



5/3/2023

Analysis of H.480

An Act Relating to Property Valuation and Reappraisals



Christopher Landin, CPRPA, VMPA, & GSI
LANDIN & ASSOCIATES ASSESSMENT SERVICES LLC

Professional Opinion on H.480 - An Act Relating to Property Valuation and Reappraisals

Here are the opinions on the merits of H.480. There is an Executive Summary attached with sources.

I am **For** – Equity in appraised market values supported by use of:

- a) The adoption of IAAO standards: *Standard on Ratio Studies* (2013) and *Standard on Mass Appraisal of Real Property* (2017).
- b) The use of ratio studies and statistical modeling, with hypothesis testing, to support the claim of equity with market values supported by time adjusted sales (example included)
- c) Removal of the Common Level of Appraisal (CLA) as an appraisal trigger
- d) The use of the Coefficient of Dispersion (COD) as the measure for Horizontal Equity
- e) The use of the Price Related Differential (PRD) with support from the Price Related Bias (PRB) as measures for Vertical Equity
- f) The use of the Gini Quotient as a supplementary test for Vertical Equity
- g) Reevaluation on the current ratio study methodology since a change to the assessment process and changes to categories.
 - a. The use of a time adjustment for sales prices

(Pages 3 to 10)

I am **For** – Time based appraisal triggers with a reinspection schedule:

- a) The time trigger depends on the appraisal methodology.
 - a. Annual for Automated Valuation Models (AVM) based on the sales comparison approach to value using IAAO, *Standard on Automated Valuation Models* (AVMS) (2018).
 - b. Five years for a traditional Computer Assisted Mass Appraisal (CAMA) system based on the market adjusted cost approach.

(Pages 10 to 12)

I am **Against** – The budget of \$2,540,000 for this project.

- a) Compared to the typical national staffing requirements of assessment offices, Vermont historically has been under supported.
- b) Additional use of resources and technology to assist the assessing office in its duty.
- c) The staffing needs will be considerable, and some candidates will have to be recruited from outside the State.
 - a. Wages and benefits will need to match industry norms.
- d) There is a higher demand for trained and experienced staff due to retirements in the valuation industry.
- e) The shift from 19 municipalities appraised/reinspected to 50+ municipalities per year,
 - a. approximately 65,500 parcels per year,
 - b. with defense and other assessment duties.
- f) A preliminary staffing cost estimate was performed, and the current budget is inadequate.

(Pages 12 to 16)

I am **Against** – The formation of a reappraisal entity solely under the control of Property Valuation and Review:

- a) Too much control is placed in one Division of Government
- b) I have listed 3 alternative structures with: strong State control, strong Local control, and one that is in between.
- c) The key to acceptance is elected leadership over a professional assessment organization.

(Pages 16 to 17)

I am **For** – Right sizing personnel in Assessment Offices.

- a) Training staff at an accelerated schedule compared to what is currently offered.
- b) Examining job tasks for adequate coverage.
- c) Use of subject matter experts and/or appraisal firms to support appraisal needs that are not covered by staff.
- d) Use a similar Competency Rule described in AF's, *Uniform Standards of Professional Appraisal Practice* (USPAP).
- e) Make statute and procedural changes to assist the Office in its execution of duty.
- f) Reward employee professional growth.

(Pages 17 to 19)

I am **For** – The formation of a judicial “tax court” or quasi-judicial board to act the current role of the State Hearing Officer

- a) If quasi-judicial there should be an odd number of members on the board, 3 or 5
- b) The requirement of property inspection should be waved and only used on the exception.
- c) The cases should be heard on a circuit throughout the State to meet the need for access by all.
- d) With possible wide acting changes to the assessment structure, a reexamination of the appeal process and levels involved may be warranted.

Executive Summary

I appreciate the opportunity to address the Senate Committee on Finance. In the property taxation field, Fair and Equitable is not just the title of our trade magazine. It is the charge that tax professionals have to uphold. We compare parcels using the same “yardstick,” meaning we use the same procedures and processes to compare all the properties within a municipality. Within that comparison, we have to defend the assessed value with equal effort among all property owners in the municipality. I am trying to make my response brief, but this is a complex problem that is technical in nature with widespread implications, and I want to point you to sources that may help you with this weighty discussion.

*Note to reader: In the statute, value may be defined as “fair market value.” In the appraisal industry we determine “market value” depending on the purpose of the appraisal. “Fair value” is a term used in accounting. I mention this now to avoid confusion.

In Dr. Frederick A. Wood’s paper, *History of Taxation in Vermont* (1894), he discusses the evolution of the Board of Listers and taxation from the pre-Revolutionary War forward. The modern assessment office has more responsibility and complexity to be fair and equitable in the execution of our duties compared to the origin of the office.

A pivotal work on tax policy is Charles M. Tiebout’s, *A Pure Theory of Local Expenditures* (1956):

“As things now stand, there is no mechanism to force the consumer-voter to state his true preferences; in fact, the “rational” consumer will understate his preferences and hope to enjoy the goods while avoiding the tax. The current method of solving this problem operates, unsatisfactorily, through the political mechanism. The expenditure wants of a “typical voter” are somehow pictured” (page 417).

His theory in simple terms states, that consumers will choose different municipalities based on the services that are provided offset by the taxes that they would pay, “they vote with their feet.” If there is an inequity between the services that the municipality provides, and the taxes paid for those services. The group that is under taxed will have a higher demand for the services provided. Granted, his theory would be difficult to prove but has been well supported within the literature.

In Joan Youngman’s book, *A Good Tax* (2016), the author goes into great detail on the benefits and pitfalls of real property taxation, since real property is a substitution for wealth:

“A good property tax is stable, efficient, and fair. A tax on immovable property is an important fiscal tool in a time of globalization and international competition for mobile capital. A tax that has been capitalized into property values reduces the economic burden on purchasers; an asset tax can help balance increasing reliance on regressive consumption taxes” (page ix).

Dr. Christopher Berry, in *Reassessing Property Tax* (2021), focused specifically on equity in assessments. The paper utilized nationwide data looking at the equity of assessments primarily in large metropolitan areas and focusing on Cook County, Illinois. Each state has varying laws on the performance of real property taxation. Dr. Berry addresses the issue of regressive influences on the tax roll from appeals on pages 19-20 and in his *Binned Scatter Plot of Cook County Regressivity*

Before & After Appeals on page 36. This is for a large metropolitan area and may be an imperfect comparison to the State of Vermont. However, this illustrates one of the ways regressivity and inequity can enter a tax roll.

Equity and Valuation

In assessment administration, we are responsible for determining market value, specifically *ad-valorem* on a given date. The elected and/or appointed official may not have the expertise, education, and tools to perform an in-house reappraisal. It is not unusual to hire an outside firm to perform reappraisal services that can meet the level of complexity and needs of the municipality.

When valuing real property there are three approaches to value: The sales comparison approach, income approach, and the cost approach. We have to consider all three approaches, but we do not have to perform all three if they will not provide credible results. The standard most commonly used for the "Fee Appraisal" industry is The Appraisal Foundation's (AF), *Uniform Standards of Professional Appraisal Practice* (USPAP) (2020). Standards 1 and 2 would most likely apply for single property "Fee Appraisal" activities. The appraiser is under no obligation to follow the standard, but it is common in the work agreement to do so.

In the assessment industry we tend to follow the International Association of Assessing Officers (IAAO) standards: *Standard on Ratio Studies* (2013) and *Standard on Mass Appraisal of Real Property* (2017). They are drawn from IAAO, *Property Assessment Valuation*, Chapter 15 (2010), pages 403-459. These two standards are compatible with USPAP Standards 5 and 6 for Mass Appraisals. The agreement between the municipality and the appraisal firm will determine the standards to be used.

The purpose of a reappraisal for a municipality is to determine the market value for the entire municipality at a given date, e.g., April 1st for a given year in Vermont. Mass Appraisal is the most cost effective and accurate method for this purpose. Using the three approaches to determine value, a market adjusted cost approach could meet the need of a municipality if the tax roll (i.e., Grand List) has to maintain accuracy for multiple years until the next reappraisal. This allows the introduction of new information to be added and to be treated the same as existing parcels between reappraisals. If the municipality is reappraising annually, a statistical model based on the sales comparison approach could be advantageous. Now a discussion of statistics that applies for real property assessments. I will try my best to simplify but include enough details to support the argument on equity.

