The Property Tax in Focus: Are Assessments and Property Taxes Equitable?

Comparative Measures of Property Tax Equity in Suffolk County, Massachusetts

2022 August 28-31 ★ Boston, Massachusetts

IAAO Annual Conference & Exhibition

Promoting Professionalism in Assessment Administration

IAAO Annual Conference & Exhibition 2022

Moderators/Presenters:

- **Margie Cusack FIAAO**, *Retired, Cook County, IL and IAAO*
- **Ron Rakow**, *Lincoln Institute of Land Policy*

Panelists:

- **Ruud M. Kathmann**, *Dutch Council for Real Estate Assessment*
- **Daniel McMillen**, *University of Illinois at Chicago*
- **Carmela Quintos**, *New York City Department of Finance*
- **Jennifer Rearich**, *Maricopa County Assessor's Office*
- **Joan Youngman**, *Lincoln Institute of Land Policy*

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Recent Academic Papers on Assessment Equity

✓*Reassessing the Property Tax*, Christopher Berry, The University of Chicago Harris School of Public Policy and the College. 2021

✓*The Assessment Gap: Racial Inequalities in Property Taxation*. Carlos Avenancio-León, Indiana University and Troup Howard, University of California, Berkeley. 2020

✓*Why are Residential Property Tax Rates Regressive?* Natee Amornsiripanitch, Federal Reserve Bank of Philadelphia. 2020

*All find significant levels of **regressivity** in assessments using national datasets*

Focus on Harris School Findings

*"**I find pervasive regressivity in assessments**: lower-priced properties are assessed at a higher proportion of their sale prices than are higher-priced properties. As a result, **property tax bills**, as a share of property price, **are also regressive**."*

*"**Assessment regressivity does not appear to result from explicit policy choices**, such as limits on assessment levels or growth, granting of appeals, or differential treatment of condominiums and single-family homes. **Rather, regressivity results in large part from data and modeling limitations in assessment.**"*

Suffolk County, MA Analysis

- National study analyzes 26 million sales from 2,600 US counties over the decade from 2007-2017
- Harris School also provides county level analysis as a standalone report on its *Property Tax Fairness* website
- A county level analysis provides an opportunity for a more in-depth review to better understand and clarify the Harris School study findings
- This presentation focuses on the Harris School analysis of Suffolk County, Massachusetts using **2017** sales

An Evaluation of Property Tax Regressivity in Suffolk County, Massachusetts

Center for Municipal Finance

THE UNIVERSITY OF CHICAGO Harris Public Policy

1 Introduction

The property tax is the single largest source of revenue for American local governments. Cities, counties, school districts, and special districts raise roughly $500 billion per year in property taxes, accounting for 72% of local taxes and 47% of locally raised revenue (U.S. Census Bureau 2016). Whether residents rent or own, property taxes directly or indirectly impact almost everyone.

In many cities, however, property taxes are inequitable; low-value properties face higher tax assessments, relative to their actual sale price, than do high-value properties, resulting in regressive taxation that burdens low-income residents disproportionately.

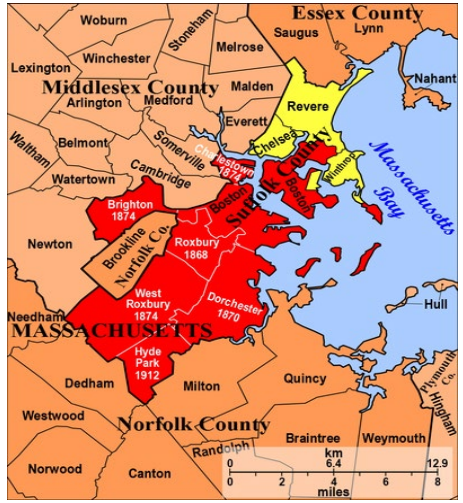
The standard approach for evaluating the quality and fairness of assessments is through a sales ratio study (International Association of Assessing Officers 2013). A property's sales ratio is defined as the assessed value divided by the sale price. A sales ratio study evaluates the extent of regressivity in a jurisdiction, along with other aspects of assessment performance, by studying sales ratios for properties that sold within a specific time period. A system in which less expensive homes are systematically assessed at higher sales ratios than more expensive homes is *regressive*.

