Appendix D Specific References to Published Reports

Recently published reports and presentations given at public meetings have alleged bias in the equity of assessments in Buncombe County. Review of these resources found a number of flaws, including errors in data sources, methods of analysis, and conclusions presented, rendering those reports and presentations unreliable as sources of information.

This appendix references the following resources:

- *An Evaluation of Property Tax Regressivity in Buncombe County, North Carolina*, Center for Municipal Finance, 2022.

- *Inquiry Into Residential Property Assessment Equity: Buncombe County, NC*, SYNEVA Economics, March, 2022.

- Buncombe County Ad Hoc Reappraisal Committee presentation by Urban 3, July, 2022.

These three resources were produced by experienced, qualified analysts and are viewed as authoritative in some circles. They present an impressive array of charts, tables, maps, and statistics, yet each presents a distorted picture of the state of assessments in Buncombe County as of their respective dates.

If we understand the process by which qualified analysts have arrived at a determination of bias, we can see and isolate problems with their approaches and techniques. I found the following problems with some or all of these resources.

Sales data not appropriate for the analysis: All three analysts used publicly available data. This includes sales data that has not been vetted to remove transactions that do not meet industry prescribed tests for being indicators of typical market activity and are therefore not useful predictors of the prices for similar properties.

Characteristics and market value data not representative of the properties at time of sale: All three analysts used only current property data - both physical attributes and market values - not data that describes the conditions that were present at the time of sale. In either case, there may be no relationship between price and value, so no valid conclusions can be drawn about bias or assessment quality.

No significant sales validation: All three analysts considered all "arm's length" transaction as valid and did not filter out outliers or transactions that do not represent typical market activity.

Imprecise time trending methods: None of the analysts accurately time trended sales.
To have a sufficient number of transactions to support reasonable analysis, the analyst must often use several years of sales data. Prices must be adjusted for time to normalize data as of a common date. Many analysts use consumer price indexes or housing indexes to adjust sales for time. The problem with

these methods is that they often result in adjustments that are linear and too general to support reliable analysis. Consumer price indexes include food, clothing, gas, guns, and butter, which all change at different rates and probably not in the same direction or degree as real estate.

Housing indexes are often reliable only at regional levels and are not granular enough to trend the prices across submarkets. Therefore, use of generalized indexes is not recommended.
Accurate time trending is a process that requires extensive knowledge of the local markets and submarkets. Frequently, there are multiple time trends in play within one jurisdiction. Some areas or types of property are simply "hotter" than others.

The most accurate method for isolating the effects of time is to build regression models that control for as many other elements as possible before calculating time adjustment factors which can be applied to time adjust all transactions. In order to accurately isolate and capture the effects of time on the Buncombe County residential market, I built and ran four separate regression models – one for the entire county and one for each of the urban, suburban, and rural submarkets. I suspected that the submarkets would each be subject to different time trends. Each model controlled for building size, lot size, type of building, quality of construction, presence of a garage, number of baths and powder rooms, general time period of construction, and the presence of a finished basement. Each model was successful in accurately isolating the effects of time. Monthly time adjustment factors were developed that allowed for adjustment of all sale prices, calibrated to December of 2023.

Figure 1 shows the four-year time trends for the Buncombe County urban, suburban, and rural submarkets. Notice that no two are the same and none are linear. If we were to use a linear trend (by drawing a straight line from the beginning point to the end point), it is apparent that in all cases we would be correct at the beginning and correct at the end but wrong at every point in between. We can also see the use of a single time trend for all properties cannot possibly yield accurate results.

Urban Time Trend   Suburban Time Trend   Rural Time Trend
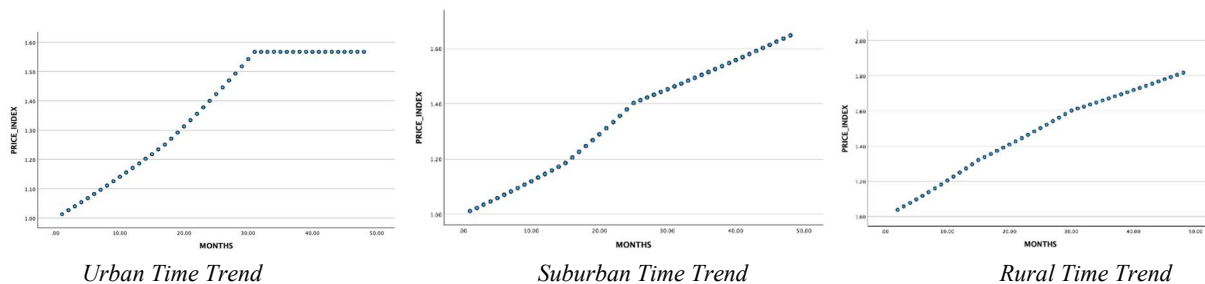Figure 1 Comparison of 48-month time trends by development class

