Minnesota Sales Ratio System
Monitor, Appraise and Equalize

MAAO 2011 Fall Conference

John Keefe	651-213-8555
Eric Willette	651-556-6100

Moderator:

Stephen Baker	651-266-2005

Ratio Study Basics

Measure the relationship between appraised and market values. (sales prices)

Discover three primary aspects of appraisal accuracy

1. Level of assessment - how close assessment is to market value on an overall basis

2. Uniformity of assessment - how close individual appraisals are to market value.

3. Reliability of the analysis

The table below displays the **Statewide 2010 final adjusted median ratios**
Stratified by property type.
The table also displays the coefficient of dispersion (COD), which measures the uniformity of
the assessments in the sample. It is the average difference from the median for each ratio.
The COD is shown as a percent of the median.

PROPERTY TYPE	FINAL ADJUSTED MEDIAN RATIO	COEFFICIENT OF DISPERSION
Residential/Seasonal	97.8	11.3
Apartment	98.8	14.1
Commercial/Industrial	96.5	20.5
Resorts	90.9	16.8
Farm	95.2	18.7
Seasonal/Recreational	99.6	17.1

General Uses of Ratio Studies

Assessors:

- Monitor appraisal performance

- Establish reappraisal priorities

- Identify appraisal procedure problems

- Adjust values between reappraisals

General Uses of Ratio Studies
Continued

Oversight Agencies:

• Provide technical assistance

• Equalize - MN DOR and Tax Court

   • *Direct equalization, State Board of Equalization

   • *Indirect equalization, School aids, levy apportionment

Uses of the Department of Revenue's Sales Ratio Study

There are five primary uses of the sales ratio study. They are:

1. The Minnesota State Board of Equalization uses the 12-month study to judge overall levels of assessment.

2. The Minnesota Tax Court uses the 12-month study in property valuation cases. The Tax Court also uses a nine-month study in property valuation cases. The nine-month study uses January through September sales, and is preferred by the Tax Court if there is an adequate sample of at least six sales.

3. The Department's State Assessed Property Unit uses the 12-month study to equalize railroad and utility values. The median ratio is used.

4. The 21-month study is used to produce adjusted net tax capacities for school aid and state aid calculations. The median ratio is used for all aid calculations. This was the original use of the sales ratio study. The adjusted net tax capacity is also used for levy apportionment.

5. Bonding companies use the adjusted estimated market values of cities and towns to measure fiscal capacities for bond rating calculations.

Steps in Ratio Studies

- Define purpose of study
- Collect and prepare market data
- Match appraisal and market data
- Stratify sample
- Perform statistical analysis
- Evaluate and apply results

Sample Size

Our inability to select a random sample makes it very difficult for us to universally determine the number of sales necessary for a reliable ratio analysis.

However, due the the practical constraints of available sales data Minnesota has adopted a minimum sample size of six sales

The new IAAO Standard for minimum sample size is five sales for COD, and 25-30 sales for PRD calculations.

Sample Size cont.

The two major factors which influence sample size requirements are:

1. Uniformity - fewer sales are needed to study an area with good assessment uniformity.

2. Acceptable error - If a larger error on results is acceptable, a smaller sample size is acceptable.

Sample Size cont.

Generally 30 is the smallest sample that is considered to be consistently statistically valid, but this number can vary with the quality of the sale data and the quality of the assessment

		A	B	C
# of parcels		5000	5000	500
Standard Dev.		15%	25%	25%
Acceptable error	+/-	10%	5%	5%
Required sample		9	98	84

Sample Size cont.

Alternatives to increasing the sample size in jurisdictions with few sales:

1. Expanding the time frame of the study.

2. Supplementing the sale sample with independent appraisals.

3. Analyze against the expected results indicated by a well calibrated CAMA system.

4. Increasing the geographic area of the sample.

Sample Size Table by City Town

12 MONTH SALES RATIO STUDY COUNTS BY CITY-TOWN

RANGES OF TOTAL SALES	RESID NUMBER OF C/Ts	APT NUMBER OF C/Ts	SRR NUMBER OF C/Ts	RESORTS NUMBER OF C/Ts	FARMS NUMBER OF C/Ts	C-I NUMBER OF C/Ts
LESS THAN 6 SALES	1,123	147	484	32	1,096	438
06 TO 15 SALES	443	17	88	0	59	52
16 TO 30 SALES	198	2	19	0	0	8
31 TO 50 SALES	92	0	2	0	0	1
51 TO 100 SALES	81	2	0	0	0	4
101 TO 500 SALES	91	2	0	0	0	0
MORE THAN 500 SALES	34	0	0	0	0	0
CITIES OR TOWNS	2,062	170	593	32	1,155	503

Sample Size Table by County

12 MONTH SALES RATIO STUDY COUNTS BY COUNTY

RANGES OF TOTAL SALES	RESID NUMBER OF C/Ts	APT NUMBER OF C/Ts	SRR NUMBER OF C/Ts	RESORTS NUMBER OF C/Ts	FARMS NUMBER OF C/Ts	C-I NUMBER OF C/Ts
LESS THAN 6 SALES	0	43	20	18	4	26
06 TO 15 SALES	0	11	11	0	15	33
16 TO 30 SALES	3	4	7	0	34	17
31 TO 50 SALES	2	2	5	0	20	5
51 TO 100 SALES	12	0	7	0	8	4
101 TO 500 SALES	43	2	7	0	3	1
MORE THAN 500	27	0	0	0		0
COUNTIES	87	62	57	18	84	86

Sale Verification and Screening

Ideally all sales should be verified and screened.

Residential or Seasonal sales in areas with large samples can be screened using information on the certificate and additional follow-up on outliers.

For areas with small samples or for income properties a verification involving personal contact with buyer and seller is required.

Sale Verification and Screening

There are two primary factors that need to be considered in the screening and verification process:

1. Are the property characteristics and conditions similar when sold and assessed?

2. Is the sale an "arm's length" transaction?

Sale Verification and Screening

In other words, does it meet the definition of market value?

 "The most probable price, as of a specified date, in cash, or in terms equivalent to cash, for which the specified property rights should sell after a reasonable exposure in a competitive market under all conditions requisite to fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, assuming neither is under undue duress." (IAAO)

Screening sales

Computer tools are available. They include:

  1. Listing extreme ratio sales.
  2. Listing sales with large or small selling prices.
  3. Listing sales with large changes in market
      value between study years.
  4. Listing sales that are more than 2 standard
      deviations or 2 CODs from the median.

Computer edits should <u>not</u> be used to eliminate
outlier sales until the sample has been properly screened.

Trimming

- Useful for removing outlier noise from data
- Inappropriate use may skew results
- Data must be thoroughly screened and adjusted prior to trimming
- The Department of Revenue does not trim sales from the study
- The Department does trim sales for time trend calculations because sales data is not yet finalized

Sales ratio calculation

FOR EQUALIZATION:
Sales Ratio = <u>Assessor's Market Value</u>
Adjusted Sale Price

FOR TIME ADJUSTMENT:
Inverted Ratio = <u>Adjusted Sale Price</u>
Assessor's Market Value

Adjustments made to sales

There are three types of adjustments:

Personal Property removes non realty items from the sale price

Financial Terms adjusts for non market rate financing.

Time of Sale adjusts the sale price to the level at the assessment date.

Which Items Are Personal Property and Which Are Real Property?

Personal

Adjustment Allowed

Above ground pool
Hot tubs
Boats and docks
Crops
Display cases
Drapes
Free standing appliances
Fireplace equipment
Farm machinery
Furniture
Fuel tanks
Garden equipment
Swing set
Commercial signs
Shelves

Real

Adjustment Not Allowed

Awnings
Attached grill or barbecue
Attic fans - air cleaners
Built-in appliances
Built-in vacuum cleaners
Central air conditioner
Garbage disposal
Gates and fences
Garage door openers
Installed carpeting (indoor-outdoor)
Light fixtures
Music/intercom system
Solar panel
Smoke or security detectors

Financial Terms

Sales that involve seller provided financing (contracts for deed) or assumed mortgages need to be adjusted to market rates.

Cash equivalency adjustments are made to recalculate the payment schedule using market rates.

There are computer programs available to calculate these adjustments.

Unreported Seller Concessions or Contributions to Buyer

- Seller contributions to buyers may be increasing and may not be consistently reported on the CRV

- Parcels to watch – sale price above list price – especially if there was an extended marketing time prior to the sale

- They may be called seller paid points, closing costs, decorating allowances, pre-paid taxes etc.

- Check MLS if available

- Adjust the sale if these payments can be identified

Time Adjustments

Time Adjustment

- Time adjustment is calculated and applied as a monthly factor using linear regression

- All days of a month get the full month's adjustment

- A Time adjustment may be calculated regionally, county-wide or for a municipality or local jurisdiction

- Adjustment is typically only applied when the time adjustment calculation meets the confidence interval test of 90% reliability
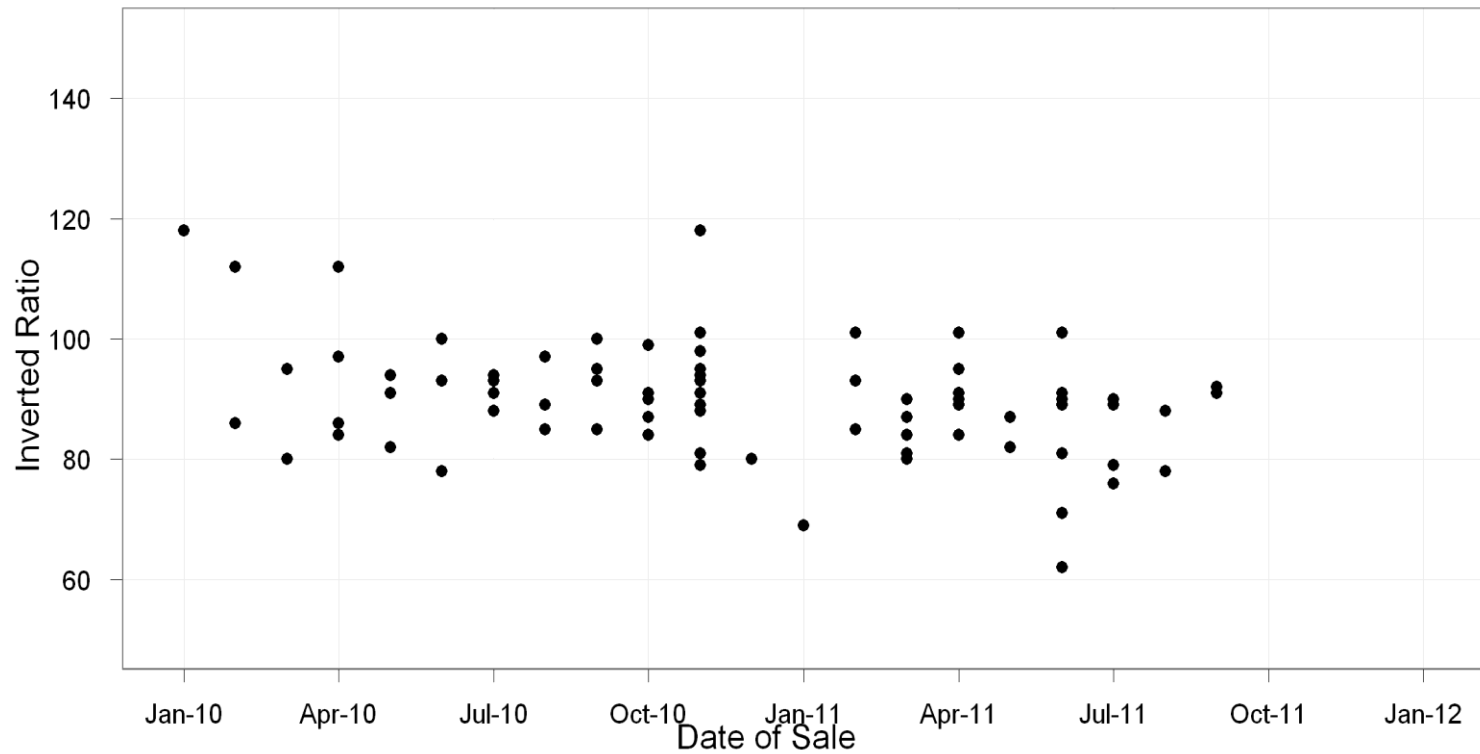
Why Time Adjustments?

- MS2010 Sec 278.05, subd 4

  - Sales must be adjusted for time for use as evidence in Tax Court

- More Accurate Ratios

  - IAAO standards identify TAs as necessary for ratio studies
  - Study guideline statutes say the department must follow IAAO guidelines whenever practical

DOR Time Trend

- Utilizes regression analysis of time (x) versus inverted sale ratios (y)

- Time = Month of Sale & Year

- Inverted Ratio = $\dfrac{\text{Sale Price}}{\text{2010 EMV}}$

- Resulting slope must be divided by y intercept to normalize time trend (at y=1.0)

Time Adjustment Calculation

$$\text{Inverted Sales Ratio} = \frac{\text{Sales Price}}{\text{2010 EMV}}$$

Define Adjustment Regions
• Before October 2010

Counties Submit Sales
• October 2011

- Intercept: ???