This report presents a basic sales ratio study for Suffolk County, Massachusetts, based on data from CoreLogic. CoreLogic collects property data from assessors (and other sources) across the country. We use data for residential properties that sold between 2010 and 2017 (the most recent year available for this jurisdiction) and are classified as arm's-length transactions by CoreLogic. For each home that sold, we compute the sales ratio as the assessed value in place on January 1 of the sale year divided by the sale price. For more details, see the Appendix.

2 Sales Ratio Analysis

The relationship between assessments and sale prices is regressive if less valuable homes are assessed at higher rates (relative to the value of the home) than more valuable homes. To evaluate regressivity in assessments, Figure 2.1 presents a binned scatter plot of sales ratios against sale prices.

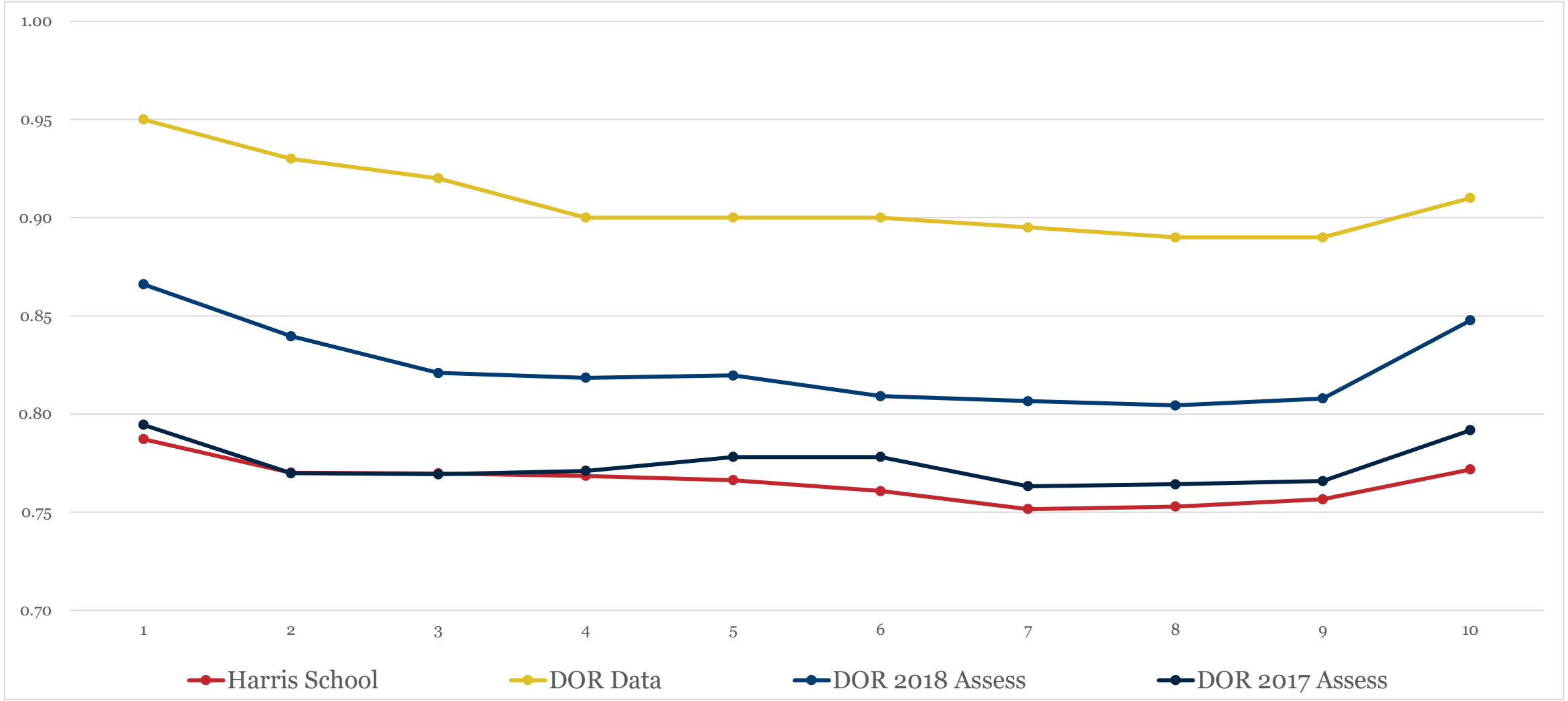
Suffolk County, Massachusetts



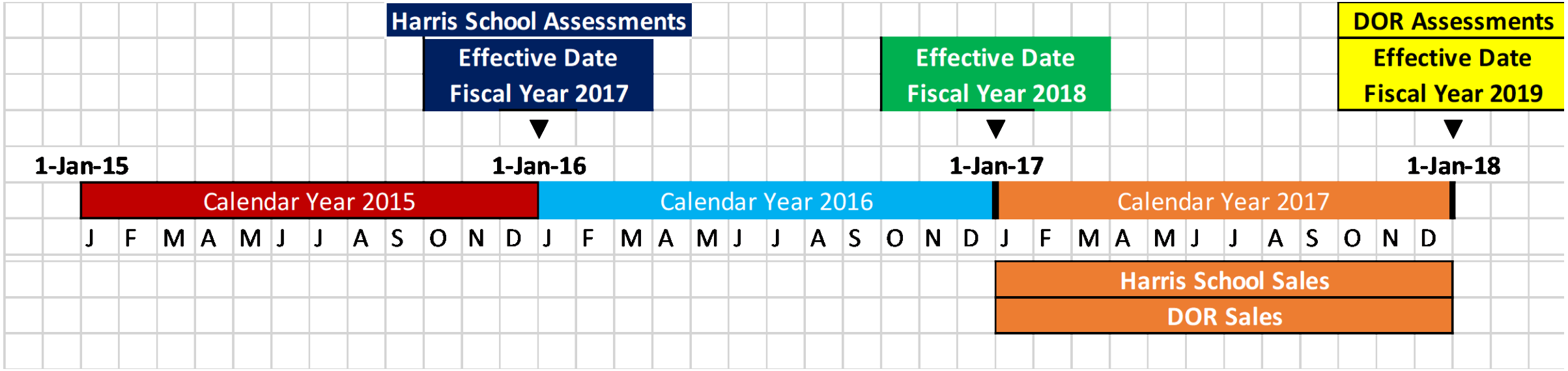
- Suffolk County includes Boston, Chelsea, Revere and Winthrop
- Each community has its own assessing office that establishes assessed values; local governments set the tax rate and can implement various tax relief programs at local option
- Sales and assessment information for the comparative study came from the Massachusetts Department of Revenue, which makes data from each community's sales ratio studies available on its website

City	2017 Sales	%Total
Boston	6,157	86.2%
Chelsea	250	3.5%
Revere	500	7.0%
Winthrop	238	3.3%
Total	7,145	100.0%