Typically, real property market statistical models have a Confidence Interval (CI) of 95%. This is correct 19 out of 20 times. The purpose of a model is to take what is known (valid sales) and predict what is not known (the market value) for the parcels that did not sell. The modeler can use linear and/or curvilinear analysis to describe a mathematical model of the data. The modeler can use an additive, multiplicative, or hybrid model. We make incremental, non-heuristic adjustments to the model. These adjustments yield highly accurate results, and foster precision in the estimate of market value. Real estate markets are non-parametric by nature and tend not to follow the bell curve. The frequency distribution below will illustrate this. In an analysis the median, the middle

value, is preferred instead of the mean, arithmetic average. This helps to minimize the influence of outliers.

Using market data, the modeler extracts the Time Adjusted Sales Price, the Land Residual, and the Improvement Residual. These can be used to better refine the model. As an additional step, we separate the Whole Database into a Model Dataset and a Test Dataset, typically using a 2/3 to 1/3 ratio. The Model Dataset is used to generate a model and the Test Dataset represents the unsold parcels in the municipality. Stepwise and entered Multiple Regression Analyses (MRA) are used to find the optimal model. Pearson chi-squared testing is used to determine if correlations exist between variables and if a variable is statistically significant. The optimal model is used with the Test Dataset. If ratio statistics are within specification, continued testing can be performed using the Whole Database.

The way that we can confirm that all variables are equal is through hypothesis testing. Since real estate markets are non-parametric, meaning they do not follow a bell curve due to skew, we use Mann-Whitney type U for only two samples and Kruskal-Wallis type H for three or more. The Null Hypothesis (H_0) property groups are appraised at equal percentages of market value and the Alternative Hypothesis (H_1) are not. To accept H_0 , the results need to be greater than or equal to the Asymptotic Significance (Asymp. Sig.) of 0.05, for a CI of 95%. If the Asymp. Sig. is less than 0.05 we must reject H_0 for H_1 . This means an adjustment is necessary. After an adjustment is made, a new round of testing is completed to confirm the adjustment was made in the correct direction. If the results are within the standard, we continue testing the next variable. This is a time-consuming process.

Table 1-2. Tests of Hypotheses

Null Hypothesis	Nonparametric Test	Parametric Test
1. Ratios are normally distributed.	Shapiro-Wilk W test D'Agostino-Pearson K^2 test Anderson-Darling A^2 test Lillifores Test	N/A
2. The level of appraisal meets legal requirements.	Binomial test	t -test
3. Two property groups are appraised at equal percentages of market value.	Mann-Whitney test	t -test
4. Three or more property groups are appraised at equal percentages of market value.	Kruskal-Wallis test	Analysis of Variance
5. Low- or high-value properties are appraised at equal percentages of market value.	Spearman Rank test	PRB, correlation or regression analysis
6. Sold and unsold parcels are treated equally.	Mann-Whitney test	t -test

IAAO, *Standard on Ratio Studies*, (page 15)

In H.480, equity between neighborhoods is being questioned. We need to define what we are testing.

Neighborhood: "1. A group of complementary land uses; a congruous grouping of inhabitants, buildings, or business enterprises"

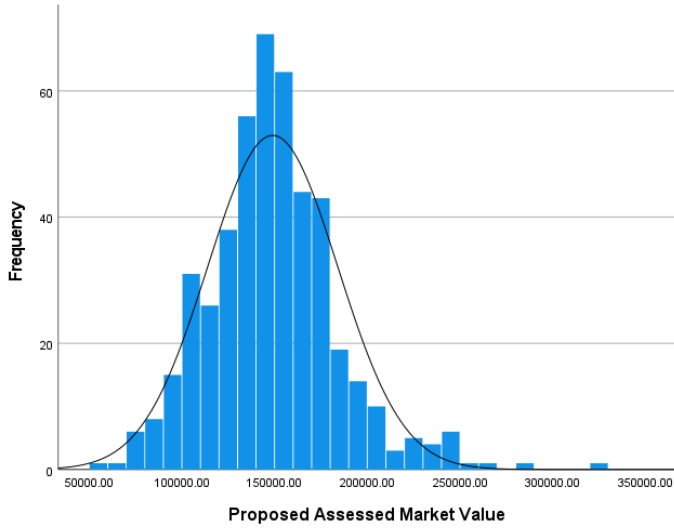
Appraisal Institute (AI), *The Dictionary of Real Estate Appraisal*, 6th ed. (2015)

Neighborhoods have spatial heterogeneity with distinct characteristics. Neighborhood adjustments need to be made with extra care. In best practice, they should be made last in the sequence to avoid double counting a variable characteristic.

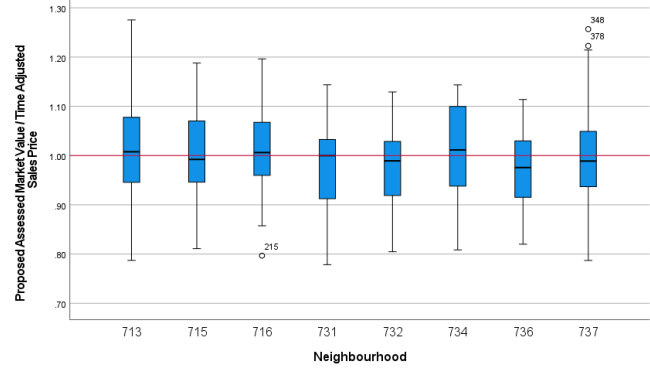
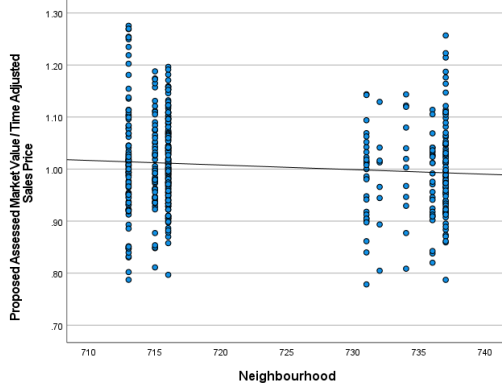
It is common to use ratio studies to represent change within an assessment district. The advantage of ratios is that all properties can easily be compared regardless of differences in the strata of the real estate market. The Assessment to Sales Ratio (ASR) is commonly used.

Here is an example of a final equity analysis between neighborhoods in a homogenous suburban assessment district using Proposed Assessed Market Value and Time Adjusted Sales Price as variables:

- The Coefficient of Determination (R^2) for the ASR from the Scattergram of 0.009, less than 0.25 is a weak relationship. The horizontal line indicates that the relationships between neighborhoods could be statistically insignificant. Meaning the neighborhoods could be treated equally.
- The neighborhoods are centered at 1.00 in the Boxplot, which supports the claim of equity. The Compare Means Table shows the statistical measures of the individual neighborhoods.
- Kruskal-Wallis type H test has an Asymp. Sig of 0.457 which is significantly greater than 0.05 for a 95% CI we can accept the H_0 "that all neighborhoods are being appraised equally." The Mean Ranks are centered around 233, which is half of the 466 records in the database.
- The medians for the neighborhoods fall between 0.95 to 1.05 and the lower and upper boundaries bracket 1.000 at 95% CI.
- The overall model metrics for horizontal and vertical equity are within standard.
 - A Coefficient of Dispersion (COD) of 7.0%, which is between 5.0% to 10.0%.
 - Confirmed with an overall Scattergram R^2 of 0.871, 0.85 or greater is a strong correlation. Proposed Assessed Market Value is a strong predictor compared to Time Adjusted Sales Price
 - The Price Related Differential (PRD) of 1.006, which is between 0.98 to 1.03. Closer to 1.000 is ideal. This is a strong indicator for vertical equity.
 - The Price Related Bias (PRB) of -0.021, which is within +/-0.050, is ideal and would fail if greater than +/-0.100. The PRB supports the results of the PRD.
 - The absolute mean difference was \$38.20 between the variables. Which is very close, less than \$200.00, and a good indicator.