To generate a meaningful analysis of bias in the current set of assessments, it was necessary to calibrate time adjustments to the date of the last revaluation – January of 2021. This makes the comparison of Market Value to Price more relevant.

Neither the previously published reports nor the presentation effectively or accurately adjusted prices for time.

Problems with sales, attribute and market value data used in ratio studies

Even if the sales approach is not the primary driver of the valuation process, sales will be used to measure assessment performance. When a property's attributes at the time of sale are principally the same as at the time of valuation, there is a relationship between sale price and market value. When the attributes at time of sale and the attributes at time of valuation are significantly different, that relationship no longer holds true. The sale price may bear little or no relationship to the value. If we are using a ratio study as part of the equity analysis, these transactions must be identified and removed from consideration. Section 3.5 of the Standard on Ratio Studies states:

"The appraiser must ascertain whether the property rights transferred, the permitted use, and the physical characteristics of the property on the date of assessment are the same as those on the date of sale. If the physical characteristics of the property have changed since the last appraisal, adjustments may be necessary before including the property in a ratio study. Properties with significant differences in these factors should be excluded from the ratio study."[1]

It must be emphasized that these sales are disqualified *only* for ratio studies. Because the attributes are matched with the sales prices, they are fine to use for modeling or valuation and representation studies. It is the comparison to *market values* when the attributes have changed that breaks the relationship between attributes and price. This requires data files that allow the analyst to make this distinction. Ratio studies are easily distorted by including transactions where the attributes of the property at the time of valuation are different than the attributes that were present at the time of sale.

Ratio Statistics for CMV / Price

Group	Mean	Median	Weighted Mean	Minimum	Maximum	Price Related Bias	Price Related Differential	Coefficient of Dispersion
Below 230k	.970	.935	.921	.252	12.831	.138	1.053	.254
230k to 275k	.882	.910	.882	.235	2.351	1.090	1.000	.151
275k to 315k	.854	.874	.854	.141	1.424	1.157	1.000	.151
315k to 350k	.843	.853	.843	.333	1.632	1.233	1.000	.154
350k to 400k	.828	.825	.827	.108	2.084	1.216	1.001	.160
400k to 450k	.811	.800	.811	.084	1.540	1.230	1.000	.162
450k to 520k	.801	.783	.800	.071	1.628	1.221	1.000	.165
520k to 625k	.797	.781	.796	.114	1.775	1.090	1.000	.167
625k to 815k	.791	.781	.791	.312	1.421	.886	1.000	.160
815k+	.775	.763	.760	.115	1.368	.043	1.019	.174
Overall	.834	.825	.806	.071	12.831	-.022	1.035	.178

Figure 2 Ratio Statistics by price class without disqualifying transactions or adjusting prices for time

---

[1] IAAO Standard on Ratio Studies April 2013 Section 3.5
https://www.iaao.org/media/standards/Standard_on_Ratio_Studies.pdf

Ratio Statistics for CMV / TASP2021								
Group	Mean	Median	Weighted Mean	Minimum	Maximum	Price Related Bias	Price Related Differential	Coefficient of Dispersion
Below 230k	.885	.894	.886	.406	1.717	.120	.999	.135
230k to 275k	.900	.903	.901	.449	1.324	.278	.999	.104
275k to 315k	.923	.921	.923	.485	1.440	.265	1.001	.107
315k to 350k	.925	.923	.923	.485	1.424	.244	1.002	.109
350k to 400k	.923	.918	.922	.159	1.459	.247	1.001	.100
400k to 450k	.920	.922	.921	.120	1.379	.285	1.000	.104
450k to 520k	.910	.908	.909	.561	1.329	.249	1.001	.101
520k to 625k	.920	.917	.919	.156	1.382	.233	1.000	.100
625k to 815k	.919	.922	.918	.441	1.589	.252	1.001	.104
815k+	.916	.912	.902	.428	1.295	-.001	1.016	.117
Overall	.914	.914	.914	.120	1.717	.048	1.000	.108

