ECONOMIC ANALYSIS

Wisconsin Department of Revenue | State and Local Finance Division

WAAO Winter Thaw | March 3, 2026

PRESENTER

Tim Pfotenhauer

Equalization Bureau Supervisor

Wausau District Office

AGENDA

- Interpreting results of the sales ratio analysis
- Components of a quality sales study
- Applying yearly economic change
- Examples of past economic changes
- Stratification of sales within classes
- Stratification examples

DOR ANNUALLY PROJECTS MARKET CHANGES

- While both the local assessor and DOR make estimates
  - Local assessor estimates the value of *each parcel*
  - DOR estimates the value of the *entire* town, village, or city
- Purpose of equalized value – guarantee the fairness in distribution of the tax burden
- DOR is required by state law to annually establish equalized value of every municipality in the State of Wisconsin
- Yearly economic projections are the result of sales analysis

ECONOMIC ANALYSIS

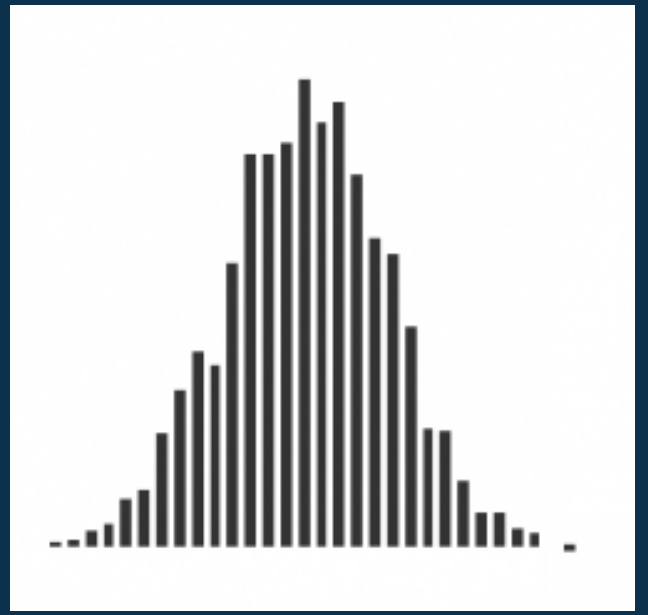
Analyze and Interpret
Sales Ratio Study

SALES VALUE PROJECTION – ASSESSMENT/SALES RATIO

Questions to consider:

- Is the quantity of sales information sufficient?
- Is the quality of sales information sufficient?
- Is the sales information a typical representation of the range of property assessed within the class?

Assumes a normal distribution with a bell-shaped curve



SALES VALUE PROJECTION – ASSESSMENT/SALES RATIO

- Sufficient sales – what is considered sufficient sales evidence?
  - **<1% of parcels sold is insufficient**
    - » Review blend group analysis when more evidence is needed to make the determination
  - **1-3%**
    - » Are the quality of sales good enough to rely on local data?
    - » Review both local sales analysis and blend group analysis
  - **4% or >**
    - » Sufficient to rely on a 1-year analysis of the municipality
- Municipal sales should be used to set the economics whenever possible.
- DOR will rely on blend groups when there are insufficient sales and/or poor and unreliable stats in the municipality.

SALES VALUE PROJECTION – ASSESSMENT/SALES RATIO

- Coefficient of Dispersion (COD)
  - Measure of the average relative distance that individual ratios lie from the median
  - A low COD indicates assessment uniformity

Range of Coefficient of Dispersion	Indicated Performance
0 - 9%	Excellent
10 - 14%	Good
15 - 20%	Fair
Above 20%	Poor
Beyond 35%	Unacceptable

SALES VALUE PROJECTION – ASSESSMENT/SALES RATIO

- Coefficient of Concentration (COC)
  - Percentage of ratios which lie within +/- 15% of the median
  - Measures assessment uniformity. A higher COC indicates greater uniformity of assessments.

