet) <i>Adjustment</i>	$\frac{10.000}{435,600}$ -	$\frac{8.856}{385,767}$	$\frac{18.277}{796,145}$	$\frac{15.444}{672,741}$	$\frac{38.930}{1,695,809}$
Topography and Floodplain <i>Adjustment</i>	Gentle slope None -	Undulating None	Sloping 20% floodplain <b>Inferior</b>	Gentle slope None	Hillside None <b>Inferior</b>
Shape <i>Adjustment</i>	Irregular -	Irregular	Irregular	Irregular	Irregular
Zoning and Stage of Entitlement <i>Adjustment</i>	PUD Unentitled -	PUD Entitled and platted <b>Superior</b>	PUD Unentitled	PUD Unentitled	PUD Unentitled
Lot Sizes (Square Feet) and Density (Units per Acre) <i>Adjustment</i>	Minimum 5,000 4.00 -	3,150 to 4,473 6.32	Minimum 5,000 4.38	3,960 to 6,938 4.53	9,000 to 13,929 1.23 <b>Superior</b>
Cost of Entitlement/Development <i>Adjustment</i>	Slightly high -	Typical <b>Superior</b>	Typical <b>Superior</b>	Typical <b>Superior</b>	High <b>Inferior</b>
Price per SF	-	<b>\$7.85</b>	<b>\$4.70</b>	<b>\$6.67</b>	<b>\$7.98</b>
Total Qualitative Adjustment	-	<b>Superior</b>	<b>Inferior</b>	<b>Superior</b>	<b>Superior</b>

## The Seven-Point Qualitative Scale

In the conversion technique, a seven-point qualitative adjustment scale is applied to each element of (qualitative) comparison. The seven-point scale is generally broad enough to cover the magnitude of required adjustment (though not always, as illustrated later in this article) and is also relatively easy to describe narratively. An example of a seven-point scale is presented in Exhibit 2. Other scales may be used, including the previously referenced three-point scale. Whatever scale is selected, the appraiser's goal should be to ensure that the difference in each increment on the scale is similar in terms of its impact on unit price.

The scale shown in Exhibit 2 uses the simple, narrative descriptive terms "slight," "moderate," "substantial," and "no adjustment." Appraisers may decide on other descriptive terms that are more suitable to their style or liking. Also, there may be situations where the total qualitative adjustments fall either within or outside of the seven-point scale applied for each element of comparison. For example, an appraiser might conclude a comparable property requires slight upward (+) adjustment for size, substantial upward (+)(+)(+) adjustment for location, and moderate upward (+)(+) adjustment for zoning. This would result in a total adjustment of upward (+)(+)(+)(+)(+)(+) or six increments. Unlike the example in Exhibit 1, the aggregation of adjustments made for specific elements of comparison is appropriate and provides an indication of the magnitude of overall adjustment required for this comparable property.

### Exhibit 2 Seven-Point Qualitative Adjustment Scale

Upward (+)(+)(+)	Substantial upward adjustment
Upward (+)(+)	Moderate upward adjustment
Upward (+)	Slight upward adjustment
No adjustment	Property is similar to the subject property
Downward (-)	Slight downward adjustment
Downward (-)(-)	Moderate downward adjustment
Downward (-)(-)(-)	Substantial downward adjustment

It is critical that the adjustments made for each element of comparison be aggregated in order to demonstrate the overall impact of all adjustments for each comparable sale. Use of a scale forces the appraiser to consider whether, for example, a slight upward (+) adjustment for size would have the same order of magnitude, if quantified, as a slight upward (+) adjustment for location. As with any technique, the appraiser's judgment as to the reasonableness of each qualitative adjustment is integral to the credibility of this technique. The learned skills that form the basis of these judgments are what separate professional appraisers from other real estate professionals.

### Incremental Qualitative Adjustment Grid

Exhibit 3 shows a case study example of an incremental qualitative adjustment grid that is suitable for this technique. This example is based loosely on an actual appraisal assignment, and it was selected purposely to illustrate the adjustment technique in its purest form. The elements of comparison and adjustment process have been left intact to illustrate certain aspects of the technique. The subject property was a 10-acre parcel of vacant land with a highest and best use of development to single-family residential lots. In this case, the entire adjustment process was qualitative; no quantitative adjustments were applied to any elements of comparison.