Median ASR by Sale Price Decile



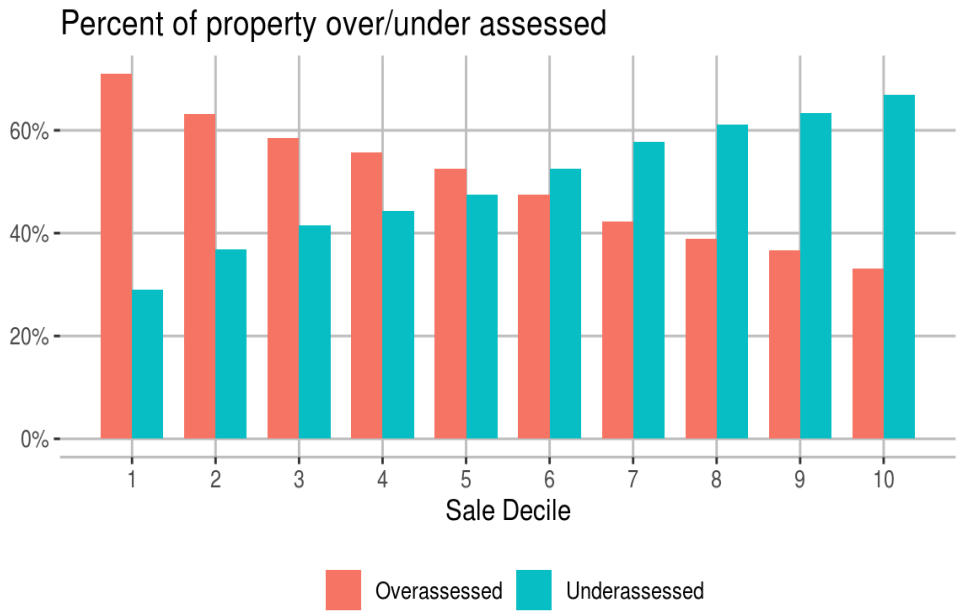
Timeline for Sales and Assessment Data



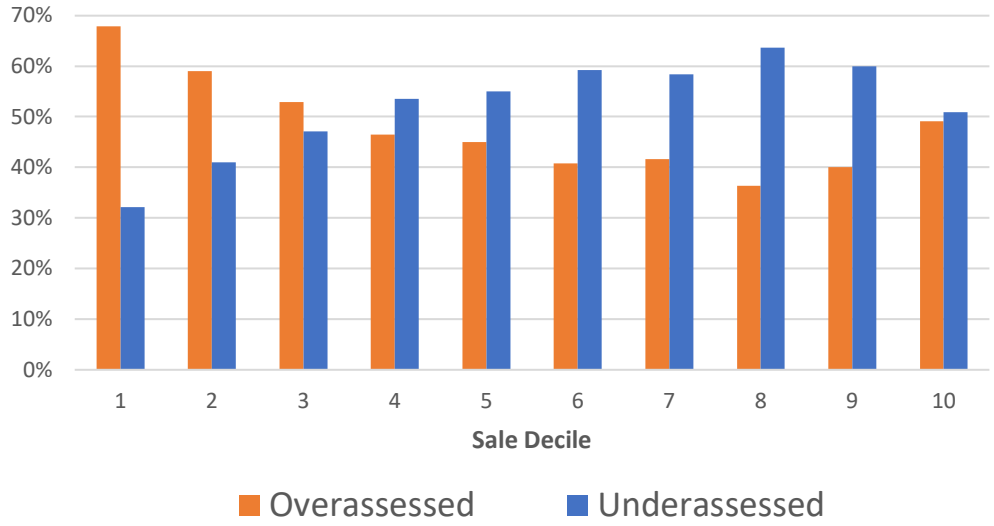
- The Harris School study may have incorrectly assumed that fiscal year 2017 assessed values and calendar year 2017 sales represented the same period, when in fact there is a significant difference.
- Harris school sales range from ***12 to 24 months*** away from the effective date of Fiscal Year 2017.
- DOR sales range from ***1 to 12 months*** away from the effective date of Fiscal Year 2019.

Percent of Property Over/Under Assessed

Harris School



DOR Data



- Lower-priced properties are more likely to be overassessed than high-priced properties.