- Slope: ???

- Significance: ???

When we plot the inverted ratio by the date of sale a visual trend may emerge.
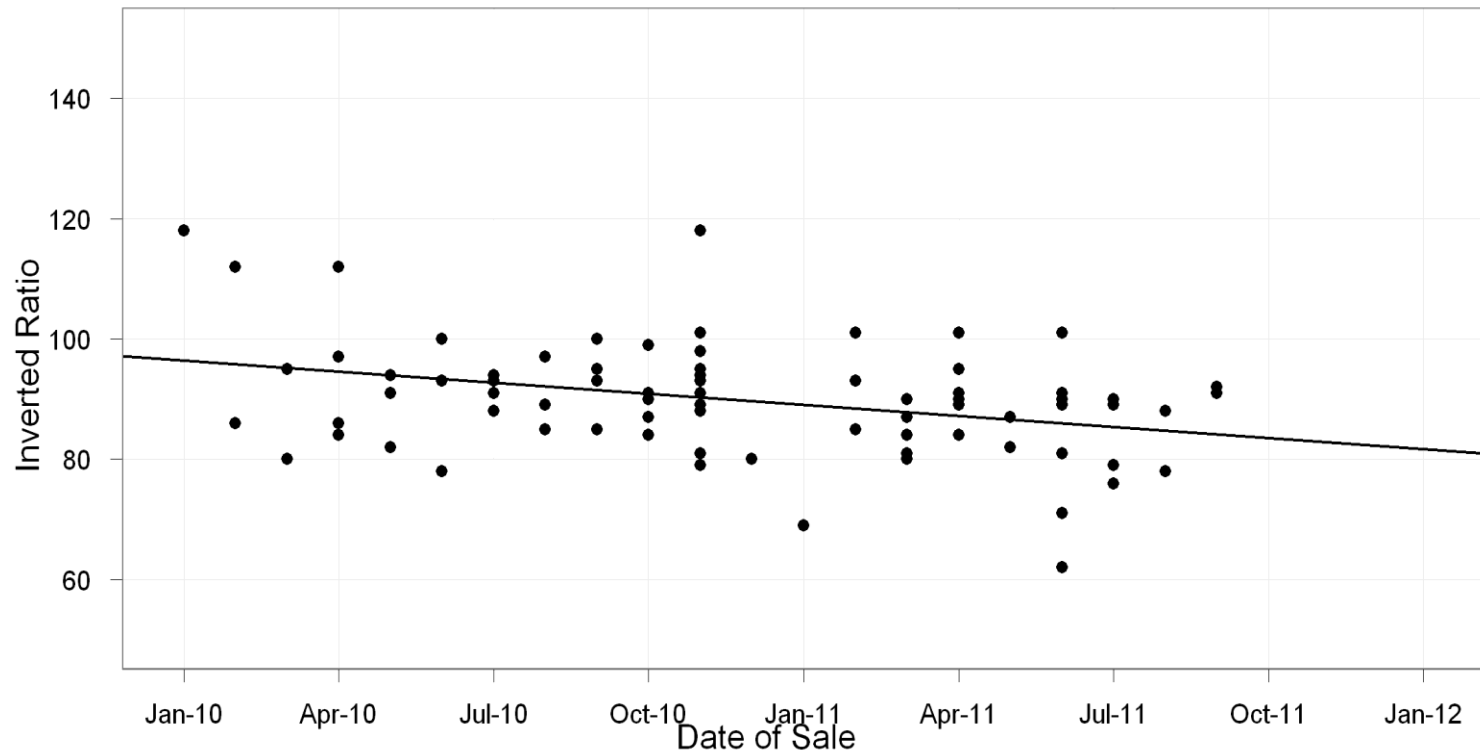
Define Adjustment Regions
• Before October 2010

Time Adjustment Calculation

- Intercept: 96.46
- Slope: -0.62
- Significance: 99.8%

By fitting a line to the data we calculate the parameters necessary to both determine if a statistically significant time trend exists and calculate the most probable time adjustment.

Define Adjustment Regions
- Before October 2010

Counties Submit Sales
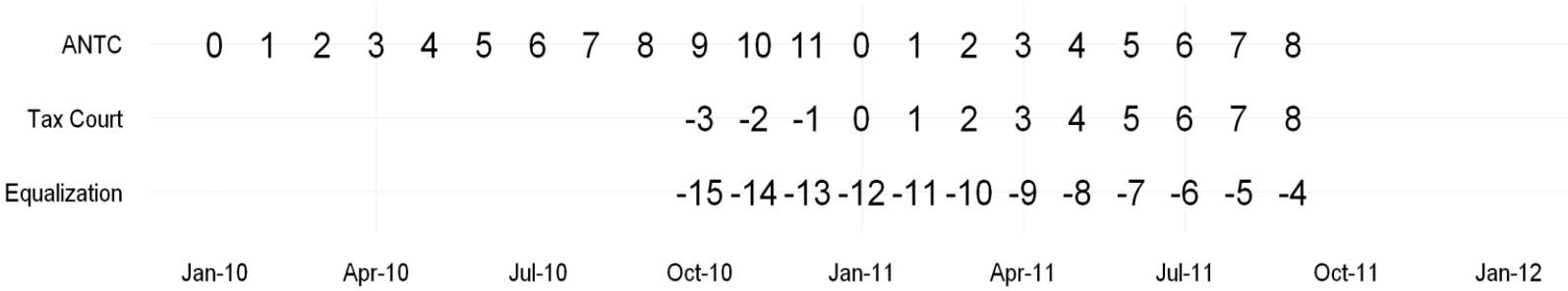- October 2011

Time Adjustment Calculation
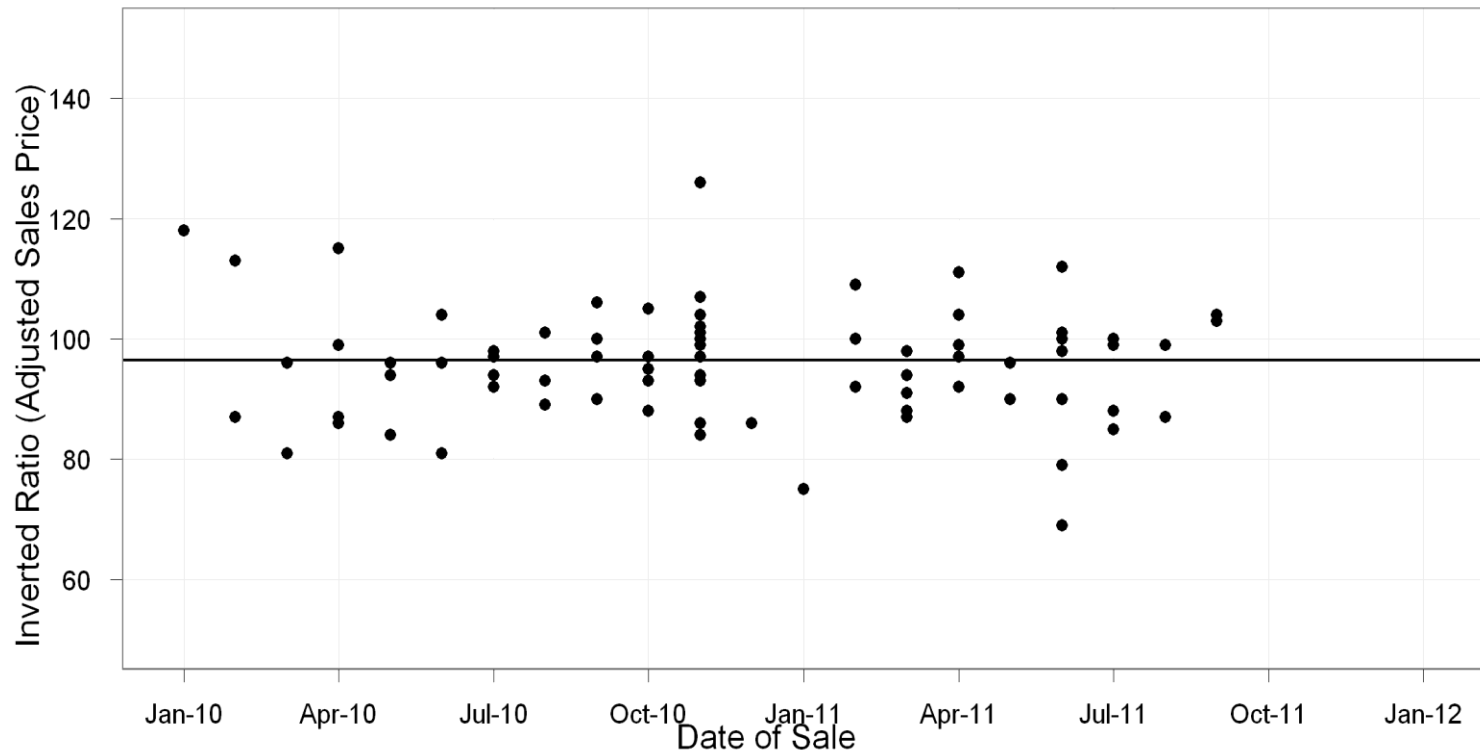
- Intercept: 96.46
- Slope: -0.62
- Significance: 99.8%

Define Adjustment Regions
• Before October 2010

If the result is deemed statistically significant (confidence level > 90%) a time adjustment is applied to the corresponding sales. Otherwise sales prices are not adjusted for time.

Counties Submit Sales
• October 2011

Time Adjustment Application
Equalization Study

ANTC	0	1	2	3	4	5	6	7	8	9	10	11	0	1	2	3	4	5	6	7	8
Tax Court										-3	-2	-1	0	1	2	3	4	5	6	7	8
Equalization										-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4

Jan-10 Apr-10 Jul-10 Oct-10 Jan-11 Apr-11 Jul-11 Oct-11 Jan-12

$$\text{Adjusted Sales Price} = \text{Sales Price} \times (1 - (-0.006 \times \text{Study Month}))$$

Sold June 2011 $ 65,000	→	Adjusted to 2012 $62,270

Define Adjustment Regions
• Before October 2010

Counties Receive Adjusted Sales Prices
• December 2011

Counties Submit Sales
• October 2011

Adjusting Sale Price For Time

Equalization Example – Prices Deflating

$65,000 = Sale Price

June 2011 = Date of Sale (-7 Mo.)

-7.2% = Annual Rate of Deflation

(= -0.6% per month)

January 2012 = Appraisal Date

$65,000 X (1-(-0.006 X -7) = $62,270

Impact of Adjusting Sale Price For Terms And Time

Example – Without Adjustments

Assessor's Market Value   = $ 70,000
Unadjusted Sale Price   = $ 65,000

$$\text{Sales Ratio} = \frac{70{,}000}{65{,}000} = 1.08 \text{ or } 108\%$$

Example---With Adjustments For Terms And Time

Unadjusted Sale Price   = $ 65,000
Adjusted For Terms(none)   = $ 65,000
Adjusted For Terms and Time   = $ 62,270

$$\text{Sales Ratio} = \frac{70{,}000}{62{,}270} = 1.12 \text{ or } 112\%$$

Time trend calculator (T-Calc)

- Excel application available through regional representatives

- Allows estimation of time trend by entering sales data

- Regional trend estimates (ag, c/i, apartment) require regional data!

Appealing a Time Adjustment

- If a time adjustment does not seem correct, talk to your DoR representative.

- Identify region and property type

- Provide evidence that time adjustment may not match your market.

- Potential issues may include non-representative sales sample or poorly defined region boundaries

- *Time will be short when discussing time!*

New State Board of Equalization Methodology

Why Was The Sales Ratio Methodology Changed?

- Inconsistencies between State Board ratios and Tax Court ratios have caused problems for some jurisdictions

- Recent market volatility has highlighted this problem

- Recommended in IAAO Standard

- MAAO Sales Ratio Committee initiated methodology change

New Methodology – What will change?

- State Board ratio will be based on current assessment, not previous assessment

- Will require assessments to approximate current market (no lag)

- One-time transition may require 'extra' change

New Methodology – What will change?

- Old: time adjusts all sales to January 2011.
- New: time adjusts all sales to January 2012.

- Old: uses 'local effort' to adjust the median sales ratios forward to reflect the next year's (2012) assessor's values.
- New: uses the specific 2012 assessor's MV for each sale.

- New: The 2012 MV used for each sale is reduced by the amount of 2011 new construction after the sale – as reported on the prelim 2012 MV by Parcel file.

What doesn't change?

- Both methods use the same sales from Oct 2010-Sept 2011.

- No changes to work flow processes for the study
    - Same study Good/Reject criteria, same data gathering, same Value Pickup.

- The process for calculating time adjustments, including the sales and MV's used, remains unchanged.
    - As with the old method, time adjustments will be available in December/January (sooner if sales data is received early).

New Construction

- The key issue: Does the new construction occur between the sale date and an assessment date that is relevant to the sales ratio analysis?

Impact of New Construction
Old vs New 12-Month State Board Methodology

- *Old Methodology*
  - The sales were compared to the Jan 2011 Assessor's MV; New construction in 2011 after the sale date had no impact.