The example could be modified to incorporate quantitative adjustments for one or more elements of comparison. For instance, the appraiser might find excellent market support for a 5% annual quantitative market conditions (date of sale) adjustment. If that were the case, the appraiser would simply adjust the actual sale prices upward by 5% annually and apply the qualitative-to-quantitative conversion process to the time-adjusted unit prices. In such an instance, the market-supported quantitative adjustment could be used to crosscheck the quantitative adjustments derived through the conversion process. Though not included in this discussion, a narrative analysis accompanied the original adjustment grid, with in-depth and descriptive discussion of the appraiser's judgment relative to each element of comparison.

Note, it is imperative that appraisers avoid use of a rule of thumb (ROT) in the qualitative adjustment process. Such ROT assumptions can be false premises relative to actual market behav-

**Exhibit 3** Incremental Qualitative Adjustment Grid

Elements of Comparison	Subject	Sale 1	Sale 2	Sale 3	Sale 4
<b>TRANSACTIONAL</b>					
Real Property Rights Conveyed <i>Adjustment</i>	Fee simple	Fee simple	Fee simple	Fee simple	Fee simple
Financing Terms <i>Adjustment</i>	Cash -	Cash	Cash	Cash	Cash
Conditions of Sale <i>Adjustment</i>	Arm's-length -	Arm's-length	Arm's-length	Arm's-length	Arm's-length
Expenditures Made Immediately <i>Adjustment</i>	None	None	None	None	None
Market Conditions (Date of Sale) <i>Adjustment</i>	Feb-20	Dec-19	Oct-19	Aug-19	May-19
<b>PROPERTY</b>					
Location <i>Adjustment</i>	Good -	Good	Fair <b>Upward (+)(+)</b>	Good	Excellent <b>Downward (-)(-)(-)</b>
Size (Acres/ Square Feet) <i>Adjustment</i>	<u>10.000</u> 435,600 -	<u>8.856</u> 385,767	<u>18.277</u> 796,145	<u>15.444</u> 672,741	<u>38.930</u> 1,695,809
Topography and Floodplain <i>Adjustment</i>	Gentle slope None -	Undulating None	Sloping with floodplain 20% in 100-year floodplain <b>Upward (+)</b>	Gentle slope None	Hillside None <b>Upward (+)</b>
Shape <i>Adjustment</i>	Irregular -	Irregular	Irregular	Irregular	Irregular
Zoning and Stage of Entitlement <i>Adjustment</i>	PUD Unentitled -	PUD Entitled and platted <b>Downward (-)(-)</b>	PUD Unentitled	PUD Unentitled	PUD Unentitled
Lot Sizes (Square Feet) and Density (Units per Acre) <i>Adjustment</i>	Minimum 5,000 4.00 -	3,150 to 4,473 6.32	Minimum 5,000 4.38	3,960 to 6,938 4.53	9,000 to 13,929 1.23 <b>Downward (-)(-)(-)</b>
Cost of Entitlement/ Development <i>Adjustment</i>	Slightly high -	Typical <b>Downward (-)</b>	Typical <b>Downward (-)</b>	Typical <b>Downward (-)</b>	High <b>Upward (+)(+)</b>
Price per SF	-	<b>\$7.85</b>	<b>\$4.70</b>	<b>\$6.67</b>	<b>\$7.98</b>
Total Qualitative Adjustment	-	<b>Downward (-)(-)(-)</b>	<b>Upward (+)(+)</b>	<b>Downward (-)</b>	<b>Downward (-)(-)(-)</b>

ior, which can lead to erroneous adjustments. For instance, the element of property size is often viewed in the context of smaller sites sell for higher unit values. While this ROT may be true in many instances, this element is often either a nonfactor or the opposite of conventional wisdom. In the current data set, there was no support for a size adjustment, even though one of the comparable properties was two to four times larger than either the subject property or the other comparable properties. Another example of actual market behavior being contrary to a ROT is lot sizes and density. An often-used, and sometimes warranted, ROT is that price per square foot increases as density increases. In the case of Sale 4, which has a significantly lower density than the other three comparable sites and the subject site, the opposite was found to be true. In this case, the larger lot sizes impacted the price per square foot upward in comparison to properties having smaller lots and higher density, the exact opposite of the conventional ROT.