Statistics		
Proposed Assessed Market Value		
N	Valid	466
	Missing	0
Mean		148989.9098
Median		147627.5493
Std. Deviation		35099.08298
Skewness		.704
Std. Error of Skewness		.113
Kurtosis		1.941
Std. Error of Kurtosis		.226
Minimum		55044.92
Maximum		323761.05
Percentiles	25	127725.1333
	50	147627.5493
	75	167058.9452



Test Statistics^{a,b}

Kruskal-Wallis H	6.736
df	7
Asymp. Sig.	.457

a. Kruskal Wallis Test
b. Grouping Variable:
Neighbourhood

Ranks

Neighbourhood	N	Mean Rank
713	92	240.11
715	59	237.63
716	156	246.46
731	29	204.03
732	8	198.38
734	12	240.00
736	27	190.33
737	83	225.67
Total	466	

Report

Proposed Assessed Market Value / Time Adjusted Sales Price						
Neighbourhood	N	Median	Mean	Std. Deviation	Minimum	Maximum
713	92	1.0077	1.0150	.11204	.79	1.28
715	59	.9922	1.0081	.08664	.81	1.19
716	156	1.0062	1.0135	.07732	.80	1.20
731	29	1.0000	.9822	.08662	.78	1.14
732	8	.9894	.9760	.09854	.80	1.13
734	12	1.0115	1.0048	.10384	.81	1.14
736	27	.9757	.9739	.07797	.82	1.11
737	83	.9888	1.0034	.09067	.79	1.26
Total	466	1.0015	1.0062	.09042	.78	1.28

Ratio Statistics for Proposed Assessed Market Value / Time Adjusted Sales Price

Group	N	95% Confidence Interval for Median			Actual Coverage	Minimum	Maximum	Price Related Bias	95% Confidence Interval for Price Related Bias		Price Related Differential	Coefficient of Dispersion	Coefficient of Variation Mean Centered
		Median	Lower Bound	Upper Bound					Lower Bound	Upper Bound			
713	92	1.008	.989	1.020	95.3%	.787	1.276	.035	-.048	.118	1.004	.083	11.0%
715	59	.992	.973	1.032	96.4%	.811	1.188	.039	-.067	.145	1.003	.070	8.6%
716	156	1.006	.992	1.027	95.5%	.797	1.196	-.068	-.116	-.020	1.006	.062	7.6%
731	29	1.000	.918	1.023	97.6%	.778	1.144	-.082	-.207	.043	1.007	.068	8.8%
732	8	.989	.805	1.129	99.2%	.805	1.129	-.183	-.650	.284	1.010	.075	10.1%
734	12	1.011	.929	1.120	96.1%	.809	1.144	.141	-.120	.403	.999	.082	10.3%
736	27	.976	.918	1.028	98.1%	.820	1.114	.003	-.138	.144	1.003	.066	8.0%
737	83	.989	.973	1.016	95.2%	.787	1.257	-.148	-.226	-.071	1.010	.071	9.0%
Overall	466	1.001	.992	1.012	95.4%	.778	1.276	-.021	-.045	.003	1.006	.070	9.0%

The confidence interval for the median is constructed without any distribution assumptions. The actual coverage level may be greater than the specified level.

Table 2-3. Ratio study uniformity standards indicating acceptable general quality*

General Property Class	Jurisdiction Size/Profile/Market Activity	COD Range
Residential improved (single family dwellings, condominiums, manuf. housing, 2-4 family units)	Very large jurisdictions/densely populated/newer properties/active markets	5.0 to 10.0
	Large to mid-sized jurisdictions/older & newer properties/less active markets	5.0 to 15.0
	Rural or small jurisdictions/older properties/depressed market areas	5.0 to 20.0
Income-producing properties (commercial, industrial, apartments,)	Very large jurisdictions/densely populated/newer properties/active markets	5.0 to 15.0
	Large to mid-sized jurisdictions/older & newer properties/less active markets	5.0 to 20.0
	Rural or small jurisdictions/older properties/depressed market areas	5.0 to 25.0
Residential vacant land	Very large jurisdictions/rapid development/active markets	5.0 to 15.0
	Large to mid-sized jurisdictions/slower development/less active markets	5.0 to 20.0
	Rural or small jurisdictions/little development/depressed markets	5.0 to 25.0
Other (non-agricultural) vacant land	Very large jurisdictions/rapid development/active markets	5.0 to 20.0
	Large to mid-sized jurisdictions/slower development/less active markets	5.0 to 25.0
	Rural or small jurisdictions/little development/depressed markets	5.0 to 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. However, 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.*

**Alternatively, assessing officials can rely on the PRB, which is less sensitive to atypical prices and ratios. PRB coefficients should generally fall between $-.05$ and $.05$. PRBs that are statistically significant and less than -0.10 or greater than 0.10 indicate unacceptable vertical inequities.*

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

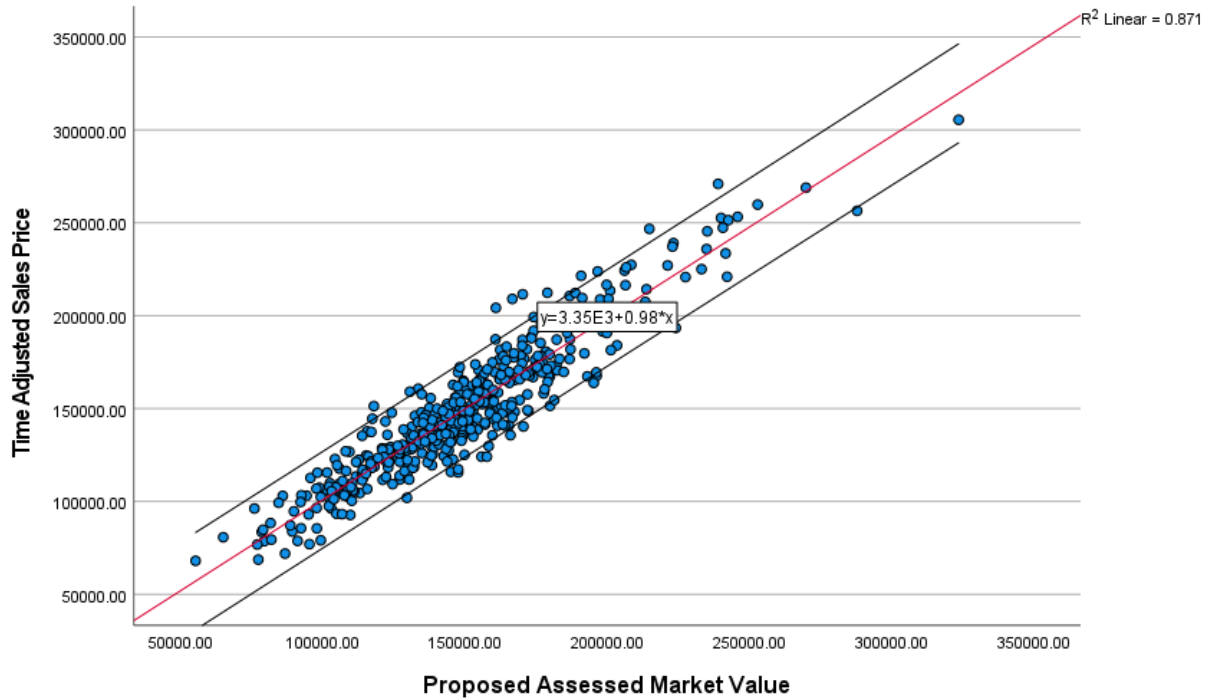
IAAO, *Standard on Ratio Studies*, (page 34)

The analysis described above, supports “Fairness” in taxation. Comparing variables and sub-variables using the same process is the key for fairness, the same “yardstick.”

“Fairness in establishing taxes implies horizontal and vertical equity. Horizontal equity requires the equal treatment of equals; that is, all properties of identical taxable value should be taxed in the same way. Vertical equity refers to the treatment of un-equals; properties of greater taxable value should face higher taxes.”

University of British Columbia, *Foundations of Real Property Assessment and Mass Appraisal (2018)*, page 1.15.