- Price Related Differential (PRD)
  - Measures progressivity/regressivity: 0.98-1.03 is good/acceptable
  - Regressive assessment
    - Low dollar property is over assessed
    - High dollar property is under assessed
  - Progressive assessment is the reverse of progressive assessment

SALES VALUE PROJECTION – ASSESSMENT/SALES RATIO

Other considerations

- Are the sales representative of the class for the municipality
- Unusual high/low volume of a particular type of property (ex: waterfront; condo; vacant land)
- Percentage of assessed value sold
- Consider the economic history of a municipality
- Note the 3-year compounded adjustment from prior years

SALES VALUE PROJECTION – ASSESSMENT/SALES RATIO

Sales are analyzed by calendar year

10 sales	Total Assessed Value	$1,260,000	=84.0%
(5% of base)	Total Selling Price	$1,500,000	

Total municipal assessed value for class	=$25,200,000
Projected class value (25,200,000/.84)	=$30,000,000
Previously reported full value	=$28,800,000
Indicated economic adjustment	=$1,200,000 or 4.2%

Apply =4.0% adjustment to previous full value = $29,952,000

APPLYING ECONOMIC CHANGE

Economic Adjustment Examples

REVIEWING STARTUP AND PREVIOUS YEARS DATA

Class 1

2024 Value Data	Parcels	Assessed Value	Mean Assessed	Mean DOR	Start Up Base	Agg Ratio
Land	585	385,413,900	29,057	38,372	508,964,600	75.73%
Improved	12,679	2,162,748,500	170,577	163,174	2,068,888,400	104.54%
Total	13,264	2,548,162,400	199,634	201,546	2,577,853,000	98.85%

Economic Total Class Adjustments History	
2024	10.00%
2023	11.00%
2022	10.00%
3 year compounded	34.31%

REVIEW SALES INFORMATION FROM SALES RATIO ANALYSIS

2024 Taxation District Sales

	# Sales	% Parcels	Assessed Value	% AV Sold	Sales Value	Aggregate Ratio	Mean Ratio	Median Ratio	Mean Assessed	Mean Price	Median Price
Vacant	9	1.54%	378,300		431,600	87.65%	92.60%	95.40%	42,033	47,956	42,500
Improved	329	2.59%	78,399,300		81,841,501	95.79%	95.31%	96.03%	238,296	248,758	201,000
Total	338	2.55%	78,777,600	3.09%	82,273,101	95.75%	95.24%	96.02%	233,070	243,412	200,050

Additional information from Sales Ratio Analysis (purified)

- COD: 7.10
- COC: 87.87
- PRD: 0.99

ESTIMATED PROJECTED ECONOMIC CHANGE

- Applied +3% economic change for this municipality
- New class ratio 95.97%

Projections for Tax District

	Sales Ratio		Projected Value	% Change
One Year	95.75%	Aggregate	2,661,266,200	3.24%
	95.24%	Mean	2,675,517,000	3.79%
	96.02%	Median	2,653,783,000	2.95%
Two Year	0.00%	Aggregate	0	0.00%
	0.00%	Mean	0	0.00%
	0.00%	Median	0	0.00%
Three Year	0.00%	Aggregate	0	0.00%
	0.00%	Mean	0	0.00%
	0.00%	Median	0	0.00%

WHEN TO USE A BLEND GROUP

- Insufficient sales in a municipality
- Poor statistics
- When significant purification is needed during ratio study

BLEND GROUP ANALYSIS

Town with low sales volume

2024 Value Data	Parcels	Assessed Value	Mean Assessed	Mean DOR	Start Up Base	Agg Ratio
Land	16	8,108,500	21,226	21,408	8,178,000	99.15%
Improved	366	78,544,700	214,603	217,086	79,453,500	98.86%
Total	382	86,653,200	235,829	238,494	87,631,500	98.88%

Economic Total Class Adjustments History	
2024	3.00%
2023	0.00%
2022	11.00%
3 year compounded	14.33%

BLEND GROUP ANALYSIS

2024 Taxation District Sales

	# Sales	% Parcels	Assessed Value	% AV Sold	Sales Value	Aggregate Ratio	Mean Ratio	Median Ratio	Mean Assessed	Mean Price	Median Price
Vacant	0	0.00%	0		0	0.00%	0.00%	0.00%	0	0	0
Improved	2	0.55%	93,000		139,000	66.91%	68.18%	68.18%	46,500	69,500	69,500
Total	2	0.52%	93,000	0.11%	139,000	66.91%	68.18%	68.18%	46,500	69,500	69,500