- *New Methodology*
- The sales are compared to the Jan 2012 Assessor's MV.

  - New construction to the sale property that occurs in 2011 after the sale date is meaningful because we are comparing the sale price forward to the Jan 2012 Assessor's MV.

  - So: the 2012 Assessor's MV for each good sale needs to be reduced by the amount of 2011 NC after the sale date – as reported on the prelim 2012 MV by Parcel file.

  - Note that NC which occurs in 2011 <u>before</u> the sale date is of no concern to us at this point because those sales already will have been rejected by the Regional Rep.

- Also note that the old and new methodologies both use the same sales from Oct 2010-Sept 2011. If a sale was good for the study under the old methodology, it is good for the study under the new.

Summary of New Construction
For New 12-Month State Board Methodology

- Oct-Dec 2010 Sales
  - If there is NC anytime during 2010, the sale is a reject for the 12-Month Study. (2010 NC before the sale = not valid with 2010 MV; NC after the sale = not valid with 2011 MV.)

- 2011 Sales
  - 2011 NC before sale, the sale is a reject.

- Oct-Dec 2010 and 2011 Sales
  - 2011 NC after sale, the sale is good **with the subtraction of the 2011 new construction from 2012 MV.**

Pros

- New Time Adjustment methodology:
  - More consistent with IAAO Standards
  - Better reflects current market
  - Better estimates Tax Court ratio
  - Allows more flexibility in changing markets

Pros

Results Comparing 2008 Study with 2009 Tax Court Ratios

	All Property Types			
	All Jurisdictions		**Jurisdictions with Time Trends**	
	Count of Jurisdictions	*Percent of Total*	*Count of Jurisdictions*	*Percent of Total*
Ratio closer to Tax Court under old method	246	30.6%	106	23.2%
Ratio closer to Tax Court under new method	558	69.4%	351	76.8%
Total	804		457	

Cons

- New methodology:
  - Difficult transition for rapidly changing markets
  - Additional data requirements

Challenges for Both Methodologies

- Time adjustment calculations difficult in much of state

- Neither method solves the problem of adjusting for a turn in market:
  - assume time trend is the same for both the sales study period and the post-analysis period
  - Market turns should be discussed with regional rep

What change means for assessors

- Targeting current year instead of prior year with values
- Must keep pace with changing markets
- More incentive to keep ratios closer to 100%
- Eliminates use of Local Effort
- Credits sub-market re-assessment

Implementation Issues

- Transition year in changing markets
  - One-time need to do extra change
  - Can do this over two years
  - 100% is assessor's friend
- Data gathering challenges
  - Get those sales files in!
  - Accurate, timely preliminary MV by Parcel file
  - Parcel number mismatches, data problems with MV by Parcel file
  - Little time to edit/correct data files in spring
- Sales chasing tests
- Ag borders

Sales Ratio Statistics

Sales ratio statistics

- Levels of assessment
  - Mean
  - Median
  - Aggregate (Weighted Mean)

  Uniformity of assessment
  - COD (coefficient of dispersion)
  - COV (coefficient of variation)
  - PRD (price related differential)

Importance of Representativeness

It is good practice to calculate measures of reliability whenever the results of a ratio study will be used for equalization.

Measures of reliability will indicate whether one can have a desired degree of confidence that a given level of appraisal has *not* been achieved.

Tests For Representativeness

Computer-intensive statistical methods, such as the bootstrap (feedback) now enable the development of confidence interval estimates for any statistic of interest. *(Efron and Tibshirani 1993),*

Confidence intervals can be calculated about various measures of level and uniformity or about a resulting property value estimate *(Sherrill and Whorton 1991);*

Standard errors can properly be calculated about the mean and weighted mean, or about an estimate of value for the population. COV? *(See IAAO [1990, chapter 20] and Gloudemans [1999, chapter 6]) for information on performing these calculations.)*

Tests for Representativeness

Other useful measures of variability or the distribution of ratio study data include:

. range

. percentiles

. quartiles

. interquartile range

. median absolute deviation

. median percent deviation

. coefficient of concentration *r-squared*

. weighted coefficient of dispersion

. weighted coefficient of variation

Tests for Representativeness

Note that the typical percentage misassessment is not the COD, but is the median percentage deviation.

Also it is the interquartile range, not the COD, that brackets 50 percent of the assessment errors.

Finally, various measures of concentration state what percentage of the sample falls within a specified distance of a measure of central tendency.

Outlier Sales

For 2011 MN DOR will use the IAAO Standard as a means of identifying the outlier sales. We have developed a table of ranges based upon the 2011 sales ratio study to identify the outlier sales. In the 2011 study, the following boundaries will be used statewide to look for outlier sales:

Property Type	Limits of Normal Ratio Range
Residential	65% to 135%
Apartments	65% to 135%
Seasonal Residential	65% to 135%
Farms	65% to 135%
Commercial-Industrial	65% to 135%

The limits are approximately 2 to 3 standard deviations from the mean ratio and 2 to 3 coefficients of dispersion from the median ratio. Statewide only 5% to 10% of the sales are outside the ranges and are flagged on preliminary sales listings.

DOR is also developing on an "outlier index" to help identify and communicate where this may be an issue, but this has not been finalized yet.

Mean, Median and Aggregate Sales Ratios Measure Level of Assessment

Assessor's Market Value	Sale Price	Sales Ratio
$26,000	$20,000	130.0
57,000	60,000	95.0
45,900	51,000	90.0
176,800	208,000	80.0
60,000	80,000	75.0

Median Ratio = Middle Ratio (equal number of ratios higher and lower) = 90.0

Mean Ratio = $\dfrac{\text{Sum Of Individual Sales Ratios}}{\text{Number of Items}}$ = $\dfrac{470.0}{5}$ = 94.0

Aggregate Ratio = $\dfrac{\text{Sum of Assessor's Market Values}}{\text{Sum of Sale Prices}}$ = $\dfrac{365,700}{419,000}$ = 87.3

Levels of Assessment

Minnesota has adopted the <u>Median</u> ratio for use in the State Board of Equalization and the Minnesota Tax Court studies.

Generally the range for an acceptable ratio in Minnesota is between 90% and 105%, with some discretion.

**The IAAO standard established the range
 of 90% to 110% as the acceptable range.**

Jurisdictions with median ratios outside the range are subject to State Board orders or Minnesota Tax Court discrimination adjustments.

Uniformity of Assessment

. **Coefficient of Dispersion (COD)**

  Horizontal Equity
  Non-Parametric

. **Coefficient of Variation (COV)**

  Parametric

. **Price Related Differential (PRD)**

  Vertical Equity

Price Related Bias (PRB)

COD
(coefficient of dispersion)

The coefficient of dispersion measures the uniformity of the assessments in the sample.

It is the average difference from the median for each ratio.
The COD is shown as a percent of the median.

Average absolute deviation = $\dfrac{100*(\Sigma\ |\text{each ratio-median ratio}|)}{\text{number of sales}}$

COD = $\dfrac{100*\text{ Average absolute deviation}}{\text{median ratio}}$

Coefficient of Dispersion
Measures Uniformity of Assessments

Sales Ratio	Deviation From Median
130.0	40.0
95.0	5.0
90.0	0.0
80.0	10.0
75.0	15.0

Ave. Deviation From Median $= \dfrac{\text{Total Deviation From Median}}{\text{Number of Items}} = \dfrac{70.0}{5} = 14.0$

Coefficient of Dispersion $= \dfrac{\text{Ave. Deviation From Median}}{\text{Median}} \times 100 = \dfrac{14.0}{90.0} \times 100 = 15.6$

Coefficient of Dispersion
Example 1

Sales Ratio	Deviation From Median
97.0	7.0
92.0	2.0
90.0	0.0
87.0	3.0
85.0	5.0
	17.0 Total

Average Deviation From Median $= \dfrac{17.0}{5} = 3.4$

Coefficient of Dispersion $= \dfrac{3.4}{90.0} \times 100 = 3.8$

Coefficient of Dispersion
Example 2

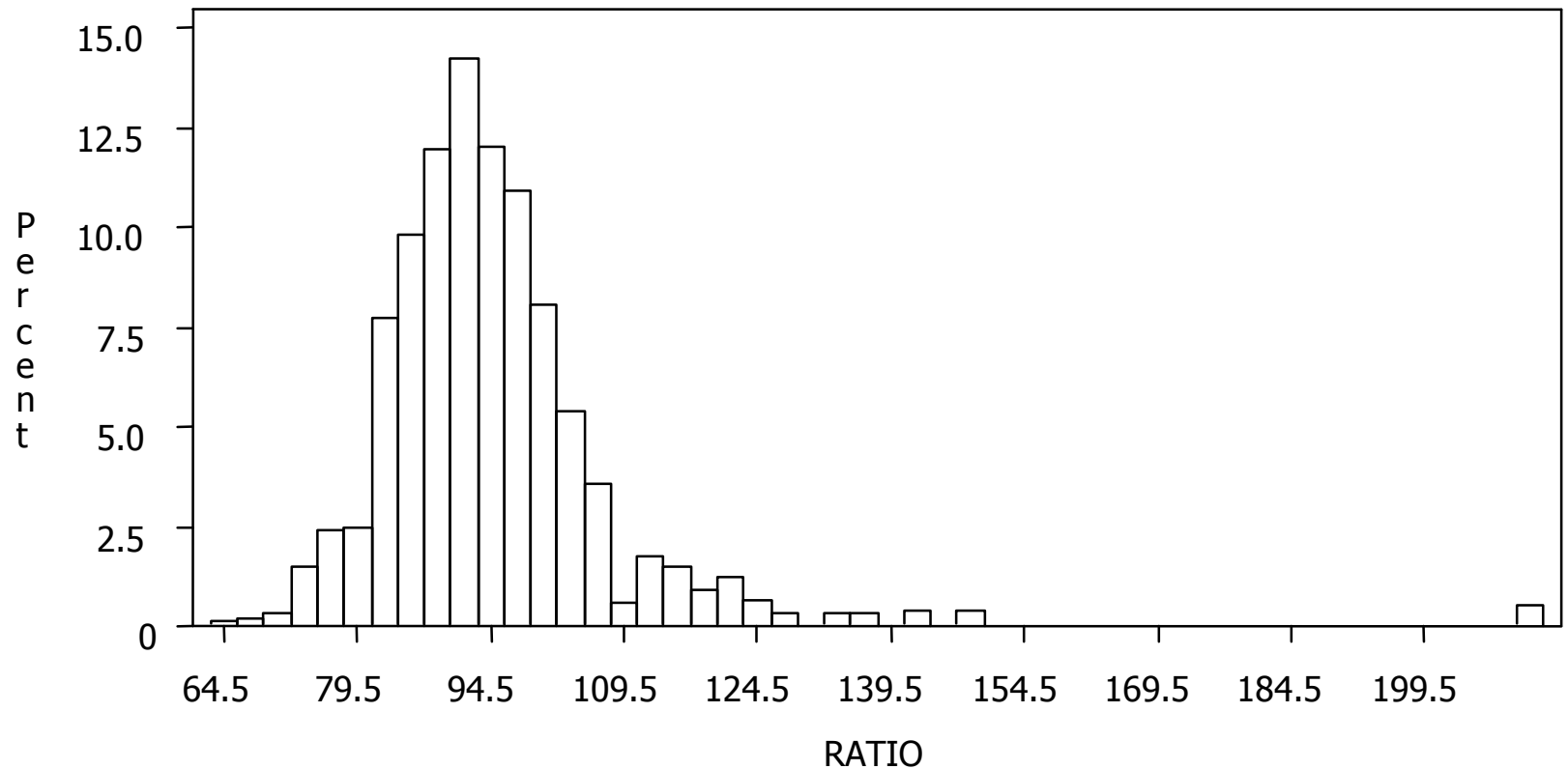|	
Sales Ratio	**Deviation From Median**
150.0	**60.0**
135.0	**45.0**
90.0	**0.0**
80.0	**10.0**
65.0	**25.0**
	140.0 Total