The following Scattergram is a visual way to confirm horizontal equity as you move left to right. The 95% CI brackets show ratios that fall outside. There were not any obvious clusters. Any ratios that fall outside the 95% CI are close to the brackets. If all the data was grouped entirely on the trend line that would indicate a very low COD and this would suggest “sales chasing”. That could indicate manipulation of the data.



The PRD with support from the PRB, shows vertical equity. The benefits of using the PRB for support of vertical equity in Robert J. Gloudeman’s article, *The Coefficient of Price-Related Bias: A Measure of Vertical Equity* (August 2011), pages 3-8:

PRB - “Importantly, it measures the percentage relationship between property values and assessment ratios and indicates by what percentage assessment levels change whenever property values are doubled (or halved). It also addresses technical deficiencies in the PRD and quantifies the statistical significance of any indicated inequities” (page 3).

In Dr. Carmela Quintos’s paper, *A Gini Measure For Vertical Equity In Property Assessments* (2020), the Gini Quotient has commonly been used in economics to compare countries in different ways. She postulates that this could be applied to real property assessments.

“The tests for vertical equity are the Kakwani Index (KI) of Kakwani (1977), which is based on the difference of Gini measures between assessment and price... which is based on the ratio. An important distinction between both tests and the PRD and currently used measures is that Gini-based analyses do not use sales ratios (assessment/price ratios) or assessment/price regressions, which basically capture the behavior of the appraisal errors.” (page 34)

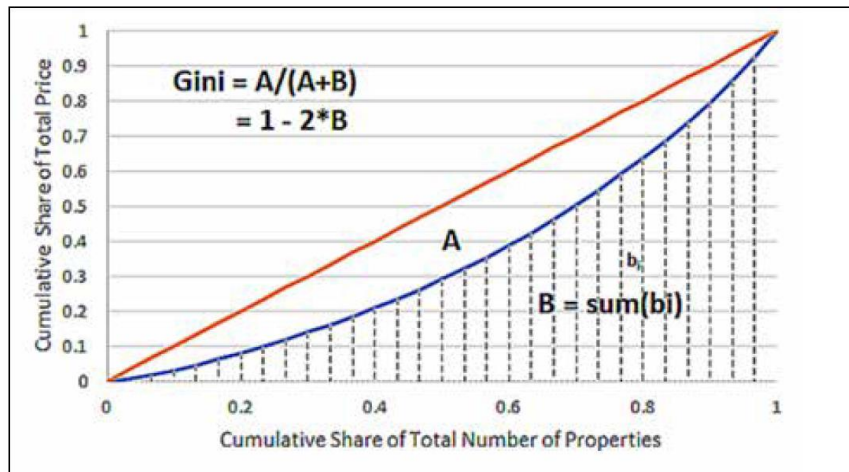
It works on the principle of shares. In simple terms, the 45 degree brown line represents perfect equity. The blue line represents the inequity curve, Lorenze Curve. The area below the Lorenze Curve represents total inequity. The relationship between the area in A versus the area in B is the purpose of this analysis. The advantage of this method:

- it is visual in nature,
- it can be performed using Excel,

- and can lead to 4 numbers to describe the relationship.

The closer to 0.0, the greater the equity; the closer to 1.0, the greater the inequity. As a modeler, you have to follow where the data is leading and avoid adding bias which can taint the results.

Figure A-1. Calculating the Gini coefficient as areas under a curve



Journal of Property Tax Assessment & Administration • Volume 17, Issue 2

59

Time-Based Reappraisal Trigger

Currently there are two triggers to force a reappraisal: The Common Level of Appraisal (CLA) used primarily to compare towns for school funding and the Coefficient of Dispersion (COD) used for horizontal equity. I agree with dropping CLA for a time-based reappraisal trigger. CLA still can be used for school funding.

After polling assessment colleagues in other New England States, Connecticut, Massachusetts, New Hampshire, and Rhode Island are on a 5-year reappraisal rotation. Maine is on a 10-year rotation. In New York, *Uniform Assessment Standards* (9/11) Publication: 1025, does not have a reappraisal trigger and it is up to the individual municipalities when to reappraise. According to Sharon Martin, City Assessor City of Troy, she confirmed that there was not a reassessment trigger, and the subject of reappraisal is a very politically charged issue.

According to Lawrence C. Walters and the IAAO Research Committee, *Staffing in Assessment Offices in the United States and Canada: Results of 2013 Survey* (2014), this study went into depth on how assessment offices are organized and run:

- 20.3% of those surveyed in New England responded and are represented in the study (page 11).
- 89.6% of respondents perform a statistical update within at least a 5-year period.
- 23.9% of respondents reappraise at least every year.
- 69.3% of respondents reappraise at least in a 5-year period.

Table 34. Frequency of statistical updates

Update Frequency	Respondents		Mean Permanent Employees per 1,000 Parcels
	Number	Percentage	
More than once a year	43	7.3%	1.22
Every year	382	64.5%	0.58
2–4 years	62	10.5%	0.59
5 years	43	7.3%	0.59
6–10 years	16	2.7%	0.89
>10 years	5	0.8%	NA*
As needed	15	2.5%	0.45
Rarely or never	26	4.4%	0.35
Total	592	100.0%	0.65

*Sample size too small for meaningful reporting.

Table 35. Frequency of reappraisals

Reappraisal Frequency	Respondents		Mean Permanent Employees per 1,000 Parcels
	Number	Percentage	
More than once a year	8	1.2%	NA*
Every year	147	22.7%	0.61
2–4 years	189	29.2%	0.63
5 years	105	16.2%	0.61
6–10 years	84	13.0%	0.96
>10 years	34	5.2%	0.29
As needed	64	9.9%	0.70
Rarely or never	17	2.6%	0.39
Total	648	100.0%	0.65

*Sample size too small for meaningful reporting.

This is supported by Paul Bidanset and Ronald Rakow’s paper, *2019 Survey on the Use of Automated Valuation Models (AVMs) in Government Assessment Offices: An Analysis of AVM Use, Acceptance, and Barriers to More Widespread Implementation*, Working Paper WP22PB1 (July 2022). This compares the use of AVMs versus other valuation methods. With AVM reappraisals predominately on an annual basis and 75% of municipalities are on a 5-year or less reappraisal cycle.

Figure 16: Jurisdiction Revaluation Frequency

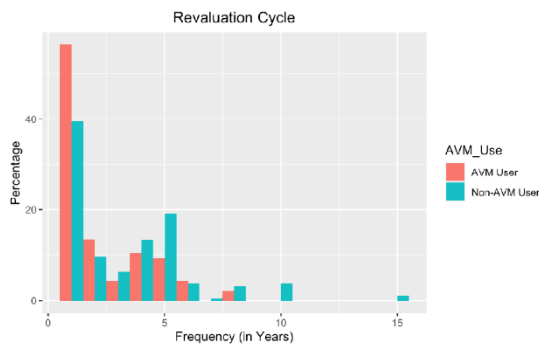


Table 2: Comparison of Jurisdiction Revaluation Frequency

Statistic	Years (Non-User)	Years (User)
Minimum	1	1
1st Quartile	1	1
Mean	3.31	2.26
Median	3	1
3rd Quartile	5	4
Maximum	15	8
Standard Deviation	2.66	1.80

Efficiencies of AVMs are further suggested by the higher parcel counts of jurisdictions that use AVMs. Non-user jurisdiction parcel counts are displayed in figure 17. Table 3 demonstrates lower mean (170,892.75 vs. 378,488.39) and median (36,300 vs. 75,000) parcel counts among

⁷ Only 205 of 427 non-AVM users answered this question.

Q4. “Please provide the following descriptive information about your jurisdiction for classification purposes: Frequency of revaluations.” Based on non-AVM users only (n=205).⁷

The time reappraisal trigger has to be tied to the methodology used for the *ad valorem* market valuation. If an AVM is used, an annual reappraisal cycle would be ideal. If an extended reappraisal cycle of 5-years is used, then a market adjusted cost approach using Computer Assisted Mass Appraisal (CAMA) software would be appropriate. This has advantages to update new information like new construction between reappraisals. Some municipalities follow a 6-year reappraisal cycle with a statistical reappraisal at the 3-year mark. Remember, both methods still need to have a “periodic field inspection.” With either method it is not just a “black box” that spits out values. There must be audits and controls on the process to assure fair and equitable valuation using optimal market models.