The judgment and magnitude of all adjustments should be logical and supported by market examples when possible, with the thought process documented in reporting of the assignment results. As Appraisal Institute instructor Nelson Bowes used to challenge students, “Show me your judgment,” and “Reporting provides a process of pronouncing the analysis and conclusions to yourself.” The larger point is that judgment should be based on sound analysis, which is clearly reported and adapted to the intended use of the assignment results. The analysis depicted in Exhibit 3 on qualitative adjustments provides the basis for the remaining discussion.

#### Comparative Qualitative Adjustment Array Table

Subsequent to concluding the qualitative analysis and adjustments, it is useful to intended users to present the results in an arrayed table for each comparable sale showing the total qualitative adjustments relative to the unit prices adjusted for any quantitative elements of comparison, if applicable (Exhibit 4). This process assists intended users in understanding the general impact of the qualitative analysis process.

#### Exhibit 4 Qualitative Adjustment Array

Sale	Price PSF	Qualitative Adjustment
2	\$4.70	Upward (+)(+)
3	\$6.67	Downward (-)
1	\$7.85	Downward (-)(-)(-)
4	\$7.98	Downward (-)(-)(-)

As noted, in this example, the entire adjustment process was qualitative, and no quantitative adjustments were applied to any elements of comparison. The fact that the unit prices are the actual, unadjusted unit prices explains, in part, the relatively wide range (i.e., \$4.70 to \$7.98 per square foot) depicted in the table. Slight variances in patterns may occur and should not be particularly concerning, unless the number of increments not fitting the pattern becomes too large or the arrayed data shows no reasonable or logical pattern in general. In such instances, the appraiser should go back through the qualitative analytical process and check for errors (including errors in judgment) that may require changes in the adjustments applied to each comparable for each element of comparison. It also may become apparent that one or more sales are not as comparable as the appraiser originally concluded. In some cases, the appraiser may decide to eliminate certain sales, because further analysis revealed too many differences for the property to be considered comparable to the subject property.

This is often the stage of the qualitative analysis where appraisal reports provide a conclusion of unit value based solely on the qualitative adjustment array. This observation applies to both non-incremental adjustment processes, such as in Exhibit 1, or incremental qualitative adjustment process, such as in Exhibit 3. A simplified narration might include language such as, “The arrayed data indicates a most probable price lying between the adjusted prices of Sale 2 (\$4.70 requiring moderate upward adjustment) and Sale 3 (\$6.67 requiring slight downward adjustment). Based on the appraiser’s professional judgment, the most appropriate unit value is \$6.00 per square foot or \$2,613,600 (\$2,614,000, rounded).”

Even if the appraiser were to narrate the results in more detail, the intended user is left in the position of trusting whether the conclusion is truly reasonable and supportable, because there is no analysis of the magnitude of either the individual adjustments or the aggregated total adjustment. This underscores the usefulness of converting the qualitative analysis to a quantitative basis. It is better to report the array results (see Exhibit 4) and provide narrative description of what it may suggest but stop short of concluding a specific unit value at this point.

### Converting Total Qualitative Adjustments to Numeric Value

The next four steps in this adjustment technique are procedural calculations that are not based on judgment. The first of these steps is to convert the total qualitative adjustments for each sale into a numeric value, which is merely the total (aggregate) number of qualitative adjustment increments. This is a very simple process based on the assumption that each (+) or (-) has a numeric value of 1. The conversion process is illustrated in Exhibit 5 using the same data presented in Exhibit 3.