Average Deviation From Median $= \dfrac{140.0}{5} = 28.0$

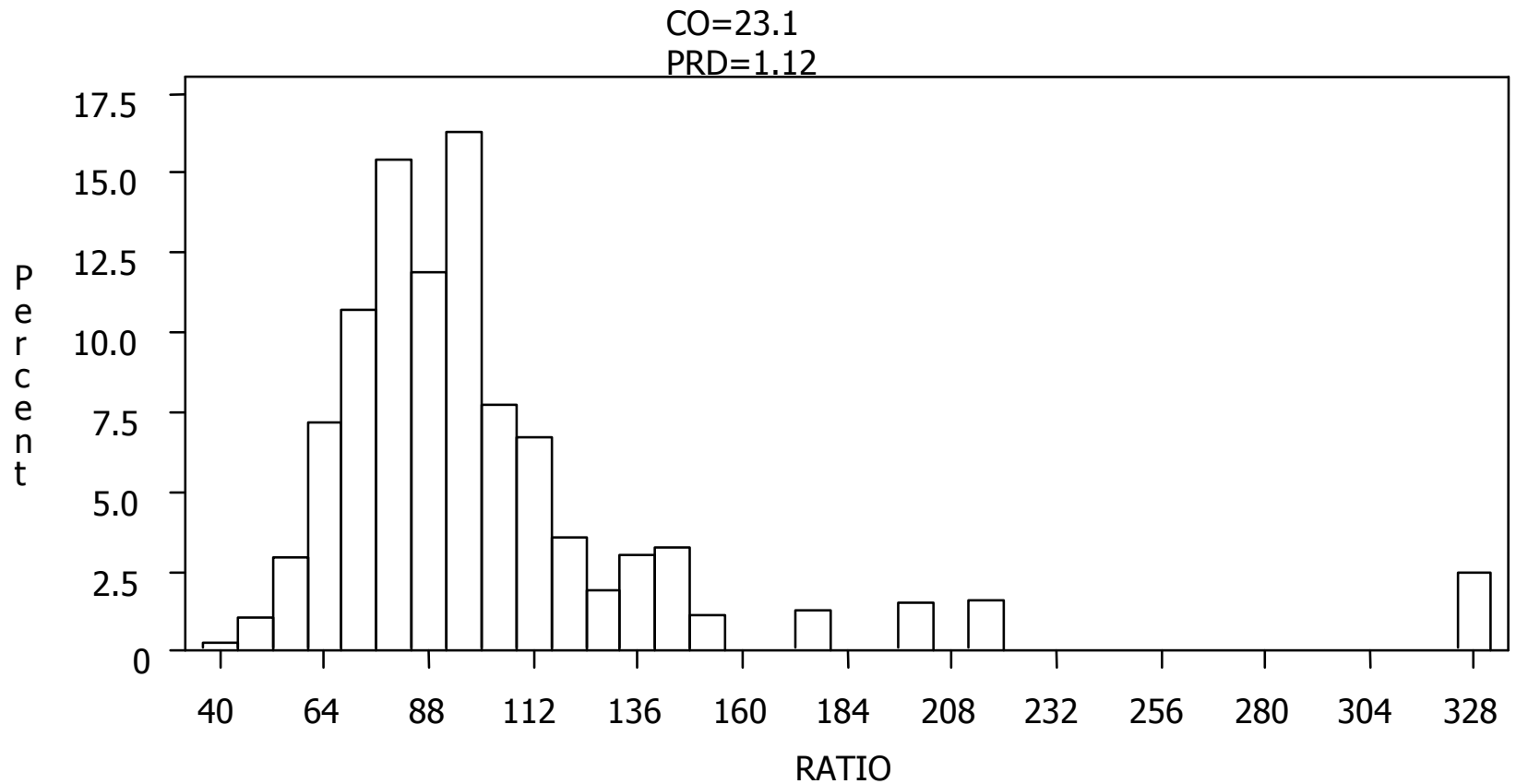**Coefficient of Dispersion** $= \dfrac{28.0}{90.0} \times 100 = 31.1$

COD example 1

FREQUENCY DISTRIBUTION OF RESIDENTIAL RATIOS

COD=8.3   PRD=1.01

COD example 2

FREQUENCY DISTRIBUTION OF RESIDENTIAL RATIOS

CO=23.1
PRD=1.12

REVISED IAAO STANDARD

Ratio Study Performance Standards indicating adequate general quality*

Type of property - General	Type of Property - Specific	COD Range**
Single-family residential (including residential condominiums)	Newer or more homogenous areas	5.0 to 10.0
Single-family residential	Older or more heterogeneous areas	5.0 to 15.0
Other residential	Rural, seasonal, recreational, manufactured housing, 2-4 family housing	5.0 to 20.0
Income-producing properties	Larger areas represented by large samples	5.0 to 15.0
Income-producing properties	Smaller areas represented by small samples	5.0 to 20.0
Vacant land		5.0 to 20.0
Other real and personal property		Varies with local conditions

These types of property are provided for guidance only and may not represent jurisdictional requirements.

* Appraisal level for each type of property shown should be between 0.90 and 1.10, unless stricter local standards are required
PRD's for each type of property should be between 0.98 and 1.03 to demonstrate vertical equity.
PRD standards are not absolute and may be less meaningful when samples are small or when wide variation in prices exist. In such cases, statistical tests of vertical equity hypotheses should be substituted (see table 1-2).

** CODs lower than 5.0 could indicate selective reappraisal of selling parcels or non-representative samples.

Table 2-3
IAAO Uniformity Standards

Ratio study uniformity standards indicating acceptable general quality*

General Property Class	Jurisdiction Size /Profile /Market Activity	COD Max
Residential improved (single family dwellings, condominiums, manuf. housing, 2-4 family units)	Very large jurisdictions / densely populated / newer properties / active markets	10.0
	Large to mid-sized jurisdictions / older & newer properties / less active markets	15.0
	Rural or small jurisdictions / older properties / depressed market areas	20.0
Income-producing properties (commercial, industrial, apartments,)	Very large jurisdictions / densely populated / newer properties / active markets	15.0
	Large to mid-sized jurisdictions / older & newer properties / less active markets	20.0
	Rural or small jurisdictions / older properties / depressed market areas	25.0
Residential vacant land	Very large jurisdictions / rapid developping / active markets	15.0
	Large to mid-sized jurisdictions / slower development / less active markets	20.0
	Rural or small jurisdictions/ little development / depressed markets	25.0
Other (non-agricultural) vacant land	Very large jurisdictions / rapid development / active markets	20.0
	Large to mid-sized jurisdictions / slower development / less active markets	25.0
	Rural or small jurisdictions/ little development / depressed markets	30.0

These types of property are provided for general guidance only and may not represent jurisdictional requirements.

* The COD performance recommendations are based upon representative and adequate sample sizes, with outliers trimmed and a 95% level of confidence.

* Appraisal level recommendation for each type of property shown should be between 0.90 and 1.10.

* PRD's for each type of property should be between 0.98 and 1.03 to demonstrate vertical equity.
  PRD standards are not absolute and may be less meaningful when samples are small or when wide variation in prices exist. In such cases, statistical tests of vertical equity hypotheses should be substituted.

* CODs lower than 5.0 may indicate sales chasing or non-representative samples.

Coefficient of Variation
Measures Uniformity of Assessments

Sales Ratio	Mean Ratio	Deviation From Mean	Deviation Squared
130.0	94.0	36.0	1296
95.0	94.0	1.0	1
90.0	94.0	4.0	16
80.0	94.0	14.0	196
75.0	94.0	19.0	361

Variance   = $\dfrac{\text{Sum of Squared Deviations}}{\text{Number of Items -1}}$ = $\dfrac{1870.0}{4}$ =   467.5

Standard Deviation   =Square Root of Variance   =Sq.Root of 467.5 =   21.6

Coefficient of Variation = $\dfrac{\text{Standard Deviation}}{\text{Mean}}$ X 100   = $\dfrac{21.6}{94.0}$ X 100   =   23.0

Level of Appraisal Standards (IAAO *section 11.1 in Part 2*)

"The calculated measures of central tendency are point estimates and provide only an indication, not proof, of whether the level meets the appropriate goal. Confidence intervals and statistical tests should be used…."

Confidence Interval
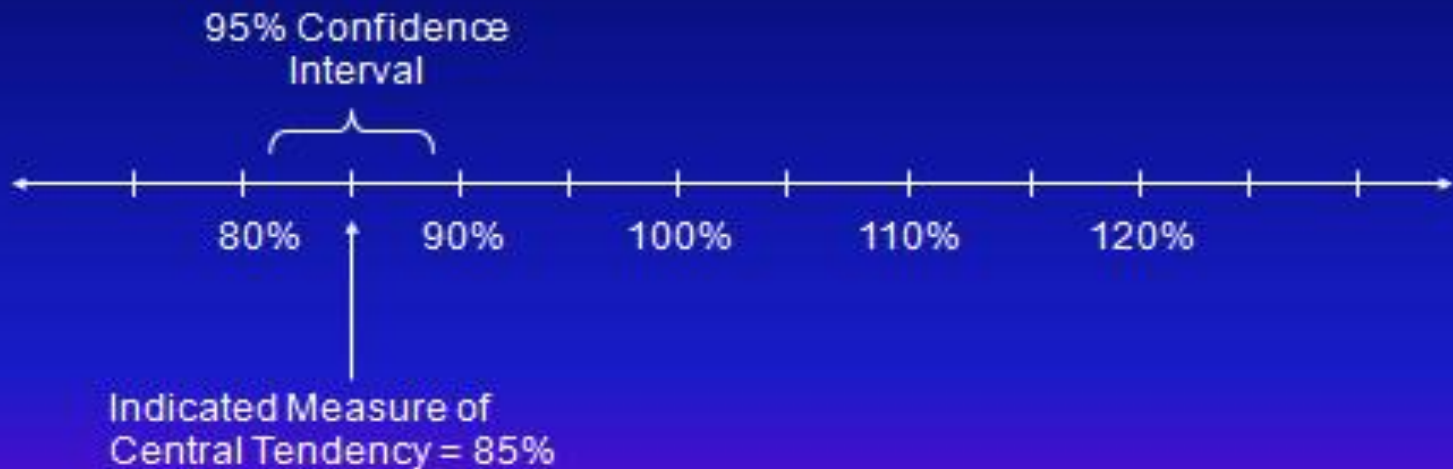
Final Approved IAAO Standard

Table 2-4

Ratio Study Standards and Decision Making--Using Median 90%-110% Standard
Example demonstrating application of standard at a 95% level of confidence

Case	Point Estimate	Confidence Interval (CI) Width			CI Overlaps Preferred Standard Range	Point Estimate in Preferred Standard Range	Equalization Action or Reappraisal Order
1	92%	86%	to	101%	yes	yes	no
2	88%	81%	to	95%	yes	no	no
3	84%	79%	to	88%	no	no	yes

Confidence Interval Example 2

95% Confidence Interval

80%   90%   100%   110%   120%

Indicated Measure of
Central Tendency = 85%

24

Confidence Interval Example 3

95% Confidence Interval

80% 90% 100% 110% 120%

Indicated Measure of
Central Tendency = 85%
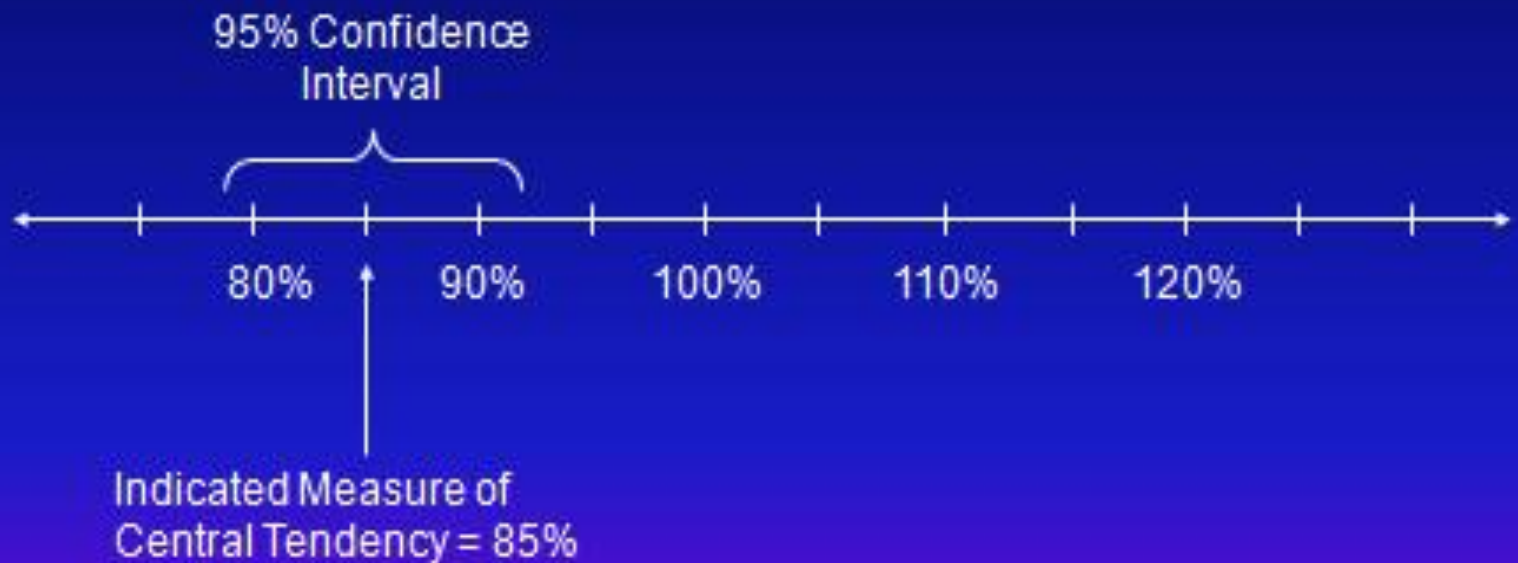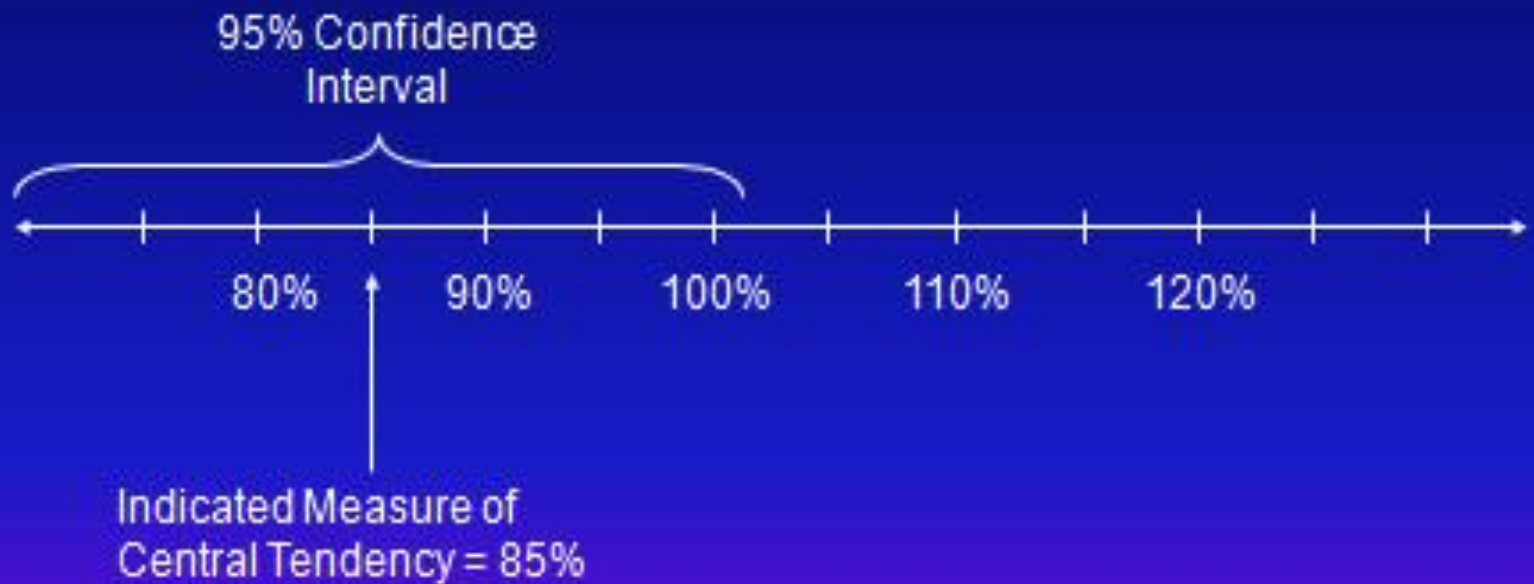
High Variability and Small Samples