IAAO, *Standard on Mass Appraisal*, 3.3.4 Maintaining Property Characteristics Data

“**Periodic field inspections** can help ensure that property characteristics data are complete and accurate. Assuming that most new construction activity is identified through building permits or other ongoing procedures, **a physical review including an on-site verification of property characteristics should be conducted at least every 4 to 6 years.** Reinspections should include partial remeasurement of the two most complex sides of improvements and a walk around the

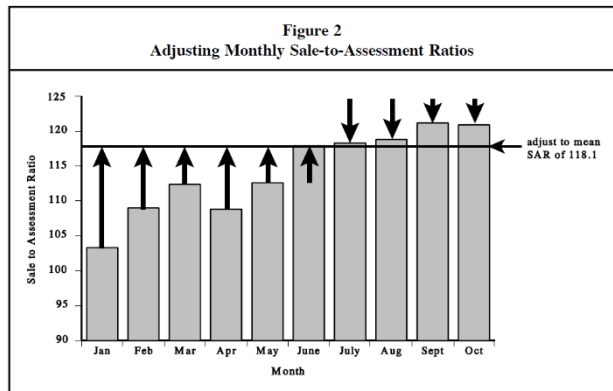
improvement to identify additions and deletions. Photographs taken at previous physical inspections can help identify changes” (page 4).

For AVMs this is covered in detail in IAAO, *Standard on Automated Valuation Models (AVMS)* (2018). In Alexander N. Bogin’s and Jessica Shui’s, *FHA Working Paper 18-03, Appraisal Accuracy and Automated Valuation Models in Rural Areas* (March 2019), from their Conclusions:

“A number of empirical studies have shown that property appraisals tend to be biased upwards and may overstate the true value of the underlying collateral. This upward bias is often exacerbated in rural areas where there are fewer comparable sales and more heterogeneity across homes. Based on our data, approximately 25 percent of rural appraisals exceed the associated contract price by five percent or more. Given the extent of upward bias in rural appraisals, we explore a wide array of AVM techniques in search of an estimator, potentially unbiased, to more accurately value the collateral underlying rural purchase-money mortgages.” (page 11)

Granted, this is based on AVMs in the fee appraisal industry. But this is a cautionary tale. Quality control would have to be high in order to have confidence with calculated values. This will require adequate field personnel to verify and to update the physical characteristics within the system. Please do not assume that a “black box” system will magically solve the problem of assessments in Vermont without adequate support.

Also, there will most likely need to be an examination of the current ratio study. In H.480, it suggests a change to the categories. A change in process would warrant a reevaluation of the ratio study. There would need to be confirmation that the ratio study performance would meet standards and the results are returning desired metrics. The recommendation of adding a time adjustment to sale prices for the ratio study. Since the current ratio study uses 3 years of sales data, this can lead to a relevant comparison. The process is outlined in detail in UBC, *BUSI 344 Lesson 8 Supplement Time Adjustment Illustration* (2014), which I can provide with permission. (page 4)



Personnel Needs and Funding

Vermont is in a similar position compared to the rest of the country. There are stressors in the personnel marketplace for qualified appraisers. There are 2 articles that address this specifically: Mike Seeley, *The Silver Tsunami* (July 2020) (pages 8-12), and Jay W. Schneider, *Tackling The Tough Topics* (Q4 2017) (pages 12-17). These were published in their respective trade magazines: IAAO and AI. Both articles address the issues of not finding qualified workers for the Valuation Industry. It is

not uncommon to switch back and forth from the fee appraisal side and the assessment side, and this is tied to which side has stability versus earning potential.

Within assessment, the competition for trained staff is high and it is common for adjacent municipalities to lure competent employees with better compensation and/or working environment. AI is concerned with the rise of alternative appraisal, AVM's, within the appraisal industry. This leads to assignments that are more complex only being issued to appraisers. With a greater level of complexity of assignments only being offered, this limits an assignment to only a certified licensee and makes it difficult to log appraisal time for those without a certification. This limits the future number of fee appraisers within the industry. On the fee appraisal side, if you have a trainee, you are ultimately training your competition and/or replacement.

In the valuation industry as a whole, there is a large impact due to retirements. The following is a non-scientific survey of the members of *Appraisal Today*, published (02/05/2013). This estimates that 39% of fee appraisers have retired by now, which is consistent with current industry literature.

<p>How old are appraisers and when do they plan to retire?</p> <p>Appraisalport poll – 1/7/13</p> <p>If you are licensed or certified, what is your age range?</p> <p>21 to 30 (2%) 138 votes 31 to 40 (15%) 1,027 votes 41 to 50 (30%) 2,095 votes 51 to 60 (42%) 2,284 votes 61 to 70 (16%) 1,113 votes Over 70 (3%) 228 votes</p> <p>Total Votes: 6,885</p>	<p>AppraisalPort poll – 1/21/13</p> <p>I plan to retire or leave the appraisal business within the next:</p> <p>5 years (22%) 1,304 votes 6-10 years (17%) 1,056 votes 11-15 years (15%) 938 votes 16-20 years (14%) 825 votes 21 or more years (15%) 938 votes Not sure at this point (16%) 991 votes</p> <p>Total Votes: 6,052</p>
---	---

The VALA Annual Conference 2021 had an impromptu survey that revealed the majority of attendees were at or approaching retirement age. A drastic shift in how assessments are performed may lead to acceleration of resignations and/or retirements within the Lister/Assessor community. Those that stay will have to pivot to meet the new standards and requirements within the industry. Change, with the uncertainty that it brings, can be frightening to established personnel. Let us not forget why the change is happening. This has the potential to lead to greater property owner confidence within the assessed values being perceived and accepted as being fair and equitable.

A difficult question is how many competent staff are needed to complete the tasks in a timely manner within budget. As mentioned in Walters Table 37 (page 27), his research shows a range of 1,590 to 2,499 Number of Parcels per Full-Time Permanent Employee depending on the organizational model. In Larry Clark's article *How Many People Do I Need in My Office?* (February 2021, pp. 8-11) states the method for

Table 37. Estimated parcels per permanent employee by type of agency leadership^a

Agency Headed by	Parcels per Permanent Employee	
	Agency Head Elected	Agency Head Appointed
An individual	2,117	2,499
A board	1,590	2,405

^a Holding constant other factors in the model.

IAAO staff would oblige by providing a quote from the *Property Appraisal and Assessment Administration* textbook.

Parcels per employee (rounded)			
Type of local government	Sample size	Mean	Median
County	358	3,100	2,600
Municipality	172	2,200	2,100
Township	364	1,800	1,600
Total	894	2,400	2,100

The table above is reproduced from page 421 of that book.

rightsizing an assessment office. The method framed in the article is used in *course IAAO-400 Assessment Administration*.

This gives a range of 1,600 to 2,600 on the median. For the sake of ease of analysis, we will use 2,100 for the Number of Parcels per Full-Time Permanent Employee. According to the *Property Valuation and Review 2023 Annual Report (2023)* (page 13), there are 327,483 parcels in the State.

If a full assessment system was to be created by the State it would require approximately **156 Full-Time Permanent Employees**. Not all staff will be field appraisers. There will be support and administrative staff in that estimate. There will still be a need for temporary workers depending on the scope of the assignment.

To recruit and keep competent employees there needs to be competitive compensation. In Walters, **the median salary was \$49,268 and the total expense was \$68,886 with benefits in 2013 dollars**. Let's use **\$50,000** for further ease of analysis.