Projections for Tax District

	Sales Ratio		Projected Value	% Change
One Year	66.91%	Aggregate	129,507,100	47.79%
	68.18%	Mean	127,094,700	45.03%
	68.18%	Median	127,094,700	45.03%
Two Year	74.64%	Aggregate	116,094,900	32.48%
	71.24%	Mean	121,635,600	38.80%
	75.88%	Median	114,197,700	30.32%

BLEND GROUP ANALYSIS

	# Sales	Assessed Value or Full Value	Sales Value	Aggregate Ratio	Mean Ratio	Median Ratio	Mean Assessed or Full Value	Mean Price	Median Price
Vacant	11	536,225	670,400	79.99%	84.84%	77.67%	48,748	60,945	60,000
Improved	67	19,554,228	21,473,908	91.06%	90.77%	90.12%	291,854	320,506	272,500
Total	78	20,090,453	22,144,308	90.73%	89.93%	89.41%	257,570	283,901	247,500

Projections based on Blend Group Sales

	Sales Ratio		Projected Value	% Change
One Year	90.73%	Aggregate	96,584,900	10.22%
	89.93%	Mean	97,444,100	11.20%
	89.41%	Median	98,010,800	11.84%

- Blend group with 78 sales and good statistics
- Recommends 10-12% increase
- Local sales volume low and trending increase, applied 10% from the aggregate ratio of the blend group

BLEND GROUP ANALYSIS

2024 Taxation District Sales

	# Sales	% Parcels	Assessed Value	% AV Sold	Sales Value	Aggregate Ratio	Mean Ratio	Median Ratio	Mean Assessed	Mean Price	Median Price
Vacant	2	1.20%	22,000		47,000	46.81%	49.44%	49.44%	11,000	23,500	23,500
Improved	16	2.11%	1,611,200		2,061,890	78.14%	87.64%	80.44%	100,700	128,868	118,000
Total	18	1.95%	1,633,200	2.38%	2,108,890	77.44%	83.40%	72.17%	90,733	117,161	110,500

Small city with very poor stats

- COD: 40.21
- COC: 16.67
- PRD: 1.08

Blend group analysis needed for this municipality

ECONOMIC ANALYSIS-CASE STUDY

2024 Taxation District Sales

	# Sales	% Parcels	Assessed Value	% AV Sold	Sales Value	Aggregate Ratio	Mean Ratio	Median Ratio	Mean Assessed	Mean Price	Median Price
Vacant	12	3.64%	585,800		659,800	88.78%	89.95%	92.03%	48,817	54,983	54,950
Improved	14	2.02%	2,996,000		3,168,400	94.56%	94.33%	99.46%	214,000	226,314	252,500
Total	26	2.54%	3,581,800	2.26%	3,828,200	93.56%	92.31%	93.07%	137,762	147,238	79,000

Projections for Tax District

	Sales Ratio		Projected Value	% Change
One Year	93.56%	Aggregate	169,569,000	2.76%
	92.31%	Mean	171,865,200	4.16%
	93.07%	Median	170,461,800	3.31%

Blend group analysis needed for this municipality?

- 26 sales in municipality
- 3 year compounded total class economic adjustment= +46.1%
- No purification needed on Sales Ratio Analysis
- COD 9.2; COC 84.6; PRD 0.99

ECONOMIC ANALYSIS-CASE STUDY

2024 Taxation District Sales

	# Sales	% Parcels	Assessed Value	% AV Sold	Sales Value	Aggregate Ratio	Mean Ratio	Median Ratio	Mean Assessed	Mean Price	Median Price
Vacant	12	3.64%	585,800		659,800	88.78%	89.95%	92.03%	48,817	54,983	54,950
Improved	14	2.02%	2,996,000		3,168,400	94.56%	94.33%	99.46%	214,000	226,314	252,500
Total	26	2.54%	3,581,800	2.26%	3,828,200	93.56%	92.31%	93.07%	137,762	147,238	79,000

Projections for Tax District

	Sales Ratio		Projected Value	% Change
One Year	93.56%	Aggregate	169,569,000	2.76%
	92.31%	Mean	171,865,200	4.16%
	93.07%	Median	170,461,800	3.31%

- Good percentage of parcels sold
- Excellent sales study statistics
- Blend group suggesting 9% increase

Applied 3% to municipality based on local sales.