- **Can cause wide confidence intervals**
- **Jurisdictions may never subject to equalization, or reappraisal**
- **Recommendations:**
  - **Expand sample sizes**
  - **Decrease confidence levels (ie: 95% confidence, etc.) by 5% per year if point estimate outside desired range**
    - **May lower confidence level to 70%**
  - **Decisions based on point estimates after 5 consecutive years**

Price Related Differential
(Index of Regressivity)
Measures Vertical Inequity

Assessor's Market Value	Sale Price	Sales Ratio
$26,000	$20,000	130.0
57,000	60,000	95.0
45,900	51,000	90.0
176,800	208,000	80.0
60,000	80,000	75.0

Median Ratio = Middle Ratio (equal number of ratios higher and lower) = **90.0**

Mean Ratio = $\dfrac{\text{Sum Of Individual Sales Ratios}}{\text{Number of Items}}$ = $\dfrac{470.0}{5}$ = **94.0**

Aggregate Ratio = $\dfrac{\text{Sum of Assessor's Market Values}}{\text{Sum of Sale Prices}}$ = $\dfrac{365,700}{419,000}$ = **87.3**

Price Related Differential = $\dfrac{\text{Mean}}{\text{Aggregate Ratio}}$ = $\dfrac{94.0}{87.3}$ = **1.08**

High PRD favors Higher Price Properties

Price Related Differential Example 2

Assessor's Market Value	Sale Price	Sales Ratio
$270,400	$208,000	130.0
76,000	80,000	95.0
45,900	51,000	90.0
16,000	20,000	80.0
45,000	60,000	75.0

Median Ratio = Middle Ratio (equal number of ratios higher and lower) = **90.0**

$$\text{Mean Ratio} = \frac{\text{Sum Of Individual Sales Ratios}}{\text{Number of Items}} = \frac{470.0}{5} = 94.0$$

$$\text{Aggregate Ratio} = \frac{\text{Sum of Assessor's Market Values}}{\text{Sum of Sale Prices}} = \frac{453,300}{419,000} = 108.2$$

$$\text{Price Related Differential} = \frac{\text{Mean}}{\text{Aggregate Ratio}} = \frac{94.0}{108.2} = 0.87$$

Low PRD favors Lower Price Properties

IAAO New Indirect Equalization Guidance very high value properties

- **Current threshold includes too many properties and considered unrealistic**
- **Re-defined as properties with >10% of value in a category (*instead of 5% in 1999 Standard*)**
- **Should be placed in separate stratum**
- **Recent sale or independent appraisal can be used**

New Value Outlier IAAO Section (5.2.1)

- **For indirect equalization – requiring estimation of value of jurisdiction**
- **Outliers may not have extremely low or high ratios, but may distort weighted mean**
- **Test by following procedure:**
  - Remove suspect sale from sample;
  - Compute weighted mean and confidence interval;
  - If weighted mean, with sale left in, is outside confidence interval, may be outlier to be trimmed or placed in separate stratum

Presentation of Sales Ratio Data
Different Purposes – Different Reports

Ratio reports :

    State Board 12 mo

    Tax Court 9 mo and 12 mo

    Five Year History

    Small Sample Study

    21 month school aid

Adjusted Net Tax   Capacities

    School District

    City/Town, County

Indicated Market Value

    City/Town,

    County,

    School District

Mapping / GIS

    Ratio

    COD

    Outliers

    Sample Size

    Local Effort

"OLD" Ratio Methodology

	2010			2011													2012													2013
Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan

2012 State Board of Equalization Study, Compared BACK to 2011 Assmnt

2012 Tax Court 9 month study - 2012 Assessment, for 2013 petitions

2012 Tax Court 12 Month Study - 2012 Assessment, for 2013 petitions

2012 School Aid Study - Sales compared to 2011 assessments

2012 School Aid Study - Sales compared to 2012 assessments

"New" Ratio Methodology

			2010		2011													2012												2013

| Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan |

2012 State Board of Equalization Study, Compared FORWARD to 2012 Assmnt

2012 Tax Court 9 month study - 2012 Assessment, for 2013 petitions

2012 Tax Court 12 Month Study - 2012 Assessment, for 2013 petitions

2012 School Aid Study - Sales compared to 2011 assessments

2012 School Aid Study - Sales compared to 2012 assessments

Evaluating Performance for Unsold Properties

- Two Study Technique
- Comparison of Average Value Changes
  - Aggregate
  - Frequency Distribution
  - Chi-squared Test
- Comparison of Average Unit Values
  - Mann -Whitney
- Ratio Studies Based on Predicted Values for Sold and Unsold Properties
  - Based on CAMA Generated Values

Compare the Actual Growth to the Required Growth as Indicated by the ratio to the previous Assessment

DOR 12 mo 2004 prelim Sales Ratio Study for Ramsey County 2005 Assessment

Adjusted for Time and Terms **APARTMENT**

Assessment Target 98.0%

Juris	Mean Ratio	Median Ratio	Aggreg Ratio	COD	PRD	# Sales	Indicated Local Effort Required	Actual Local Effort	Inferred Ratio
St Paul	97.5%	95.3%	100.3%	10.3	0.97	89	2.83%	2.800%	97.97%
County	**95.9%**	**95.1%**	**100.9%**	**10.6**	**0.95**	**109**	**2.93%**	2.800%	97.76%

Compare Aggregate Growth (Local Effort) Unsold (Or ALL) Properties to Aggregate Growth of Only the Sold Properties

CHANGE 2004 TO 2005 COMMERCIAL VALUES BY JURIS

(INCLUDES VACANT LAND) **(UNSOLD PROPERTIES)**   **Sold Properties**   Difference in

JURIS	COUNT	Min	Avg	Max	UNSOLD CHG	COUNT	Min	Avg	Max	2004SUM	2005SUM	SOLD CHG	Unsold - sold CHG
CITY	4534	-100	23.22%	1813.04	**8.52%**	81	-37.55%	13.10%	130.14%	56,887,500	64,139,500	**12.75%**	**2.78%**
SUBURBS	2966	-100	31.41%	2647.44%	**9.67%**	40	0.00%	11.87%	41.90%	58,559,100	63,825,300	**8.99%**	**-0.47%**
COUNTY	7500	-100	26.46%	2647.44%	**9.17%**	121	-37.55%	12.69%	130.14%	115,446,600	127,964,800	**10.84%**	**-1.17%**

Based on 2005 3-3 overrides and percent increases. Excludes new construction and exempt..

Friday, February 18, 2005   *Page 1 of 1*

Sold / Unsold Comparison
Evidence of Equal Treatment Required

- Compare Aggregate Growth of Sold and Unsold properties
  - One year analysis measures sales chasing in current year
  - Two year analysis may identify sales chasing that occurred within the previous assessment
  - Change in value should be similar in both instances or be explainable

- Inferred Growth
  - Measure change in value of a set of proxy parcels that are representative of the sale population
  - Change in value should be similar
  - Helpful to select properties that reflect the important attributes to value
    - Location
    - Age
    - Type
    - LUC

INCORPORATING TIME ADJUSTMENT INTO APPRAISAL MODELS

- TIME ADJUSTMENT SHOULD BE A CENTRAL FEATURE IN ANY APPRAISAL
- ELECTRONIC SPREADSHEETS FACILITATE THE PROCESS
- ROBUST SALES VERIFICATION IS A NECESSITY
- ROBUST DATA VERIFICATION IS A NECESSITY
- DATA MUST BE HOMOGENEOUS

INCORPORATING TIME ADJUSTMENT INTO APPRAISAL MODELS (CONT.)

- PROCESS STRONGLY SUPPORTS DEFENSE INITIATIVES
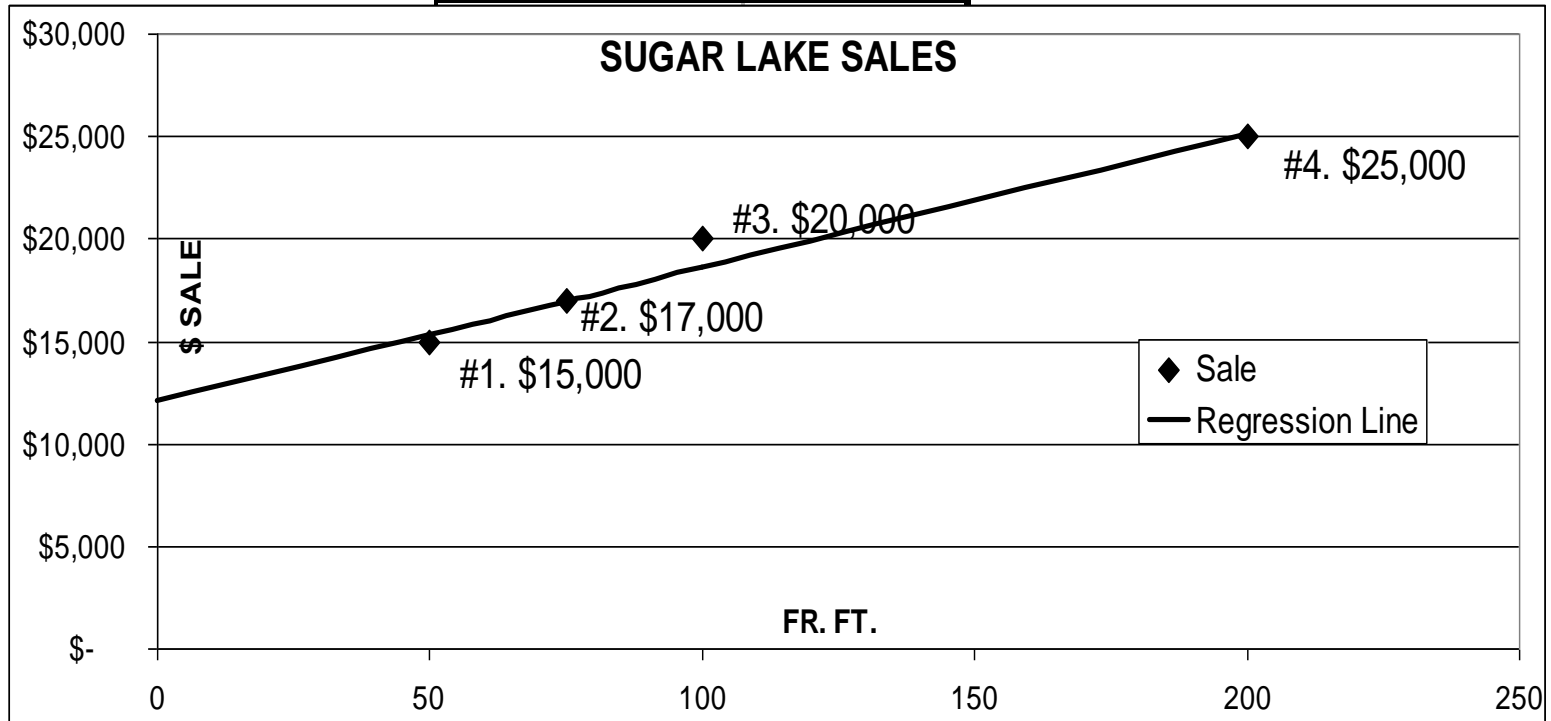- PROVIDES GRAPHIC SUPPORT OF APPRAISAL/ASSESSMENT

LINEAR REGRESSION

- IS BASICALLY THE SLOPE OF THE AVERAGE LINE THROUGH THE DATA SET AND ITS' Y INTERCEPT.