Table 18. Total budget per permanent employee

Type of Agency	Number of Respondents	Total Budget per Permanent Employee			
		Mean	Median	Minimum	Maximum
County	301	\$77,721	\$70,453	\$819	\$851,813
Municipality	219	\$73,068	\$70,284	\$600	\$793,569
Township	75	\$57,156	\$56,000	\$760	\$206,583
Public multiple	25	\$74,350	\$70,000	\$21,667	\$213,000
Private multiple	15	\$58,627	\$37,000	\$3,453	\$164,450
State/Province	13	\$72,864	\$68,330	\$1,267	\$229,488
Overall	648	\$73,099	\$68,886	\$600	\$851,813

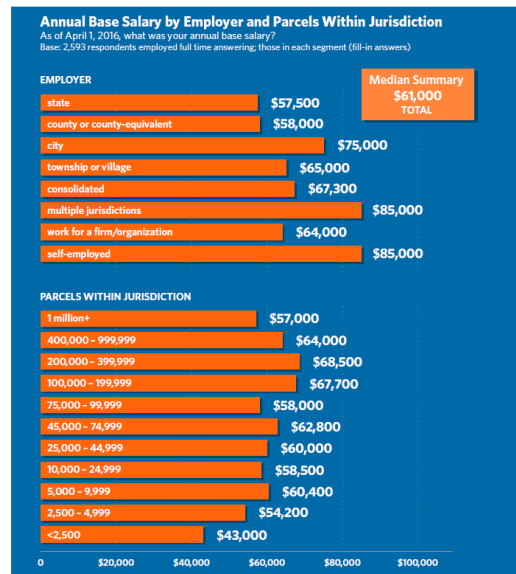
Table 20. Total salaries and benefits per employee^a

Type of Agency	Number of Respondents	Total Salaries and Benefits per Employee			
		Mean	Median	Minimum	Maximum
County	214	\$52,589	\$50,091	\$0	\$185,283
Municipality	163	\$49,270	\$49,890	\$0	\$194,828
Township	59	\$43,525	\$37,717	\$0	\$150,000
Public multiple	18	\$55,908	\$55,785	\$15,000	\$99,720
Private multiple	7	\$64,310	\$39,500	\$0	\$282,500
State/Province	5	\$48,812	\$56,092	\$9,750	\$80,396
Overall	466	\$50,544	\$49,268	\$0	\$282,500

^aIncludes permanent and temporary employees.

This is supported by the IAAO in the, *IAAO 2016 Assessment Industry Compensation Survey (2017)*. This survey only looked at salary, not salary plus benefit cost. The median salary was **\$61,000 in 2016 dollars**. According to the Employment Cost Index (ECI), the Government column from the US Bureau of Labor Statistics adjusted on the December Index 2013 dollars to 2023 dollars is \$50,000 to a +29.86% and adjusted on December 2016 dollars to 2023 dollars is a +21.89%. The best estimate in 2023 dollars would **\$64,929 to \$74,353**. Let's use **\$69,500** as our estimate in 2023 dollars.

$$\text{\$69,500/employee} \times 156 \text{ employees} = \text{\$10,842,000 in estimated salaries alone.}$$



The Annual Base Salaries by Job Function from the 2016 study is on the next page. This can give greater detail on staffing costs. The Adjusted ECI for 2016 to 2023 is approximately 22%.

Compensation in private industry and state and local government, 12-month percent change, not seasonally adjusted			2013 Study	2016 Study
Month	Private industry	Government	\$ 50,000.00	\$ 61,000.00
Dec-13	2.00%	1.90%	\$ 50,950.00	
Dec-14	2.30%	2.00%	\$ 51,969.00	
Dec-15	1.90%	2.50%	\$ 53,268.23	
Dec-16	2.20%	2.40%	\$ 54,546.66	\$ 62,464.00
Dec-17	2.60%	2.50%	\$ 55,910.33	\$ 64,025.60
Dec-18	3.00%	2.60%	\$ 57,364.00	\$ 65,690.27
Dec-19	2.70%	2.90%	\$ 59,027.55	\$ 67,595.28
Dec-20	2.60%	2.30%	\$ 60,385.19	\$ 69,149.97
Dec-21	4.40%	2.60%	\$ 61,955.20	\$ 70,947.87
Dec-22	5.10%	4.80%	\$ 64,929.05	\$ 74,353.37
Percent Change			29.86%	21.89%

Annual Base Salary by Job Function

As of April 1, 2016, what was your annual base salary?

Base: respondents employed full time in each segment answering (fill-in answers), *results not shown if fewer than five responses.

	n	PERCENTILE		
		25th	50th	75th
ADMINISTRATIVE				
Assessor, Administrator, Department Head, Director	1,015	\$55,000	\$71,500	\$93,200
Chief Deputy Director, Assistant Assessor, Deputy Assessor	182	\$48,000	\$72,000	\$95,300
Office Manager, Office Coordinator	29	\$44,500	\$60,100	\$85,500
Clerical Supervisor	22	\$34,800	\$42,100	\$60,900
Clerk, Admin. Assistant, Customer Service Rep., Taxpayer Assistance Rep.	51	\$30,500	\$38,500	\$51,000
REAL PROPERTY APPRAISAL/ASSESSMENT: COMMERCIAL/INDUSTRIAL				
Real Property Appraisal/Assessment Manager - Commercial/Industrial	58	\$63,800	\$73,300	\$96,800
Real Property Appraisal/Assessment Supervisor - Commercial/Industrial	40	\$55,300	\$68,000	\$84,400
Senior Commercial/Industrial Appraiser/Analyst	99	\$53,000	\$61,500	\$73,400
Commercial/Industrial Appraiser/Analyst	89	\$41,800	\$51,900	\$63,500
Appraisal Specialist - Unique Property, Railroad and Utility, Mineral	12	\$48,400	\$51,100	\$56,500
Data Collector - Commercial/Industrial	8	\$42,800	\$51,500	\$59,000
REAL PROPERTY APPRAISAL/ASSESSMENT: RESIDENTIAL				
Real Property Appraisal/Assessment Manager - Residential	73	\$48,000	\$65,000	\$82,800
Real Property Appraisal/Assessment Supervisor - Residential	47	\$53,000	\$67,300	\$83,000
Senior Residential Appraiser/Analyst	79	\$46,000	\$55,000	\$62,000
Residential Appraiser/Analyst	202	\$38,000	\$44,100	\$55,000
Data Collector - Residential	30	\$30,000	\$35,500	\$43,400
PERSONAL PROPERTY APPRAISAL/ASSESSMENT				
Personal Property Manager	53	\$49,400	\$62,000	\$80,800
Personal Property Supervisor	19	\$41,000	\$52,500	\$60,000
Senior Personal Property Appraiser/Analyst	20	\$38,500	\$50,500	\$56,000
Personal Property Appraiser/Analyst	27	\$26,900	\$34,000	\$46,000
LEGAL				
Attorney	7	\$72,600	\$87,000	\$108,000
Administrative Defense Coordinator	6	\$60,300	\$84,500	\$105,500
Board of Review Member/Appeal Hearing Judge	8	\$46,000	\$56,900	\$85,000
Exemption Analyst	8	\$44,000	\$56,500	\$76,000
Title Research Specialist	7	\$33,000	\$42,000	\$58,000
CAMA/IT				
IT Manager/IT Coordinator	18	\$66,100	\$80,200	\$92,000
Senior IT Staff	15	\$58,000	\$87,000	\$92,600
Senior Statistician/Analyst/CAMA Modeler	23	\$58,500	\$65,000	\$80,000
Statistician/Analyst/CAMA Modeler	8	\$54,300	\$58,000	\$71,000
IT Staff	2	*	*	*

Looking at Costs per Parcel in Walters gives us a range of \$20.93 to \$26.85 per parcel. If we use a trend similar to the ECI rounded to 30% since employee costs makes the majority of expenses in an assessment office. That is \$27.21 to \$34.91 adjusted to 2023 dollars. For this analysis, \$31.00 per parcel cost is close to the middle.

Table 40. Estimated cost per parcel by type of agency leadership*

Agency Headed by	Cost per Parcel	
	Agency Head Elected	Agency Head Appointed
An individual	\$21.75	\$20.93
A board	\$26.85 ^a	\$21.43

^a Holding constant other factors in the model.

327,483 parcels x \$31.00/parcel cost = **\$10,151,973 base budget**

This may appear lower than the salary estimates. This is an estimated base value. But in Tables 39 & 41 discuss the multipliers to the base. The point is the existing budget of **\$2,540,000** appears to be insufficient compared to what is proposed in H.480.

Assessment Organization

Under the H.480, the Office of Statewide Reappraisals and a Statewide Reappraisal System under PVR is a bad idea. Please believe me, I hold PVR leadership and staff in high regard. They do their absolute best with the resources they have. This is not meant to be a slight to the Division.