Figure 3 Ratio Statistics by price class after properly disqualifying transactions and adjusting prices for time

The ratio study results in Figures 2 and 3 use the same sales data file from Buncombe County, which contained 15,848 transactions recorded between January of 2020 and December of 2023, validated by the Buncombe County Assessor's Office. Figure 2 replicates the results of other analysts. Figure 3 uses the same data, properly screened, filtered, and adjusted for time. The difference between the two is the disqualification of 7,475 transactions from the results in Figure 3, but not from the in Figure 2. Transactions were disqualified where the attributes of the property at the time of valuation are different than the attributes that were present at the time of sale or were identified as outliers, which do not represent typical market activity, by regression models. Regression models have been used to adjust prices for time, calibrated to January of 2021, in the results in Figure 3.

Looking at the median ratios and coefficients of dispersion in Figure 2, an analyst could easily conclude that both over-assessment in the lower price ranges and under-assessment in the higher price ranges is common and that both horizontal and vertical equity are poor. After removing transactions that do not comply with the IAAO Standard on Ratio Studies and adjusting sales for time, a completely different picture emerges. The range in median ratio by price class becomes much tighter, exhibiting a reasonable degree of variance. The "bias" against the lower price classes and in favor of the highest price classes disappears. Measures of both vertical and horizontal equity are also greatly improved and fall within the IAAO performance standards.

This demonstrates why it is so important to use a properly screened and validated data source when conducting analysis of assessment performance, and why it is strongly recommended that a well validated file of transactions that meet these criteria is created and used to evaluate assessment performance. The difference is not trivial. It is not unusual to disqualify around 40% of the transactions through this process. In qualifying sales for the study used in this report, 41.2% were disqualified for having attributes of the property at the time of valuation that were different than the attributes that were present at the time of sale. Another 6% of the transactions were disqualified as outliers.
If almost half of the data used for a study is flawed, any analyst is bound to get misleading results!

To qualify/disqualify transactions, comparisons were made of neighborhoods, property types, condition of improvements, quality of construction, size category, and building square footage at time of sale to those same attributes at time of valuation, disqualifying transactions where any of these attributes were different. Minor changes to a property would not disqualify a transaction.

Critics who are unfamiliar with, or choose not to adhere to the IAAO Standard, will say that too many sales are removed in this process. This is not a subjective process, and there is no target number of sales to remove. Disqualification is not determined by a person. The disqualifiers are in the data. *This is the way it is supposed to be done!*

All of the previous published studies used publicly available sales data which was not validated and did not capture attributes as of the date of sale. Therefore, transactions where the attributes of the property at the time of valuation were different than the attributes that were present at the time of sale were not removed from those ratio studies. We can be sure of this because the Assessor's Office created the file that meets this standard in preparation for this study – it had not existed before this.

Understanding how rates of disqualification, expressed as the percentage of transactions that are disqualified, vary across submarkets yields valuable insights into the behavior of the residential market in Buncombe County*. Unqualified analysts often assume that disqualification rates should be constant throughout the inventory.* This is hardly ever the case in "real" markets.

The table below (Figure 4) compares the disqualification rates by price classes in Buncombe county. Column 0 shows the number and percentage of qualified sales. There are two reasons for disqualification. Column 1 shows the number and percentage of sales that were disqualified because attributes of the property at the time of valuation were different than the attributes that were present at the time of sale. Column 2 shows the number and percentage of sales that were disqualified as outliers. Outliers are considered to represent atypical market activity. **Section 12.2** of this report discusses disqualification of sales in greater depth. Even more detail is available in **Appendix C: Sales Disqualification Study**. Outlier removal is explained is **Section 12.4** of this report**.**