ECONOMIC ANALYSIS-CASE STUDY

2024 Taxation District Sales

	# Sales	% Parcels	Assessed Value	% AV Sold	Sales Value	Aggregate Ratio	Mean Ratio	Median Ratio	Mean Assessed	Mean Price	Median Price
Vacant	4	3.74%	52,500		105,700	49.67%	51.91%	45.79%	13,125	26,425	18,900
Improved	7	2.15%	1,285,800		1,921,400	66.92%	68.45%	62.00%	183,686	274,486	293,000
Total	11	2.54%	1,338,300	2.34%	2,027,100	66.02%	62.44%	52.37%	121,664	184,282	226,400

Projections for Tax District

	Sales Ratio		Projected Value	% Change
One Year	66.02%	Aggregate	86,598,900	1.05%
	62.44%	Mean	91,564,100	6.84%
	52.37%	Median	109,170,500	27.39%

Blend group analysis needed for this municipality?

- 11 sales in municipality
- 3 year compounded total class economic adjustment= +47.5%
- COD 34.6; COC 35; PRD 0.95

ECONOMIC ANALYSIS-CASE STUDY

Projections for Tax District

	Sales Ratio		Projected Value	% Change
One Year	66.02%	Aggregate	86,598,900	1.05%
	62.44%	Mean	91,564,100	6.84%
	52.37%	Median	109,170,500	27.39%

Projections based on Blend Group Sales

	Sales Ratio		Projected Value	% Change
One Year	91.69%	Aggregate	93,466,100	9.06%
	91.66%	Mean	93,496,700	9.10%
	93.91%	Median	91,256,600	6.48%

- Good percentage of parcels sold
- Poor sales ratio study statistics
- Large difference between aggregate ratio and median ratio
- Blend group with 51 sales
  - COD 14.7; COC 59; PRD 1

Applied blend group result +9%

ECONOMIC ANALYSIS-CASE STUDY

2024 Taxation District Sales

	# Sales	% Parcels	Assessed Value	% AV Sold	Sales Value	Aggregate Ratio	Mean Ratio	Median Ratio	Mean Assessed	Mean Price	Median Price
Vacant	0	0.00%	0		0	0.00%	0.00%	0.00%	0	0	0
Improved	5	1.20%	1,263,000		1,400,900	90.16%	96.93%	84.13%	252,600	280,180	360,000
Total	5	1.01%	1,263,000	1.44%	1,400,900	90.16%	96.93%	84.13%	252,600	280,180	360,000

Projections for Tax District

	Sales Ratio		Projected Value	% Change
One Year	90.16%	Aggregate	97,026,000	-5.56%
	96.93%	Mean	90,249,300	-12.16%
	84.13%	Median	103,980,300	1.20%

Blend group analysis needed for this municipality?

- 5 sales in municipality
- 3 year compounded total class economic adjustment= +65.5%
- COD 32.6; COC 20; PRD 1.08

ECONOMIC ANALYSIS-CASE STUDY

Projections for Tax District

	Sales Ratio		Projected Value	% Change
One Year	90.16%	Aggregate	97,026,000	-5.56%
	96.93%	Mean	90,249,300	-12.16%
	84.13%	Median	103,980,300	1.20%

Projections based on Blend Group Sales

	Sales Ratio		Projected Value	% Change
One Year	105.31%	Aggregate	97,562,000	-5.04%
	110.37%	Mean	93,089,200	-9.40%
	103.75%	Median	99,028,900	-3.61%

- Poor percentage of parcels sold
- Poor sales ratio study statistics
- Local sales suggesting decrease
- Blend group with fair stats

Applied blend group result -4%

BLEND GROUP ANALYSIS

Projections for tax district divergent from blend group

2024 Value Data	Parcels	Assessed Value	Mean Assessed	Mean DOR	Start Up Base	Agg Ratio
Land	9	2,496,800	8,885	18,225	5,121,300	48.75%
Improved	272	29,359,700	107,940	193,806	52,715,100	55.70%
Total	281	31,856,500	116,825	212,031	57,836,400	55.08%

Economic Total Class Adjustments History	
2024	7.00%
2023	22.00%
2022	19.00%
3 year compounded	55.34%

BLEND GROUP ANALYSIS

Projections for tax district divergent from blend group

- 2.14% sold in tax district- with average statistics (COD 14)
- 30 Sales in blend group- with average statistics

Projections for Tax District

	Sales Ratio		Projected Value	% Change
One Year	60.02%	Aggregate	53,076,500	-8.23%
	59.80%	Mean	53,271,700	-7.89%
	58.04%	Median	54,887,100	-5.10%

Projections based on Blend Group Sales

	Sales Ratio		Projected Value	% Change
One Year	88.92%	Aggregate	65,043,200	12.46%
	89.96%	Mean	64,291,200	11.16%
	90.40%	Median	63,978,300	10.62%

What should the class economic change be?