- THE CALCULATION IS ESSENTIALLY AN AVERAGE OF THE SQUARES OF THE X AND Y COORDINATE VALUES

- **Slope =** $\dfrac{\Sigma xy - [(\Sigma x \Sigma y)/ n]}{\Sigma x^2 - [(\Sigma x)^2/ n]}$

Y-Intercept = Avg.y – (Slope x Avg.x)

LINEAR REGRESSION EXAMPLE

Sale #	Front Feet	Sale Price
	X	Y
1	50	$ 15,000
2	75	$ 17,000
3	100	$ 20,000
4	200	$ 25,000

SUGAR LAKE SALES

#4. $25,000

#3. $20,000

#2. $17,000

#1. $15,000

◆ Sale
— Regression Line

$ SALE

FR. FT.

$30,000
$25,000
$20,000
$15,000
$10,000
$5,000
$-

0   50   100   150   200   250

REGRESSON CALCULATION

Sl. #	X	X*X	Y	Y*Y	X * Y
1	50	2500	$ 15,000	225,000,000	750,000
2	75	5625	$ 17,000	289,000,000	1,275,000
3	100	10000	$ 20,000	400,000,000	2,000,000
4	200	40000	$ 25,000	625,000,000	5,000,000
SUM:	425	$ 58,125	$ 77,000	1,539,000,000	9,025,000
Avg.:	106		$ 19,250		
n=	4.00				

$$\text{Slope} = \frac{\Sigma xy - [(\Sigma x \Sigma y)/n]}{\Sigma x^2 - [(\Sigma x)^2/n]} = \frac{9{,}025{,}000 - [(425 \times 77{,}000)/4]}{58{,}125 - (425^2/4)} = \frac{843{,}750}{12{,}969} = 65$$

$$\text{Y-Intercept} = \text{Avg.y} - (\text{Slope} \times \text{Avg.x}) = 19{,}250 - (65 \times 106) = 12{,}360$$

REGRESSION RESULT

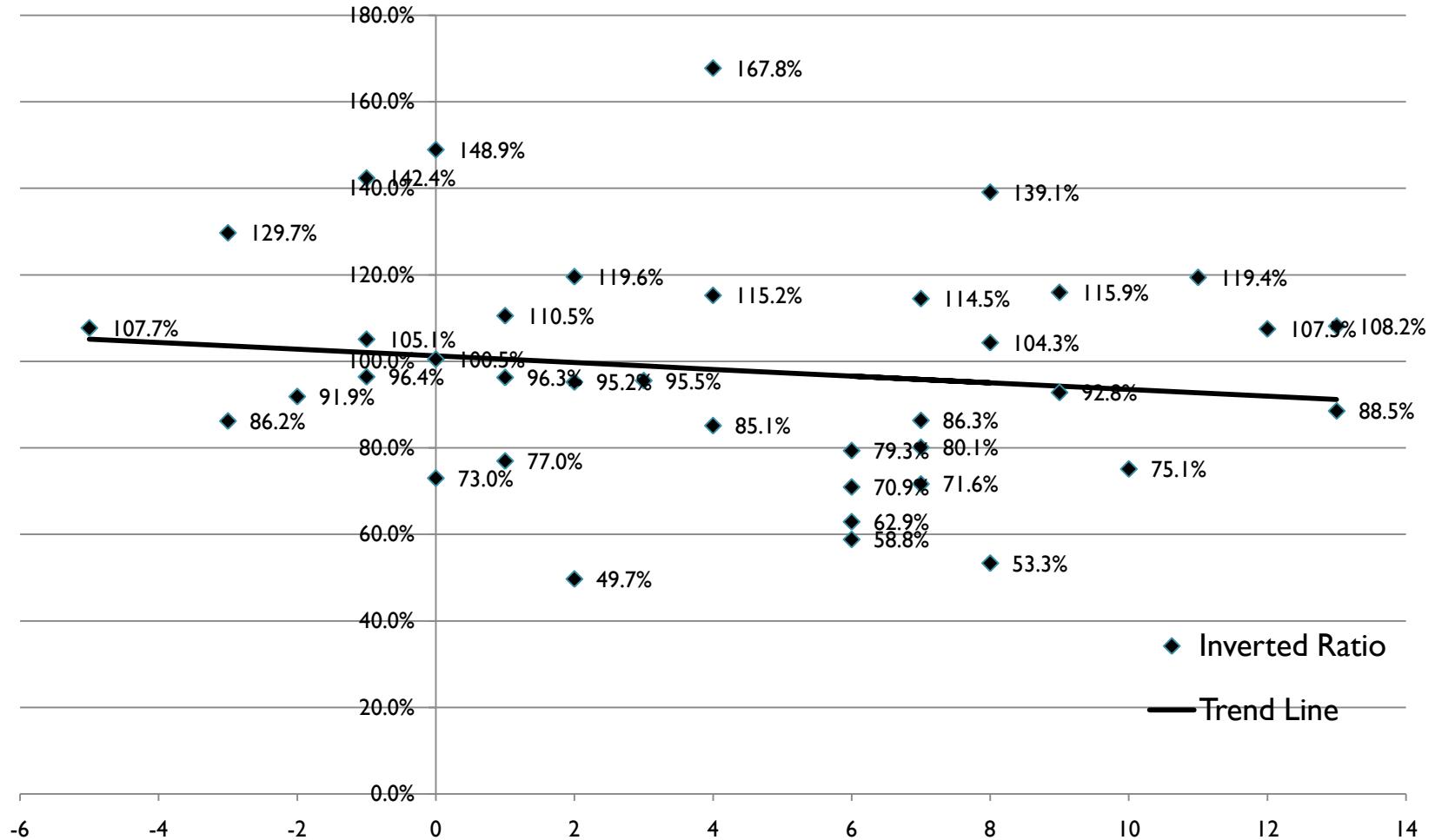- Close-up View of Graph Illustrates Concept of Slope & Y Intercept

$12,467

$12,402

Y INTERCEPT: $12,337

$65: SLOPE

Regression Line

1 UNIT

Y Axis

X Axis

0   1   2   3

Front Feet
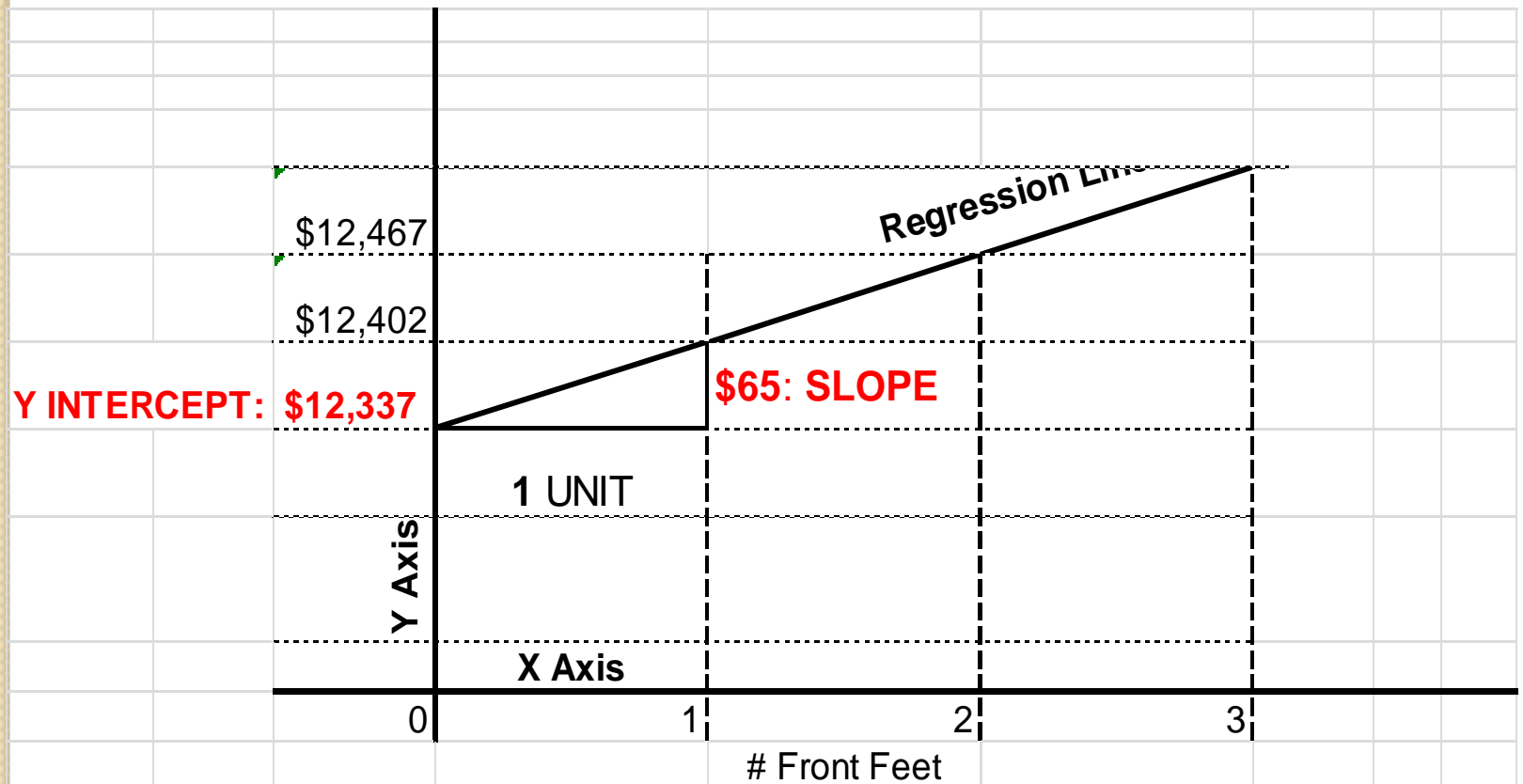
USE DOR TIME CALCULATOR TO GET THE ANNUAL TREND

NORTHERN CHISAGO RURAL LAND SALES			SALE	EMV	Month	Year	Study Month	Inverted Ratio
Intercept Year	2010		$ 60,000	$ 55,700	8	2009	-17	107.7%
Sale Count	38		$ 100,000	$ 77,100	10	2009	-15	129.7%
Slope	-0.008		$ 42,500	$ 49,300	10	2009	-15	86.2%
Intercept	1.013		$ 352,000	$ 383,200	11	2009	-14	91.9%
P-Value (Significance)	0.40325		$ 81,250	$ 77,300	12	2009	-13	105.1%
Annual Trend	**-9.2%**		$ 85,000	$ 59,700	12	2009	-13	142.4%
Applied Trend	**0.00%**		$ 35,000	$ 36,300	12	2009	-13	96.4%
			$ 84,000	$ 56,400	1	2010	-12	148.9%
			$ 200,000	$ 199,000	1	2010	-12	100.5%
			$ 110,000	$ 150,700	1	2010	-12	73.0%
			$ 52,084	$ 54,100	2	2010	-11	96.3%
			$ 150,000	$ 194,900	2	2010	-11	77.0%
			$ 32,500	$ 29,400	2	2010	-11	110.5%