### Exhibit 5 Converting the Total Qualitative Adjustments to a Numeric Value

Sale	Total Qualitative Adjustment	Numeric Value
2	Upward (+)(+)	2
3	Downward (-)	-1
1	Downward (-)(-)(-)	-3
4	Downward (-)(-)(-)	-3

### Analysis of Numeric Differences in Qualitative Adjustments for Paired Sales

In the next step, the numeric value of the difference in qualitative adjustments for each pair of sales is compared. The resultant numeric differences (i.e., number of adjustment differences) for

each pair then are used to establish the difference in unit price per qualitative adjustment increment. This process is summarized in Exhibit 6 using the previous sample of adjusted data.

### Exhibit 6 Difference in Qualitative Adjustments

Paired Sales	$\Delta$ Qualitative Adjustments
1 and 2	5
1 and 3	2
1 and 4	0
2 and 3	3
2 and 4	5
3 and 4	2

Before moving on to the next step, it is important to note that any pair of sales that has the same number of qualitative adjustments will result in a numeric difference of zero (i.e., Paired Sales 1 and 4). As described later, any such pairs must be eliminated from the calculation of the unit price difference per qualitative adjustment.

### Analysis of Differences in Unit Prices for Paired Sales

The next step is to compare the unit prices for each pair of comparable sales. Once again, this is a process calculation not requiring judgment. As noted previously, there were no quantitative adjustments applied to any elements of comparison in this example. Had such quantitative adjustments been used, it would be appropriate to apply those adjustments and use that adjusted unit price in this step. The resultant unit-price differences are divided by the numeric difference in qualitative adjustments calculated in Exhibit 5, resulting in an indication of the unit price per incremental qualitative adjustment for each pair of comparable sales. The increment being sought is the absolute value,<sup>9</sup> which rep-

9. An *absolute value* is "a nonnegative number equal in numerical value to a given real number." *Merriam-Webster Online Dictionary*, s.v. "absolute value," accessed August 1, 2021, <https://bit.ly/3yZ95NZ>.

resents the magnitude of each incremental, qualitative adjustment. The calculation of differences in unit prices for each pair of comparable sales from the example is summarized in Exhibit 7. In a subsequent step, the unit-price difference per adjustment is multiplied by the number *and direction* (i.e., upward or downward) of qualitative adjustments concluded for each comparable, in order to conclude the quantified, adjusted unit prices.

Now that the difference in unit prices and the numeric value of total qualitative adjustments has been calculated, the appraiser can calculate the difference in unit price per qualitative adjustment for each pair of comparable sales.

**Exhibit 7** Absolute Value of Differences in Unit Prices

Paired Sales	Δ \$ PSF	Absolute Δ \$ PSF
1 and 2	\$3.15	\$3.15
1 and 3	\$1.18	\$1.18
1 and 4	(\$0.13)	\$0.13
2 and 3	(\$1.97)	\$1.97
2 and 4	(\$3.28)	\$3.28
3 and 4	(\$1.31)	\$1.31

**Calculating Unit Price per Qualitative Adjustment**

The next procedural calculation involves dividing the absolute difference in unit price for each pair of sales by the numeric difference in qualitative adjustments between each pair of sales. The result of this calculation is the *quantified difference* in unit price per qualitative adjustment. This process is summarized in Exhibit 8. Measures of dispersion (i.e., range) and central tendencies (i.e., mean and median) for the unit prices per qualitative adjustment are presented as part of Exhibit 8. These measures, though not reliable statistically due to the small sample size, can be useful in analyzing and reconciling a standardized unit price per qualitative adjustment increment.

**Exhibit 8** Unit Price per Qualitative Adjustment Increment (QA)

Paired Sales	Absolute Δ \$ PSF	Δ Numeric Difference in QA	Δ \$ PSF per QA
1 and 2	\$3.15	5	\$0.63
1 and 3	\$1.18	2	\$0.59
1 and 4	\$0.13	0	-
2 and 3	\$1.97	3	\$0.66
2 and 4	\$3.28	5	\$0.66
3 and 4	\$1.31	2	\$0.66
	<b>Low:</b>		<b>\$0.59</b>
	<b>High:</b>		<b>\$0.66</b>
	<b>Mean:</b>		<b>\$0.64</b>
	<b>Median:</b>		<b>\$0.66</b>

In this sample, there are differences in the number of qualitative adjustments for each pair except Sale 1 and Sale 4. In that case, the numeric difference is zero (e.g., downward (-) (-)(-) = 3 downward (-)(-)(-) = 3; therefore 3 - 3 = 0). As a result, this pair must be omitted from further consideration in the standardization of a unit price difference per qualitative adjustment, because any number divided by zero does not produce a valid mathematical result. In practical terms, any pairs in which there is no difference in the number of qualitative adjustments should be similar overall to one another.