STRATIFICATION

STRATIFICATION

- Stratification (definition)
  - Arrangement or classification of something into different groups
  - Equalized values are already stratified by property class (i.e., residential, commercial, agricultural, etc)
  - Stratification divides our data into groups, resulting in treating specific properties or property types differently than the rest of the class

STRATIFICATION

- Why stratify?
  - Real estate market forces might determine that certain property types change value at different rates
  - If we have enough data to recognize these differences, stratification yields more accurate economic change projections
  - Large and unique properties may change value at a different rate due to specific characteristics
  - Stratification ensures that sub-group adjustments will be weighted proportionately

STRATIFICATION

- Sales stratification
  - On water/off water sales
  - High value sales
  - Condo/non-condo sales
  - Vacant vs Improved sales
- Unique properties
  - One particular parcel, or group of parcels, that account for a large percentage of base value
- Class 7 Cranberries
  - Cranberry values are removed from typical economic sales projections

STRATIFICATION-CASE STUDY

Waterfront sales vs Non-waterfront sales

2024 Taxation District Sales

	# Sales	% Parcels	Assessed Value	% AV Sold	Sales Value	Aggregate Ratio	Mean Ratio	Median Ratio	Mean Assessed	Mean Price	Median Price
Vacant	34	1.50%	594,200		1,148,900	51.72%	56.75%	56.07%	17,476	33,791	31,000
Improved	60	1.22%	11,383,500		18,798,500	60.56%	60.36%	59.25%	189,725	313,308	314,500
Total	158	2.20%	33,860,100	2.09%	61,021,253	55.49%	58.22%	57.76%	214,304	386,210	294,950

Projections for Tax District

	Sales Ratio		Projected Value	% Change
One Year	55.49%	Aggregate	2,915,367,800	9.14%
	58.22%	Mean	2,778,663,000	4.02%
	57.76%	Median	2,800,792,200	4.85%

STRATIFICATION-CASE STUDY

Waterfront sales vs Non-waterfront sales

Strata	Sales	Sales DNU	Total Asmt	Total Calc Full Value	Total Price	Median Sale Pric...	Aggr Ratio	Mean Ratio	Median Ratio
Water Vac	10	2	1139400		2179299	154950	52.28	58.51	59.62
Water Imp	54	1	20743000		38894554	549400	53.33	56.72	56.01
All Water	64	3	21882400		41073853	485000	53.28	57	56.45
Non-W Vac	34	3	594200		1148900	31000	51.72	56.75	56.07
Non-W Imp	60	0	11383500		18798500	314500	60.56	60.36	59.25
Non-Water	94	3	11977700		19947400	145500	60.05	59.06	58.67
All Residential	158	6	33860100		61021253	294950	55.49	58.22	57.76

- Waterfront sales Aggregate Ratio: 53.3
- Non-waterfront sales Aggregate Ratio: 60.1

STRATIFICATION-CASE STUDY

Waterfront sales vs Non-waterfront sales

- Need information from local assessor
  - Non-water % assessed: 22%
  - Water % assessed: 78%
- Projected totals
  - Non-water ratio: 60.1= 592,183,500
  - Water sales ratio: 53.3=2,367,420,800

STRATIFICATION-CASE STUDY

Waterfront sales vs Non-waterfront sales

- New projected total: 2,959,604,300
- Strata results in a +10.8% adjustment
- +11% adjustment applied to municipality
- 44 million difference from initial projection of 9%

STRATIFICATION-CASE STUDY

Commercial Sales Stratification

Strata Description	Total %	Total Ratio	Projected Land	Projected Impr	Projected Total
APARTMENT	24	106	60576300	211317600	271893900
OFFICE	37	109	90818200	316814800	407633000
RETAIL	24	105	61153200	213330100	274483300
WAREHOUSE	15	98	40950800	142855000	183805800