GRAPHIC REPRESENTATION

NORTHERN CHISAGO COUNTY RURAL LAND SALES (TIME)
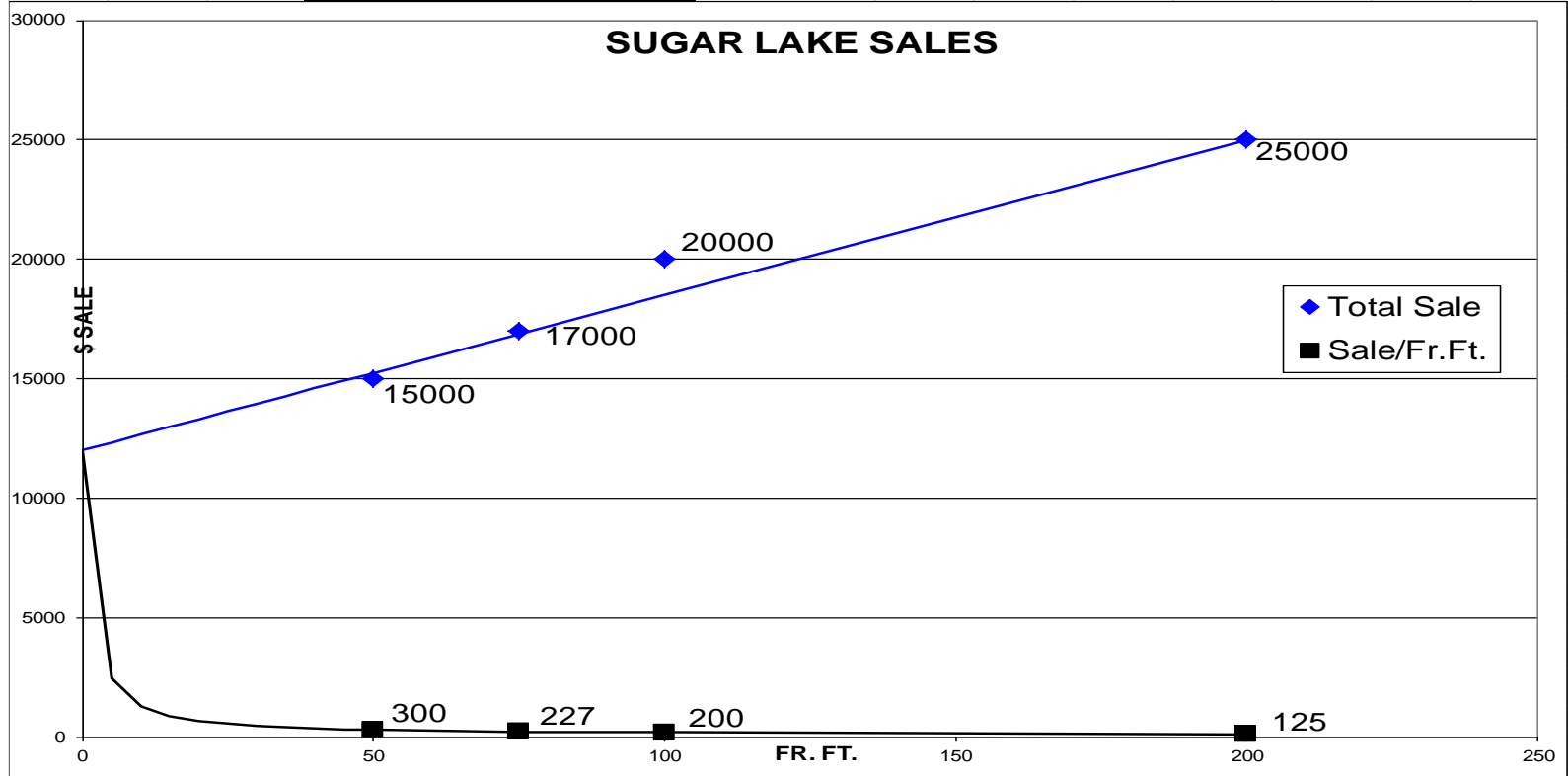
INSERT TIME ADJ. INTO MODEL

							Site Imp.=	$	10,000				
							SA=	$	20,000				
							Tillable=	$	1,800				
							Dry&Past.=	$	1,500				

NESSEL/RUSHSEBA AREA LAND SALES

| Low= | $ | 900 |
| Waste= | $ | 500 |

Deflation/Yr.: -9.2% Date: 01/02/11   Road= $ -

Time Adj. Sale Price	Actual Sale Price	Pay 2011 Assd. EMV	Sale Ratio	Sale Date	Imp. EMV	Indicated Land EMV	Total Acres	$/Ac. Sale	$/Ac. EMV Land	Land EMV	Total EMV Sale ratio
$ 29,977	$ 32,500	$ 29,400	N/A	2/24/10	$ -	$ 29,977	3	$ 8,589	$ 7,231	$ 25,235	N/A
$ 26,000	$ 27,000	$ 33,700	N/A	8/5/10	$ -	$ 26,000	5	$ 5,200	$ 5,500	$ 27,500	N/A
$ 38,116	$ 39,500	$ 34,500	90.51%	8/13/10	$ -	$ 38,116	10	$ 3,889	$ 3,012	$ 29,520	77.45%
$ 37,969	$ 42,500	$ 49,300	129.84%	10/29/09	$ -	$ 37,969	17	$ 2,207	$ 2,464	$ 42,380	111.62%
$ 70,009	$ 69,000	$ 63,800	91.13%	2/28/11	$ -	$ 70,009	20	$ 3,432	$ 2,661	$ 54,290	77.55%
$ 87,437	$ 90,000	$ 64,700	74.00%	9/9/10	$ -	$ 87,437	30	$ 2,905	$ 2,393	$ 72,020	82.37%
$ 41,926	$ 45,000	$ 47,100	112.34%	4/1/10	$ -	$ 41,926	30	$ 1,384	$ 1,302	$ 39,440	94.07%
$ 87,609	$ 93,000	$ 80,700	N/A	5/12/10	$ -	$ 87,609	31	$ 2,847	$ 2,206	$ 67,885	N/A
$ 316,333	$ 352,000	$383,200	121.14%	11/20/09	$ 293,600	$ 22,733	37	$ 614	$ 1,716	$ 63,480	116.04%
$ 137,826	$ 150,000	$194,900	141.41%	2/10/10	$ 75,800	$ 62,026	39	$ 1,599	$ 2,186	$ 84,800	123.78%
$ 90,113	$ 90,000	$ 82,800	91.88%	1/7/11	$ -	$ 90,113	40	$ 2,264	$ 1,697	$ 67,550	74.96%
$ 70,690	$ 75,000	$ 88,100	124.63%	5/14/10	$ -	$ 70,690	41	$ 1,741	$ 1,692	$ 68,700	97.19%
$ 97,450	$ 95,500	$149,400	153.31%	3/23/11	$ -	$ 97,450	70	$ 1,390	$ 1,593	$111,660	114.58%
$ 152,939	$ 165,000	$138,000	90.23%	3/12/10	$ -	$ 152,939	75	$ 2,036	$ 1,543	$115,875	75.77%
$ 150,076	$ 150,000	$152,100	101.35%	1/4/11	$ -	$ 150,076	95	$ 1,572	$ 1,491	$142,300	94.82%

| | | **Median: 106.8%** | | | LINEST: $ 1,346 | 36 | | **Median: 94.44%** |
| | | **COD: 19.0%** | | | INTERCEPT: $ 22,183 | | | **COD: 15.55%** |

GRAPH OF LAND MODEL

NESSEL/RUSHSEBA AREA RURAL LAND SALES & EMV
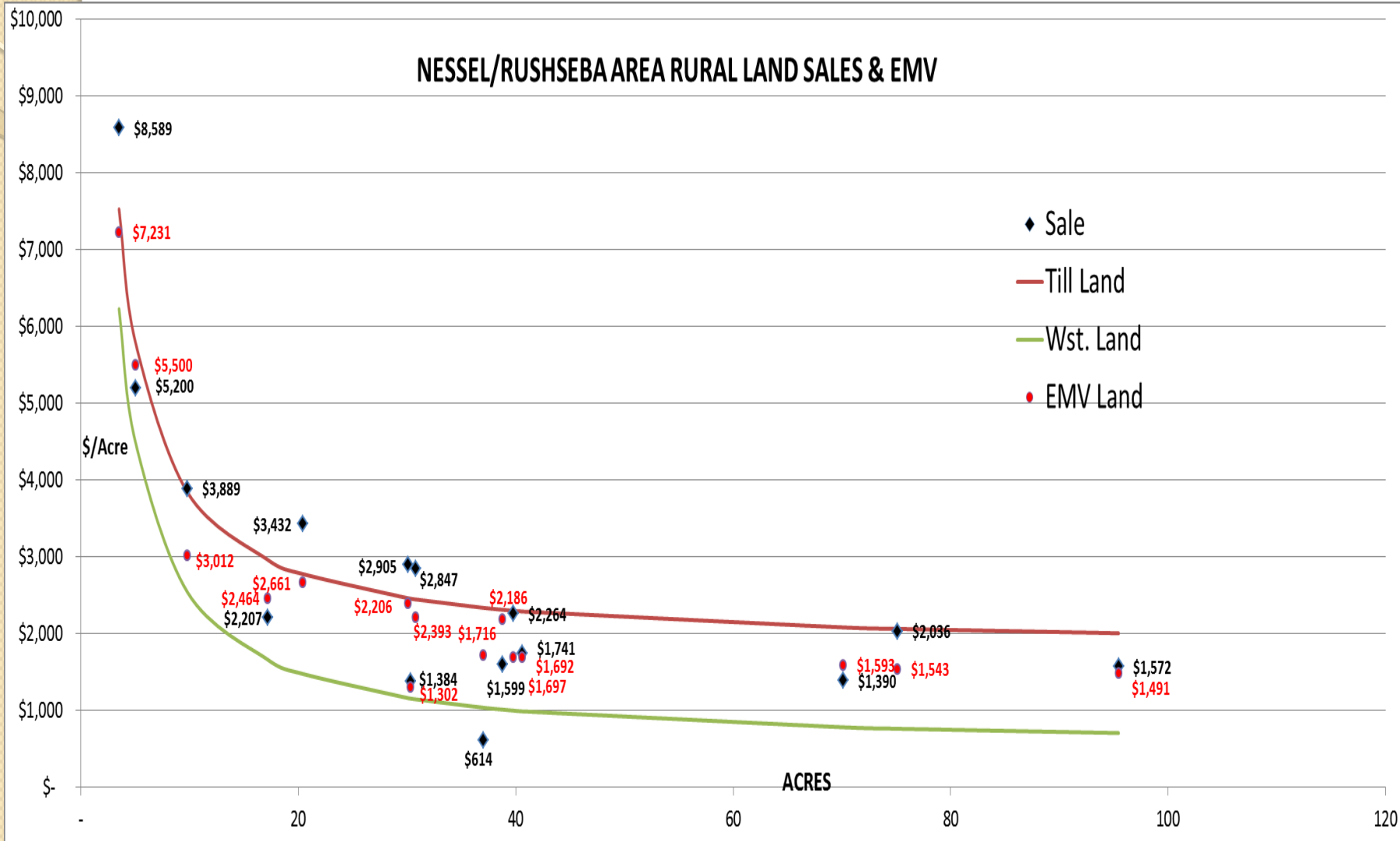
Linear Regression Per Unit Conversion

Sale #	Front Feet	Sale Price	Sale/Fr.Ft.
	X	Y	Y/X
1	50	$ 15,000	$ 300
2	75	$ 17,000	$ 227
3	100	$ 20,000	$ 200
4	200	$ 25,000	$ 125
LINEST:		$ 65	
INTERCEPT:		$ 12,337	

SUGAR LAKE SALES

$ SALE

- ◆ Total Sale
- ■ Sale/Fr.Ft.

25000
20000
17000
15000
300   227   200   125

FR. FT.