Disqualifications by Price Class

Price Class			Disqualify 0	Disqualify 1	Disqualify 2	
Price Class	Below 230k	Count	1012	208	325	1545
		% within Price Class	65.5%	13.5%	21.0%	100.0%
	230k to 275k	Count	967	336	73	1376
		% within Price Class	70.3%	24.4%	5.3%	100.0%
	275k to 315k	Count	1086	415	54	1555
		% within Price Class	69.8%	26.7%	3.5%	100.0%
	315k to 350k	Count	1029	516	41	1586
		% within Price Class	64.9%	32.5%	2.6%	100.0%
	350k to 400k	Count	1093	779	42	1914
		% within Price Class	57.1%	40.7%	2.2%	100.0%
	400k to 450k	Count	899	738	35	1672
		% within Price Class	53.8%	44.1%	2.1%	100.0%
	450k to 520k	Count	705	721	42	1468
		% within Price Class	48.0%	49.1%	2.9%	100.0%
	520k to 625k	Count	700	885	73	1658
		% within Price Class	42.2%	53.4%	4.4%	100.0%
	625k to 815k	Count	575	926	74	1575
		% within Price Class	36.5%	58.8%	4.7%	100.0%
	815k+	Count	307	1005	187	1499
		% within Price Class	20.5%	67.0%	12.5%	100.0%
Total		Count	8373	6529	946	15848
		% within Price Class	52.8%	41.2%	6.0%	100.0%

Figure 4 Disqualified transactions by Price Class

Looking at disqualifications by price classes reveals a pattern. Notice how the attribute disqualification rate increases as price class increases, ranging from a low of 13.5% in the lowest price class to a high of 67% in the highest price class. This is because entry level buyers tend to buy as much house as they can afford. After settlement, they may struggle to meet the monthly obligations of mortgage, insurance, utilities, maintenance, and taxes. After settling on the property, they typically lack resources to make costly alterations or improvements to the property, but will live in it as it was at the time of purchase. Buyers in the higher price ranges are more likely to have the capacity to modify the residence to suit their particular tastes and needs. In the highest price range, most owners will make significant alterations or improvements.

Figure 4 shows that there are much higher percentages of outlier transactions in the lowest and highest price classes. No mass appraisal process can account for variance in price that is not linked to the attributes of properties, such as the atypical motivations of buyers and sellers or their relative negotiating skills. **Section 4.1** of this report discusses problems inherent in mass appraisal of high-priced and low-priced properties. More transactions in these price classes do not represent typical market activity and should be removed as outliers. This is true not only in Buncombe County but in almost all markets. Whether we examine rates of atypical market activity by price class, community, property type, race class, income class, condition of improvements or *any* stratification of the inventory, rates of atypical activity are not constant. Variance is normal, and should not be conflated with bias.

The previously referenced reports and presentation did not disclose the method(s) used to remove outliers. The most common methods are simple truncation and interquartile range. Both are well suited to produce one set of performance statistics for an entire county or jurisdiction but poorly suited for use

in diagnostic ratio studies that stratify the inventory in a variety of ways. Outlier removal is discussed in **Section 12.4** of this report.

Ratio study based on flawed data: Without proper disqualification of transactions, as per the IAAO Standard, market value and sale price not necessarily connected. All three analysts failed to properly disqualify transactions and adjust prices for time. This resulted in ratio studies that were based on flawed data and are therefore unreliable.

"Market noise" not recognized or removed from the analysis:
The analysts do not appear to understand why distortions in the high and low-price ranges or between different types of properties are a natural consequence of mass appraisal and assumed these are indications of bias.

Real estate markets present datasets that contain a lot of noise. Prices for comparable properties can vary due to the relative negotiating skills of the parties; the unknowable motivations of either the buyer or seller; the presence of attributes that are not captured in the data files, or that appear so infrequently that they are statistically insignificant; cyclical changes in the economy – both local and global; changing social trends; governmental actions; spatial relationships between properties; and other factors that make attribute based valuation extremely difficult. Normal degrees of variance should be expected within any set of assessments. Extensive knowledge of local market dynamics is required to filter out as much noise as possible. Analysts who are not familiar with these dynamics are at a disadvantage when filtering, managing or understanding the data.

Data quality contributes to market noise. Most assessors do not conduct interior inspections, relying on what can be observed from the outside of the property. This leads to assumptions of normalcy for attributes that are not observed. These assumptions are more likely to be inaccurate in the lower and higher price ranges. For properties that are sold, external data sources, such as MLS, Zillow or Redfin, can provide some insight into conditions inside of the properties. However, it must be recognized these resources are not available for the vast majority of properties that do not sell, and sellers in the lower price classes often do not use real estate professionals to market their properties. The typical result is better data quality for properties that sell through professional real estate channels (versus unsold properties) and for properties that are in the middle of the price spectrum (versus high-end or low-end properties).