Here is the issue, in my professional opinion, of the bill H.480 as written:

- PVR would be overseeing all real property valuation in the State.
- Then PVR would be performing its own audit through the Ratio Study.
- Grievance and State Hearing Officer process would still be under its control.
- To reach a body outside PVR’s influence would be the Superior Court and/or Supreme Court of Vermont.
- PVR has the potential to take over all functions of the Grand List.

This has the potential for too much overreach in one Division. I have full faith that the current leadership and staff would not. But the future is unknown, and this could lead to a potential conflict of interest.

If and only if, the intent of the Committee was to move forwards with the Office of Statewide Reappraisals (OSR), I will propose possible organizational options. I will call this Option “A”. My recommendation would be they would have to be separate from PVR. In 8 V.S.A. § 2241(11) which is applicable for the “fee appraisal” industry was put in place to discourage undue influence in the appraisal process.

- PVR should audit the results of the OSR. As part of the appraisal process, a ratio study will have to be performed.
- OSR should defend the values that they generate.
- OSR has to have competent staff with adequate education, training, and experience to perform specific types of appraisals, similar to the Competency Rule in USPAP.
- The towns would have to have the ability to request experts to be used for complex appraisal problems that the OSR staff does not normally have competency.

For this scenario, the strongest appraisal method would most likely be an AVM on an annual reappraisal schedule. This may shift a majority of the Grand List functions to the State. The State would be responsible for all reappraisal funding and defense.

Here are two alternatives to Option "A": (Options B and C)

- If it is the intent of the Committee for a 5-year, or less, reappraisal cycle, group similar cities and towns into, for a lack of a better term, Assessment Districts. The districts would exist "between" the municipalities and the State. For the sake of example, they could be grouped in 10 or so towns with reasonably similar markets. Those towns will be completed during the same year in the reappraisal cycle. 5 Assessment Districts could be reappraised per year, approximately 50 municipalities, ideally 65,500 +/- parcels per year.
- There needs to be elected oversight in this process. This could be one person, a committee, or a board. The elected official(s) need to be from the effected assessment area. This is crucial for the acceptance of equity. The direct subordinate, "manager," needs to be from outside the district to avoid conflicts of interest.

The reappraisals could be handled in two ways.

- For Option "B" there would be one Assessment Office (five in the State) that would oversee five Assessment Districts and rotate through the communities. This will require a unified CAMA system that would apply across the State. Electronic systems from other municipal offices would be key (i.e., permits, deeds, etc.). This will require more support by the State as far as physical locations, tools, vehicles, and other necessary items. Assessment offices can have a pool of subject matter experts depending on appraisal complexity: electrical inventory, telecommunications, industrial, etc.
- For the Option "C" reappraisal process, the Cities and Towns have greater control. With choice comes fiscal responsibility. They can collectively bargain with reappraisal firms to potentially bring down costs. For example, only a single land schedule would be developed and a local adjustment is applied if the town falls outside the scheduled results. Larger cities could choose to choose an alternate vendor with a more complex CAMA system. The reappraisal has the potential of being split between vendors. As an example, different vendors perform different steps in the appraisal process: commercial/industrial, electrical utility, residential inspections, and statistical analysis. This allows the existing appraisal expertise to come to bear. This will benefit small and large reappraisal firms alike.

Both options would need central control of some sort and there would be widely different uses of reappraisal vendors.

According to the testimony of Jill Remick, Director of PVR, currently 19 reappraisals on average are performed a year. This will need to increase to 50+ municipalities reappraised per year. This could happen with greater efficiency within the reappraisal process. Here are some possible solutions:

- Remove the requirement of interior inspection except in the case of changes of square footage, percent complete, new construction, etc.

- Coordinate inspections with Zoning and Planning and “access to inspect” is included in the permit application.
- Collective bargain for access to the Multiple Listing Services (MLS), NEREN, Loopnet, and others to have the ability to gauge quality, condition, and changes overtime.
- Clarify and/or define that assessment official(s) have “access to inspect” in the execution of their office, **Exterior Only**.
 - Example: Georgia Department of Revenue. *Board of Equalization 20 Hour Update (2018)*. page 85: O.C.G.A. § 48-5-264.1
- Integration of GIS in the assessment process outlined in Chapters 4 and 5 in Margie M. Cusack, et al., *GIS for Property Tax and Assessment Professionals (2018)*.
- Inspection alternatives - utilization of change detecting software from arial photographs, the use of pictometry for denser urban/suburban areas, LIDAR imagery, and possible new technologies in the future.

In real property modeling, the goal is to have an optimal model. The process of creating a modern robust assessment system can be daunting. The above suggestions are based on best practices within other states. It is not my place to suggest which assessment organization option is the best. All three options have strengths and weaknesses. It is my intent to let decision makers know that there are options available.

Training and Staff Retention

We cannot assume that all Listers, Assessors, and/or Reappraisal Firms are going to transition to a new assessment organizational model. The hiring of qualified staff would be daunting. The current educational model offered by The Vermont Association of Listers and Assessors (VALA) has a 3-year rotating cycle of IAAO courses offered. Depending on when you start the cycle, it can take 3 to 5 years to complete since you may not have the background to take more advanced courses offered earlier in the process. Not all Listers/Assessors have the desire to complete all the IAAO courses offered. PVR has a program for Vermont Property Assessor Certification Program for Listers and Assessors (VPACP). It has 12 course requirements and four certification levels. Due to the cyclical nature of the work, it takes approximately 3 years to reach competency in duties of an assessment office.

According to the U.S. Bureau of Labor Statistics, *Employee Tenure Summary*, UDL-22-1894, (9/22/2022):

“In January 2022, median employee tenure (the point at which half of all workers had more tenure and half had less tenure) for men held at 4.3 years. For women, median tenure was 3.8 years in January 2022...”

If the current training and competency cycle is 3 to 5 years, turnover at the median of the U.S. is approximately 4-years. The Listers and Assessors might have a greater than 4-year retention cycle. This may be to the pride of civic engagement and supporting their neighbors. We need to assume that this may not be the case with a change to the assessment organization.

There would have to be a reevaluation of training goals. Is the current rate of training meeting the needs of the organization? With the suggested changes in H.480, there is going to be a higher demand on training at all levels within whatever organizational structure that is created.

Here are some possible leadership solutions to help with employee retention.

- The use of clear and defined metrics for work performance that can lead to advancement. This may help to retain competent employees using compensation and non-compensation benefits. This will help support the goal of professional designations.
- Applying employee's goals in to work plans. The use of cohort learning and mentoring may help with retention, team development, and employee growth.
- Clearly defined duties and responsibilities for each job in relation to other jobs in the organization. This will help to avoid frustration and limits tasks from falling between the cracks.
- A robust leadership system to help support subordinates so they can receive the tools to be successful, "What do you need."

The ultimate goal is to form sustainable high-producing teams. The use of rightsizing staffing needs with temporary workers and reappraisal companies could meet challenges throughout the assessment year.

Final Thoughts

It is very hard to perform a cost-benefit analysis on equity in an assessment system. Either your system has equity, or it does not. In this analysis, I have distilled my close to two decades of experience in the real estate industry. I am not a statistician, but I have been trained in collegiate level statistical analysis techniques specifically for real property markets. It is my intent to give the decision-makers the sources so they can make informed decisions. These are not the only sources on this subject. Please use due diligence with the information contained in this document. I see that this is my civic duty to pay back the Vermonters for all the education and experience that they have provided me.