0   50   100   150   200   250

CLOSEUP VIEW OF PER UNIT GRAPH

SUGAR LAKE SALES
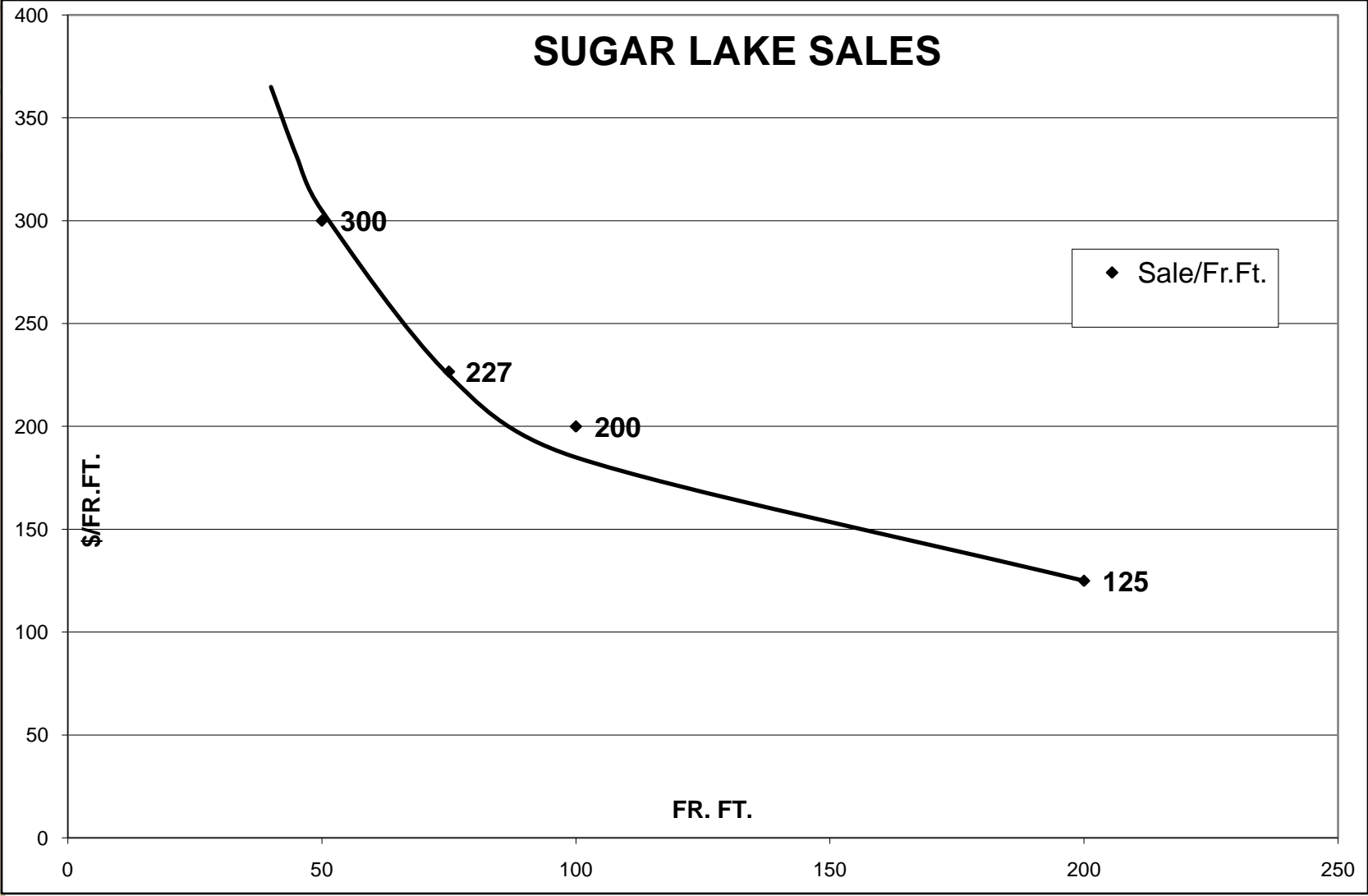
LAKESHORE MODEL

WEST RUSH LAKE			Was P11:	063020:	$ 85,000	063021:	$ 300	as P11:	063025	$ 80,000	063026:	$ 200			
09 & 10 SALES			Site Imp.=	$ -				Site Im	$ -						
nflation/Yr.:	0%	Date:	01/02/11	SA=	$ 85,000	FF=	$ 275	SA=	$ 70,000	FF=	$ 200				
Time Adj. Sale Price	Actual Sale Price	Pay 2011 Assd. EMV	Sale Ratio	Sale Date	Imp. 11 EMV	Excess Land EMV	Ind. Lake Land EMV	Depth	Front Footage	Frnt. Ft. Sale	Nbhd. A Formula	Nbhd B Formula	Formula EMV	Nbd	Formula Sale ratio
$ 80,000	$ 80,000	$ 80,000	100.00%	5/25/10	$ 42,000	$ -	$ 58,462	80	15	$ 3,897	$ 5,942	$ 4,867	$ 89,450	B	111.81%
$ 90,011	$ 90,011	$ 135,100	150.09%	3/19/09	$ 63,148	$ -	$ 41,328	85	20	$ 2,066	$ 4,525	$ 3,700	$ 111,248	B	123.59%
$ 159,900	$ 159,900	$ 172,500	107.88%	10/14/08	$ 71,000	$ 17,000	$ 92,179	113	61	$ 1,511	$ 1,668	$ 1,348	$ 167,385	A	104.68%
$ 210,000	$ 210,000	$ 149,100	71.00%	5/1/2009	$ 49,200	$ -	$ 174,783	156	75	$ 2,330	$ 1,408	$ 1,133	$ 146,375	A	69.70%
$ 105,000	$ 105,000	$ 138,600	132.00%	4/21/09	$ 59,300	$ -	$ 55,732	120	80	$ 697	$ 1,338	$ 1,075	$ 129,820	B	123.64%
$ 202,500	$ 202,500	$ 207,700	102.57%	2/18/10	$ 113,300	$ 5,000	$ 90,538	145	80	$ 1,132	$ 1,338	$ 1,075	$ 198,280	B	97.92%
$ 250,000	$ 250,000	$ 212,200	84.88%	8/21/09	$ 100,200	$ -	$ 151,313	200	90	$ 1,681	$ 1,219	$ 978	$ 208,853	A	83.54%
$ 220,000	$ 220,000	$ 202,800	92.18%	10/10/08	$ 103,100	$ -	$ 132,841	145	90	$ 1,476	$ 1,219	$ 978	$ 199,680	A	90.76%
$ 245,000	$ 245,000	$ 200,600	81.88%	9/26/08	$ 105,400	$ -	$ 164,235	130	90	$ 1,825	$ 1,219	$ 978	$ 198,688	A	81.10%
$ 192,000	$ 192,000	$ 183,300	95.47%	5/1/09	$ 76,900	$ -	$ 121,158	170	90	$ 1,346	$ 1,219	$ 978	$ 181,163	A	94.36%
$ 133,000	$ 133,000	$ 107,900	81.13%	11/3/09	$ -	$ 1,000	$ 121,101	460	130	$ 932	$ 929	$ 738	$ 132,618	A	99.71%
$ 121,200	$ 121,200	$ 175,300	144.64%	9/16/09	$ 58,700	$ -	$ 58,962	260	145	$ 407	$ 861	$ 683	$ 163,640	B	135.02%
$ 224,100	$ 224,100	$ 262,700	117.22%	9/19/08	$ 139,000	$ -	$ 92,500	160	160	$ 578	$ 806	$ 638	$ 257,680	A	114.98%
$ 239,400	$ 239,400	$ 257,400	107.52%	9/30/08	$ 136,600	$ -	$ 97,905	250	170	$ 576	$ 775	$ 612	$ 245,800	B	102.67%
$ 175,000	$ 175,000	$ 202,600	115.77%	10/22/10	$ 57,200	$ -	$ 125,319	170	230	$ 545	$ 645	$ 504	$ 196,555	A	112.32%
$ 228,361	$ 228,361	$ 242,100	106.02%	11/20/09	$ -	$ 400	$ 209,139	380	375	$ 558	$ 502	$ 387	$ 205,456	A	89.97%
$ 250,000	$ 250,000	$ 350,000	140.00%	11/3/09	$ -	$ 1,400	$ 228,073	380	505	$ 452	$ 443	$ 339	$ 245,424	A	98.17%
$ 300,000	$ 300,000	$ 256,900	85.63%	7/28/10	$ -	$ 1,800	$ 273,578	300	525	$ 521	$ 437	$ 333	$ 251,819	A	83.94%
		Median:	95.47%	Bldg Adj.									Median:		97.92%
		COD:	20.82%										COD:		14.87%

99

GRAPH OF LAKESHORE MODEL

WEST RUSH LAKE SALES 09 TO 10
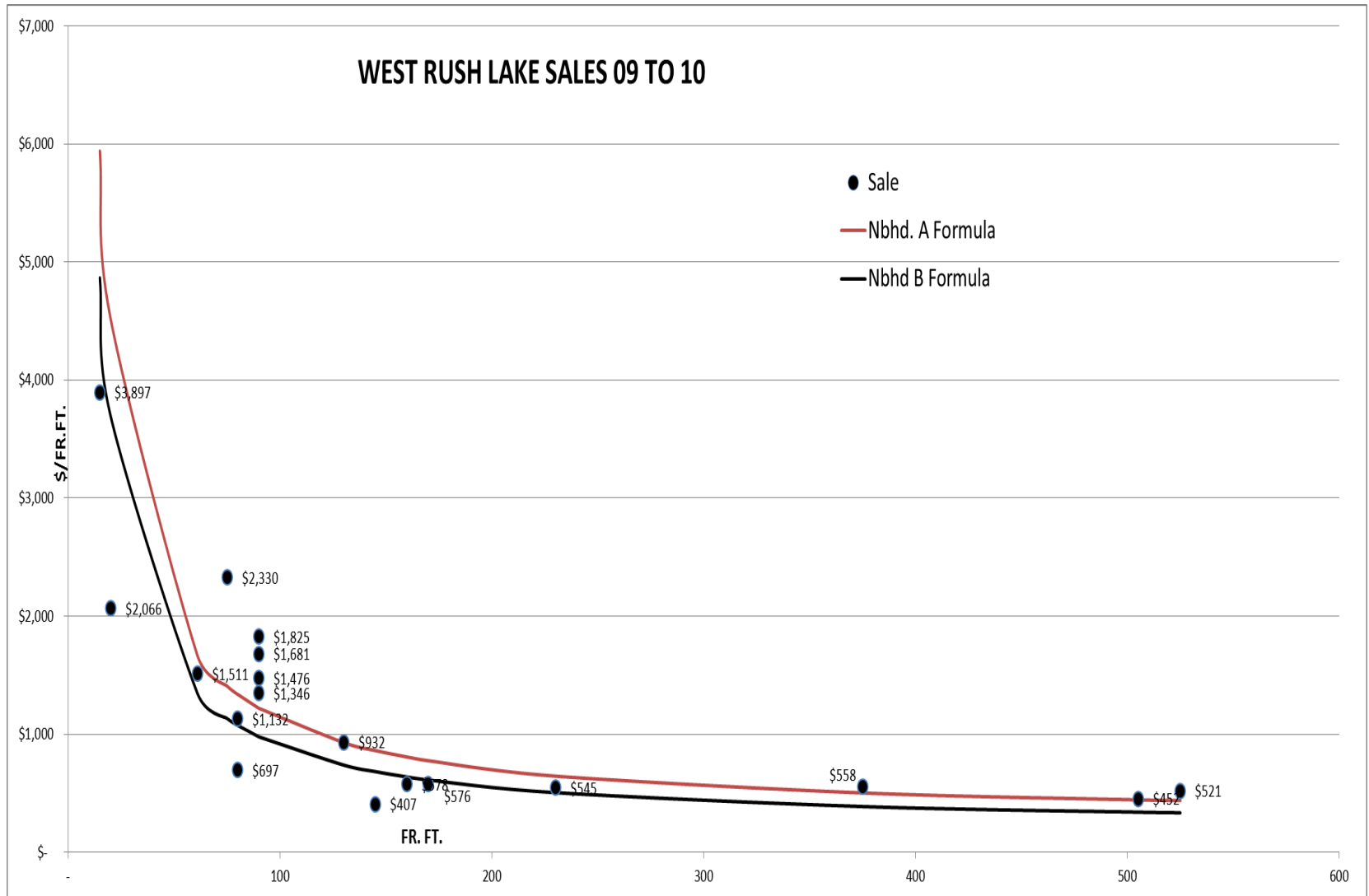
Current Topics of Concern

- **Current ratio topics, issues and concerns:**

- Sales of properties with a changing use – how should these be treated?, which study should they be in – the one based on existing use or the one based on the planned use?

- The use or non-use of Green Acres and how this impacts sales ratios

- 2a 2b Ratio Methodology, Conservation Easements: CREP/CRP/RIM

- LIRP / 4D

- Indirect Equalization; should we continue to use Taxable market value for indirect equalization?

- Inequities of the present system

- Assurance of proper screening of sales for inclusion or exclusion from the study and assurance of equal treatment of sold and unsold property

- New Time Adjustment Methodology

- Procedures for New Construction

- Treatment and analysis of outlier ratios

- Improvements to ratio studies that measure and test the representativeness of the sample to the population being measured

IAAO Key Issues

- Are states and provinces adopting more features of the IAAO Ratio Study Standard?
- Differences between level and uniformity standards in use and IAAO uniformity standards
- Point estimates v. confidence intervals
  - For uniformity statistics
  - For level statistics
- Outlier treatment and trimming procedures
- Sales chasing testing and resolution

IAAO Future issues to explore

- More detail on <u>how</u> outliers are identified
- Review of specific methods for testing sales chasing – for instance, no state or province indicated using the comparison of average unit values (per square foot, etc.) method now found in Appendix D.2 of the Standard.
- In depth exploration of standards specifically related to direct v. indirect equalization
  - Standard suggests different level standards; do states use them?
  - Are different measures of level in use?
- Do states and provinces that use confidence intervals lower degree of confidence in cases of long term level problems?

Challenges for the Minnesota Ratio Study System

- How do we address the inequities of multiple studies for the same assessment?

- Issues surrounding Outlier Ratios

- What additional tests do we need to assure high-quality assessments

- What is the proper measure of central tendency for indirect equalization?

- We need to begin using confidence interval testing for COD's – but it is difficult

How Do Assessors Improve the System

- Integrate the ratio analysis into your work
- Ask questions
- Use your Compliance Officer as a resource we are a team
- Implement best practices in avoiding sales chasing and ensuring accurate sales screening
- Process new construction sales early

- Get abstracts in on-time
- Get our sale & value files turned in on-time
- Address questionable sales promptly
- Network with fellow assessors
- Review ratio reports and time adjustments promptly
- Regular training

MAAO Sales Ratio Committee Recommendations

The suggested methods to improve the equity in the Minnesota ratio study system are:

Move to One Study

  Reduce impact of changing market conditions
  Makes ratio studies more understandable
  Will require robust quality standards

Expanded sold versus unsold property analysis.

  This process is useful in pointing out possible
   selective reappraisal problems.
  Designed to ensure high quality assessments
  Will provide the courts evidence of assessment
   verifiability

Teamwork for a Minnesota System that Serves All our State

- Henry Ford

- Coming together is a beginning.

- Keeping together is progress.

- Working together is success.