Theoretically, the unit prices, either unadjusted or adjusted for quantitative differences, should be the same or at least reasonably similar. As illustrated, this is the case for Sale 1 (\$7.85 per square foot) and Sale 4 (\$7.98 per square foot). If the unit prices for such a pair are vastly different but have a similar total of qualitative adjustments, the appraiser should revisit the qualitative adjustment process and check for inconsistencies and/or errors in judgment. The appraiser should not be disappointed by such an occurrence, as the process of iteration serves as a check of reasonableness and enhances the cred-

ibility of assignment results. For example, assume in the initial analysis the appraiser had concluded a location adjustment of (-)(-) was required for Sale 4, instead of the concluded adjustment of (-)(-). In the initial conversion process, the difference in adjustment between Sale 1 and Sale 4 would have indicated 1, and either Sale 1 required less downward adjustment or Sale 4 required more downward adjustment. After conducting additional research and analysis, including interviews of market participants, assume it became apparent Sale 4 had a substantially superior location and required more downward adjustment, i.e., (-)(-), than was applied in the initial analysis. In this way, the process of iteration enhances the credibility of analysis and assignment results.

The differences in unit price per qualitative adjustment for each pair of sales can be analyzed and reconciled to estimate a *standardized unit price* for each qualitative adjustment. This step marks a return to judgment by the appraiser in the analysis. An example of narration summarizing the thought process (analysis) and reconciled conclusion is instructive. For instance, a simplified narration might state,

The following points summarize the unit price per qualitative adjustment calculations for the pairs of comparable sales:

- The differences per square foot per qualitative adjustment range from a low of \$0.59 to a high of \$0.66 per square foot; a \$0.07-per-square-foot range.
- The mean and median unit prices per adjustment equals \$0.64 and \$0.66 per square foot, respectively.

- The appraiser believes the most reasonable and supportable incremental difference is \$0.65 per square foot for each qualitative adjustment.

In the reconciliation example, analysis of the range, mean, and median were useful tools in helping to explain the results. To no surprise, larger sample sizes tend to reduce the impact one sale has on the analysis. In this small sample, at \$0.65 per square foot, the impact of each qualitative adjustment is relatively high compared to the actual unit prices of \$4.70 to \$7.98 per square foot. As a percentage, each qualitative adjustment is 8% to 14% of the actual unit prices.

### Adjusting Unit Prices of Comparable Sales

As a second-to-last step (a procedural calculation), the standardized unit price per qualitative adjustment is multiplied by the number of qualitative adjustments made to each comparable sale. It is at this point that the direction of adjustment (i.e., downward or upward; negative or positive) is reflected. That is to say, if the total number of qualitative adjustments is downward, the overall adjustment will be negative (i.e., the property is superior to the subject property), and if the total number of adjustments is upward, the overall adjustment will be positive (i.e., the property is inferior to the subject). Exhibit 9 summarizes the process of applying the standardized unit price per qualitative adjustment to the number of adjustments for each comparable sale. Once again, measures of dispersion and central tendencies—this time for the adjusted prices per square

## Exhibit 9 Conversion of Qualitative Adjustments to Quantitative Basis

Sale	Actual \$ PSF	Total Qualitative Adjustment (QA)	Numeric Value of QA	Δ \$ PSF per QA	Quantified Adjustment	Adjusted Price PSF
1	\$7.85	Downward (-)(-)(-)	(3)	\$0.65	(\$1.95)	\$5.90
2	\$4.70	Upward (+)(+)	2	\$0.65	\$1.30	\$6.00
3	\$6.67	Downward (-)	(1)	\$0.65	(\$0.65)	\$6.02
4	\$7.98	Downward (-)(-)(-)	(3)	\$0.65	(\$1.95)	\$6.03
					<b>Low:</b>	<b>\$5.90</b>
					<b>High:</b>	<b>\$6.03</b>
					<b>Mean:</b>	<b>\$5.99</b>
					<b>Median:</b>	<b>\$6.01</b>

foot—are presented in a table format. The table presentation is useful in analyzing and reconciling a final unit value for the subject property.