	Land	Imps	Total
Strata results (% chg)	6.55	-15	-10.99

STRATIFICATION

Unique Properties Stratification

STRATIFICATION-CASE STUDY

Unique Properties – Oil Terminal

- Local oil terminal accounts for 60% of the commercial class (7,612,100)
- Commercial blend group analysis suggesting 9% increase
- Need to separate terminal from traditional commercial parcels

2024 Value Data	Parcels	Assessed Value	Mean Assessed	Mean DOR	Start Up Base	Agg Ratio
Land	8	792,600	30,485	27,735	721,100	109.92%
Improved	18	12,517,000	695,389	631,256	11,362,600	110.16%
Total	26	13,309,600	725,874	658,990	12,083,700	110.15%

STRATIFICATION-CASE STUDY

Unique Properties – Oil Terminal

- Isolate terminal value and apply blend group analysis to the rest
- Stratification results in -1.21% overall adjustment
  - Decrease in terminal value
  - Increase in traditional Class 2 properties
- New base value for the class 11,937,500
- If applied 9% without stratifying tank facility base value would be 13,171,200

STRATIFICATION-CASE STUDY

Unique Properties – Properties-Large Office Complex

- Local office complex accounts for 65% of city's entire commercial base (1,385,296,400)
- Commercial sales analysis suggests 10% increase for traditional commercial properties
- We stratify this office complex and work with assessor to value separately

2024 Value Data	Parcels	Assessed Value	Mean Assessed	Mean DOR	Start Up Base	Agg Ratio
Land	97	244,823,600	541,645	454,117	205,260,700	119.27%
Improved	355	1,932,385,000	5,443,338	5,412,287	1,921,361,900	100.57%
Total	452	2,177,208,600	5,984,983	5,866,404	2,126,622,600	102.38%

STRATIFICATION-CASE STUDY

Unique Properties – Properties-Large Office Complex

- Isolate office complex value and apply blend group analysis to the rest.
- Stratification results in +3.41% overall adjustment
  - Approximately 1% increase for office complex
  - 10% increase for traditional Class 2 properties
- New base value for the class 2,199,140,400
- If applied 10% without stratifying office complex, base value would be 2,339,284,900

STRATIFICATION-CASE STUDY

Cranberry Stratification

- Cranberry farms
  - Specialty land
  - Cranberry beds are usually located on low wetlands that are not generally adaptable to other agricultural uses

STRATIFICATION-CASE STUDY

Cranberry Stratification

- Cranberry farms
  - Cranberry improvements are included in Class 7 Other – beds, ditches, dikes, and bulkheads
  - Traditional Class 7 Other sales used for economic adjustment
  - Need to separate cranberry improvements from traditional Class 7 Other improvements
  - Cranberry values supplied by assessor on previous years final MAR

STRATIFICATION-CASE STUDY

Cranberry Stratification

2023 Value Data	Parcels	Assessed Value	Mean Assessed	Mean DOR	Start Up Base	Agg Ratio
Improved	132	15,799,200	119,691	123,381	16,286,300	97.01%

- Cranberry value accounts for 5,639,500 of the base value total
- Class 7 Improvement sales study suggests an economic adjustment of +3%
- Cranberry values separated from the base value and +3% added to the rest of the Class 7 Improvements
- Stratification results in a 1.96% change

STRATIFICATION

- DOR staff can identify when stratification is needed and will request information from assessors
- Assessors can request stratification from DOR
  - DOR supplies a spreadsheet and instructions on our website.
  - revenue.wi.gov/Pages/Assessors/home.aspx
  - revenue.wi.gov/Documents/2009stratfrm.pdf
  - Stratification requests from assessors due to the Equalization Bureau District Office by May 1.
- Can only stratify with sufficient sales data

THANKS!

Mission

Strengthen Wisconsin through fair tax and lottery administration, while educating and serving the public, our customers and communities.

Vision

To be the premier agency in providing innovative, accessible resources, and exceptional customer service built on a foundation of trust, inclusivity and creativity.

Values

- Integrity
- Knowledge
- Innovation
- Empathy
- Inclusivity
- Security