The contributory importance or value of attributes can vary a lot between different types of properties. A garage on a three-acre parcel in Ivy does not have the same contributory value as a garage in downtown Asheville. Deed restrictions requiring a minimum lot size in some neighborhoods result in excess land that is unusable and does not have the same contributory value as lots with no such restrictions. These examples will result in variance in market value through the cost approach that may not be reflected in sale prices. Normal degrees of variance, especially across properties that are not comparable, should not be mistaken for bias.

Representation of unsold properties not considered: The analysts assumed that sales in the ratio study proportionately represent unsold properties and that assessment performance for unsold properties therefore mirrors performance in the ratio study.

Whenever we use ratio studies to analyze assessment performance or use sales-based methods to estimate property value, we are assuming properties that sell are similar to properties that do not sell and that representation of unsold properties is proportionate with sales activity. In reality, every sale may represent a different number of unsold properties. One sale may represent a group of twenty comparable properties, while another sale may represent a group of five unsold properties. The sale that represents twenty unsold properties clearly carries more weight than the sale that represents only five properties. Many properties are not represented by *any* sales, and ratio studies tell us little or nothing about those properties. **Section 14** of this report gives a detailed discussion and analysis of representation in Buncombe County, where 49.2% of single-family residences are not represented by at least one comparable sale.

None of the previously published reports considered the degree to which sales represented the inventory of unsold properties.

Use of anecdotal evidence as proof of systemic bias: Finding specific isolated cases of overvaluation or undervaluation is not proof of systemic bias. Errors will always be present. A coefficient of dispersion of 10%, which is an excellent result, means that ratios, on average, vary by 10% from a perfect 1.00. Choosing one case that is overvalued by 10% and comparing that to another case that is undervalued by 10% - citing a 20% difference between them – is not proof of a systemic problem. Both cases fall within the IAAO standard for assessment performance. The difference is normal variance. Variance is not the same as bias.

The scatterplot in Figure 5 shows the convergence of time adjusted price with market value using properly qualified sales from Buncombe County. The diagonal fit line is where price and value are equal. Sales are color-coded by Race Class. The assessment performance that is indicated by this chart is excellent. Most transactions are very close to the fit line throughout the entire price spectrum. Moreover, there are transactions from all race classes both above and below the fit line. Even so, there are anecdotal examples to be found pointing to cases that are both overvalued and undervalued in all price classes and race classes. Cases like the two that are circled will always be present, yet they do not indicate systemic bias. These cases can be selectively presented to create the *appearance* of bias where none actually exists.
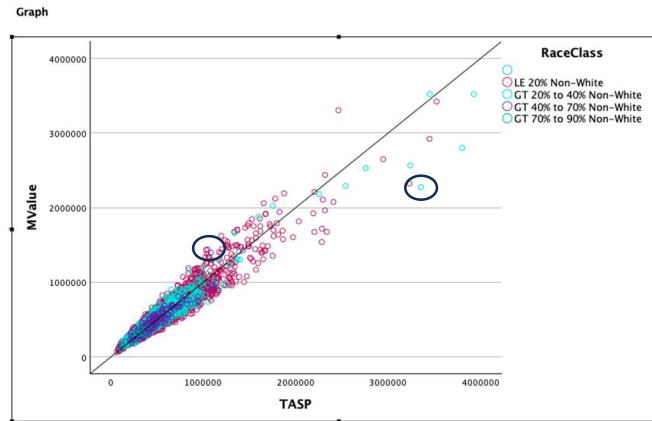
Figure 5 Scatterplot of assessment performance

The Urban 3 presentation makes extensive use of this misleading technique, selecting properties that are not comparable – such as small urban properties and large suburban or rural properties - presenting them as though they *should be* comparable and concluding that differences are evidence of bias.

Conclusions

All three analysts relied heavily on ratio statistics based on flawed data as proof of bias. All of them used inappropriate sources of sales data, failed to properly screen data to disqualify transactions, used historic sale prices compared to current attributes and market values, and either did not time trend sales or used one time trend for the entire county. These mistakes disqualify these reports as credible.

Qualified analysts are entitled to draw different conclusions based on the same data, but should not mishandle the facts in order to support their respective hypotheses. In my view, such practice is calculated and diminishes the integrity of the profession as it misleads those who trust in our expertise and objectivity. The resulting disinformation can be damaging to the counties and communities that make decision in good faith based on these studies.