### **Developing Conclusion of Unit Value and Estimate of Value**

The final step involves sound judgment and provides the appraiser a final opportunity to assess the reasonableness of the adjustment process. The appraiser needs to ensure the quantified, adjusted unit prices make sense. If they do not, it is necessary to return to the qualitative adjustment analysis and check for inconsistencies and/or errors in judgment. As noted previously, the process of iteration serves as a check of reasonableness and enhances the credibility of assignment results. In the example reconciliation, the following points are made regarding the adjusted prices and a final indication of value: (1) the low and high adjusted unit prices are \$5.90 and \$6.03 per square foot; and (2) the mean and median adjusted unit prices are \$5.99 and \$6.01 per square foot, respectively.

At this point, it is relatively apparent to both the appraiser and intended user that the appropriate unit value for the subject property is near \$6.00 per square foot, which results in a value indication of \$2,613,600 or approximately \$2,614,000, rounded.

Note that the value conclusion is the same as that derived using purely qualitative analysis. The

difference is that intended users now have a much better understanding of why the conclusion of \$6.00 per square foot was the most reasonable and supportable estimate of unit value. Simply put, the results may be deemed to be more credible.

### **Summary and Conclusion**

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This article describes a practical technique for converting qualitative adjustments to a quantitative basis. The analysis is based on application of an incremental scale to the qualitative analysis. This process forces the appraiser to consider the magnitude of incremental differences associated with the qualitative adjustment process. The technique also provides a tool that is useful in analyses of mathematically small sample sizes. The reliability and credibility of the analysis is directly related to the appraiser's professional judgment and analysis of forces within the marketplace. Rules of thumb should not be part of such analysis, as they can be false premises relative to actual market behavior and can result in erroneous adjustments. Application of an incremental scale provides a technique that addresses consistency of qualitative adjustments. This adjustment technique provides the appraiser an opportunity to demonstrate the logic and thought processes used in the analysis, with the ultimate goal being more credible assignment results.

### **About the Author**

**Stephen M. "Steve" Rothweiler, MAI**, has been in the real estate appraisal profession since 1980. He founded The Rothweiler Group Inc. in 1994 and continues to serve as its president and active appraiser. Rothweiler earned a bachelor of science degree in real estate from Arizona State University. His experience includes appraisal and consultation assignments involving some of the most significant land, office, industrial-warehouse, and retail properties located in the Denver-Boulder area. The primary focus of Rothweiler's appraisal practice is the area of eminent domain. He has been qualified as an expert witness in Adams, Arapahoe, Boulder, Denver, and Jefferson County District Courts.

**Contact:** [steve@rgiappraisal.com](mailto:steve@rgiappraisal.com)

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### **Additional Resources**

Suggested by the Y. T. and Louise Lee Lum Library

#### **Appraisal Institute**

- **Education**  
<http://www.appraisalinstitute.org/assets/1/7/aiedcat.pdf>
- **Guide Notes to the Standards of Professional Appraisal Practice**  
[https://www.appraisalinstitute.org/assets/1/7/AI\\_Guide\\_Notes.pdf](https://www.appraisalinstitute.org/assets/1/7/AI_Guide_Notes.pdf)
- **Lum Library, External Resources, Resource Links [Login required]**  
Knowledge Base Bibliographies—Value
- **Property Rights Symposium Discussion Paper**  
<http://bit.ly/SymposiumPaper>

#### **Realtor.com—Real Estate Data**

<https://www.realtor.com/research/data/>

#### **Redfin—Data Center**

<https://www.redfin.com/blog/data-center>

#### **Zillow—Housing Data**

<https://www.zillow.com/research/data/>