Sincerely,



Christopher M. Landin
Managing Director and Chief Appraiser
Landin & Associates Assessment Services LLC

Graduate of the Certificate Program in Real Property Assessment (CPRPA), from The University of British Columbia
Vermont Master Property Assessor (VMPA), from Property Valuation and Review
Professional Member of the International Association of Assessing Officers
Candidate for Two Designations from the International Association of Assessing Officers
Instructor for the International Association of Assessing Officers
Gold Standard Instructor (GSI), from the Real Estate Educators Association

Bibliography

- Appraisal Foundation, The Appraisal Standards Board. (2020). *Uniform Standards of Professional Appraisal Practice* (2020-2021 ed.). The Appraisal Foundation, Washington, DC.
<https://appraisalfoundation.org/imis/itemDetail?iProductCode=405&Category=PUB>
- Appraisal Institute (2015). *The Dictionary of Real Estate Appraisal* (6th ed.) Appraisal Institute, Chicago, IL.
<https://www.amazon.com/Dictionary-Real-Estate-Appraisal-6th/dp/193532862X>
- Appraisal Today (02/05/2013). How Old Are Appraisers and When Do They Plan to Retire, *Appraisal Today*, Alameda, CA. <https://appraisaltoday.com/2013/02/05/how-old-are-appraisers-and-when-do-they-plan-to-retire/>
- Berry, C. (2021). *Reassessing Property Tax*, The University of Chicago-Harris School of Public Policy, Chicago, IL. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3800536
- Bidanset, P. and Rakow, R. (July 2022). *2019 Survey on the Use of Automated Valuation Models (AVMs) in Government Assessment Offices: An Analysis of AVM Use, Acceptance, and Barriers to More Widespread Implementation*, Working Paper WP22PB1. Lincoln Institute of Land Policy, Cambridge, MA. <https://www.lincolninst.edu/publications/working-papers/2019-survey-use-automated-valuation-models-avms-in-government-assessment>
- Bogin, A. N. and Shui J. (March 2019). *Appraisal Accuracy and Automated Valuation Models in Rural Areas, FHA Working Paper 18-03*. Federal Housing Administration, Washington, DC.
https://www.fhfa.gov/PolicyProgramsResearch/Research/PaperDocuments/AVMs-versus-Appraisals-in-Rural-Areas_20180419.pdf
- Clark, L. (February 2021). How Many People Do I Need in My Office? *Fair & Equitable, Vol. 19 Issue 2*. International Association of Assessing Officers, Kansas City, MO.
https://www.iaao.org/publications/Fair_and_Equitable/FE_February_2021.pdf
- Cusack, M. M., Bidanset, P. E., and Fasteen, D. J., (2018). *GIS for Property Tax and Assessment Professionals*. International Association of Assessing Officers, Kansas City, MO.
<https://www.amazon.com/GIS-Property-Tax-Assessment-Professionals/dp/0883292432>
- Department of Taxes-Property Valuation and Review. (June 2022). *Vermont Property Assessor Certification Program for Listers and Assessors (VPACP)*, Publication GB-1100. Department of Taxes, Montpelier, VT. <https://tax.vermont.gov/sites/tax/files/documents/GB-1100.pdf>
- Department of Taxes-Property Valuation and Review. (2023). *Property Valuation and Review 2023 Annual Report*, Publication RP-1295-2023. Department of Taxes, Montpelier, VT.
<https://tax.vermont.gov/pvr-annual-report>

- Georgia Department of Revenue. (May 2018). *Board of Equalization 20 Hour Update*. Georgia Department of Revenue, Atlanta, GA.
https://dor.georgia.gov/sites/dor.georgia.gov/files/related_files/document/LGS/Training%20Program/BOE/20%20hr%20BOE%20Manual%20%2805-18%29.pdf
- Gloudeman, R. J. (August 2011). The Coefficient of Price-Related Bias: A Measure of Vertical Equity. *Fair & Equitable, Vol. 9, Issue 8*. International Association of Assessing Officers, Kansas City, MO.
https://iaao.org/Publications/Fair_and_Equitable/Archive/Aug_11_FE/FE_August_2011.pdf
- International Association of Assessing Officers. (2010). *Property Assessment Valuation (3rd ed.)*. International Association of Assessing Officers, Kansas City, MO.
<https://www.iaao.org/Store/SearchResults.aspx?Category=BOOKS&Page=2>
- International Association of Assessing Officers. (2013). *Standard on Ratio Studies*. International Association of Assessing Officers, Kansas City, MO.
https://www.iaao.org/media/standards/Standard_on_Ratio_Studies.pdf
- International Association of Assessing Officers. (2017). *IAAO 2016 Assessment Industry Compensation Survey*. International Association of Assessing Officers, Kansas City MO.
<https://www.iaao.org/store/detail.aspx?id=BK0100>
- International Association of Assessing Officers. (2017). *Standard on Mass Appraisal of Real Property*. International Association of Assessing Officers, Kansas City, MO.
<https://www.iaao.org/media/standards/StandardOnMassAppraisal.pdf>
- International Association of Assessing Officers. (2018). *Standard on Automated Valuation Models (AVMS)*. International Association of Assessing Officers, Kansas City, MO.
https://www.iaao.org/media/standards/Standard_on_Automated_Valuation_Models.pdf
- New York State Board of Real Property Services - Office of Real Property Services. (April 2012). *Uniform Assessment Standards, (9/11), Publication: 1025*. New York State Department of Taxation and Finance, Albany, NY. <https://www.tax.ny.gov/pdf/publications/orpts/uniformassmtstndrd.pdf>
- Quintos, C. (2020). A Gini Measure for Vertical Equity in Property Assessments. *Journal of Property Tax Assessment & Administration, Vol. 17, Issue 2*. International Association of Assessing Officers, Kansas City, MO. <https://researchexchange.iaao.org/jptaa/vol17/iss2/>
- Seeley, M. (July 2020). The Silver Tsunami. *Fair & Equitable, Vol. 18, Issue 6*. International Association of Assessing Officers, Kansas City, MO.
https://www.iaao.org/publications/Fair_and_Equitable/FE_July_2020.pdf

- Schneider J. W. (Q4 2017). Tackling the Tough Topics. *Valuation*. Appraisal Institute, Chicago, IL.
https://www.valuationdigital.com/valuation/q4_2017/MobilePagedReplica.action?pm=2&folio=Cover#pg1
- Tiebout, C. M. (October 1956). A Pure Theory of Local Expenditures. *The Journal of Political Economy*, Vol. 64, No. 5. The University of Chicago Press, Chicago, IL.
<http://www.jstor.org/stable/1826343>
- U.S. Bureau of Labor Statistics. (9/22/2022). *Employee Tenure Summary*, UDL-22-1894. U.S. Bureau of Labor Statistics, Washington, DC. <https://www.bls.gov/news.release/tenure.nr0.htm>
- U.S. Bureau of Labor Statistics. (2023). *Employment Cost Index*. U.S. Bureau of Labor Statistics, Washington, DC. <https://www.bls.gov/eci/>
- University of British Columbia- Sauder School of Business. (2014). *BUSI 344 Lesson 8 Supplement Time Adjustment Illustration*. University of British Columbia, Vancouver, BC.
<https://www.sauder.ubc.ca/programs/real-estate/credit-programs/busi344-statistical-computer-analysis>
- University of British Columbia- Sauder School of Business. (2018). *Foundations of Real Property Assessment and Mass Appraisal*. University of British Columbia, Vancouver, BC.
<https://www.sauder.ubc.ca/programs/real-estate/credit-programs/busi443-foundations-real-property-assessment-mass-appraisal>
- Vermont Association of Listers and Assessors. (2021). *VALA Annual Conference 2021*. Vermont Association of Listers and Assessors.
<https://valavt.org/wp-content/uploads/sites/33/2022/09/VERMONT-ASSOCIATION-OF-LISTERS-AND-ASSESSORS-2021-annual-conf-minutes.pdf>
- Vermont Association of Listers and Assessors. (2023). *Training VALA 2023 IAAO Classes*. Vermont Association of Listers and Assessors. <https://valavt.org/education/training/>
- Walters, L. C. & IAAO Research Committee (2014). *Staffing in Assessment Offices in the United States and Canada: Results of 2013 Survey*. International Association of Assessing Officers, Kansas City, MO.
https://www.iaao.org/wcm/Resources/Research_Library/Staffing_Benchmark_Survey_2013/wcm/Resources_Content/Library/Staffing_Benchmark_Survey_2013.aspx?hkey=c5897c6e-1a5b-47e8-ae92-1594e6d3648b
- Wood, F. A. (1894). History of Taxation in Vermont. *Studies In History, Economics and Public Law*, Vol. IV, Num. III. Columbia College, New York, NY.
<https://ideas.repec.org/a/sae/anname/v5y1895i4p148-149.html>

Youngman, J. (2016). *A Good Tax*. Lincoln Institute of Land Policy, Cambridge, MA.
<https://www.lincolninst.edu/publications/books/good-tax>