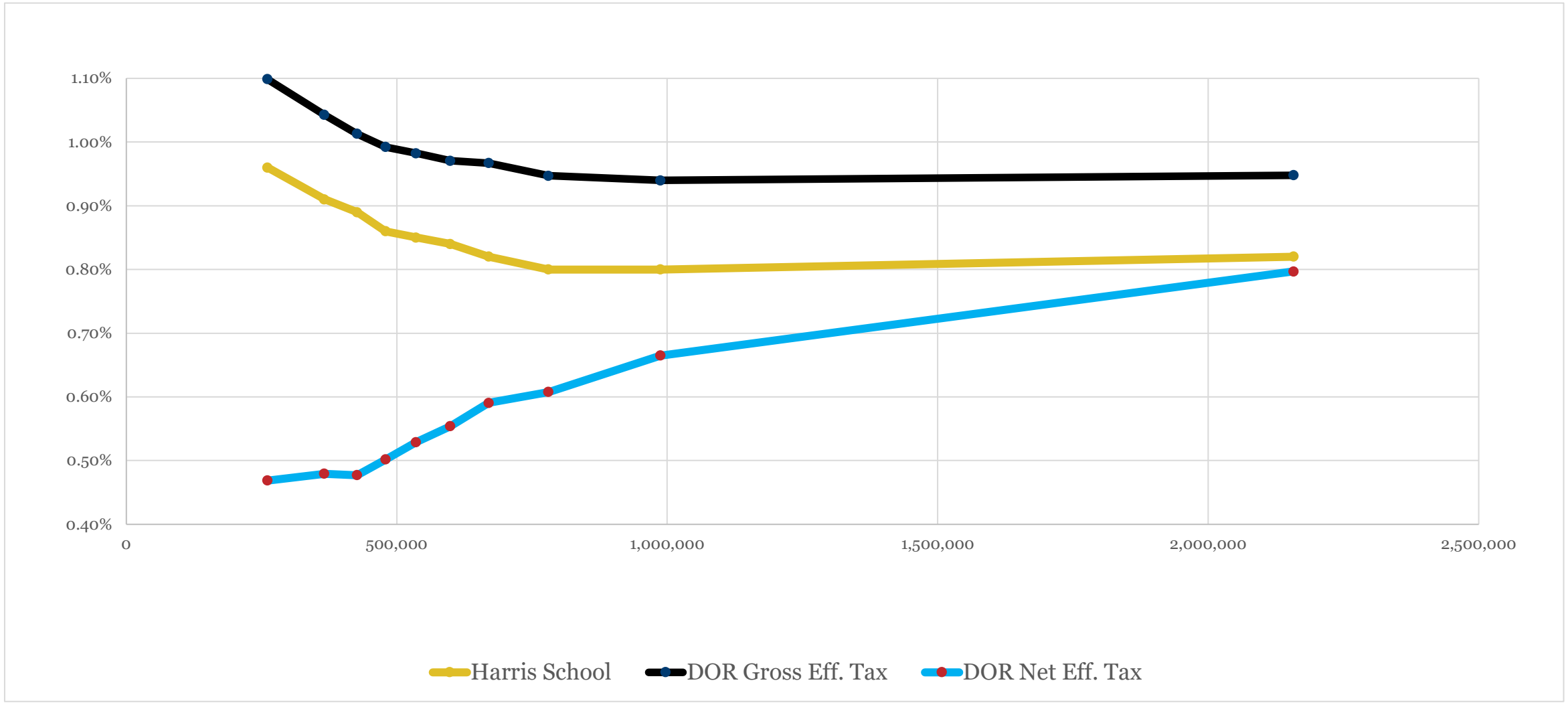
ASR Statistics from Harris School and DOR Data

	Median	COD	PRD	PRB
Harris School	0.77	12.24	1.014	0.012
DOR Data	0.91	8.10	1.007	-0.007

- Differences in **Median Ratio** and **COD** are driven by the use of prior year assessments by the Harris School
  - Comparing sales that took place well after the effective date of the assessed values – especially in an changing market – likely leads to greater variability in the COD
  - The use of a lower ASR in the denominator of the COD calculation also contributes to a higher COD

- **PRD** and **PRB** are similar and well within IAAO standards

Effective Tax Rate Analysis



Effective Tax Rates

- The Harris School study clearly does not account for homestead exemptions
- This leads to an incorrect finding of a regressive pattern in effective tax rates, when in fact the effective tax rates in Suffolk County are significantly progressive
- The DOR Data - which includes the impact of the homestead exemption – shows a very progressive distribution of taxes, with higher-priced homes providing a subsidy to lower-priced homes

	Harris School	DOR Data	
Decile	Effective Tax Rate	Gross Tax Rate	Net Tax Rate
1	0.96%	1.10%	0.47%
2	0.91%	1.04%	0.48%
3	0.89%	1.01%	0.48%
4	0.86%	0.99%	0.50%
5	0.85%	0.98%	0.53%
6	0.84%	0.97%	0.55%
7	0.82%	0.97%	0.59%
8	0.80%	0.95%	0.61%
9	0.80%	0.94%	0.66%
10	0.82%	0.95%	0.80%

IAAO Sales Ratio Standard

- The Harris School study refers to the IAAO Standard on Sales Ratios several times. One of that standard's most important elements states:

  "The findings of a ratio study can only be as accurate as the data used in the study."

- Every state, county, township, city, and town may have separate:

  - ✓ assessment dates
  - ✓ assessment ratios
  - ✓ tax rate structures
  - ✓ exemption programs
  - ✓ overlapping taxing jurisdictions
  - ✓ etc.

- Massive commercially available datasets and powerful analytic tools may obscure the difficulties of capturing these crucial complexities, impacting the validity of the findings

Conclusions

- The Suffolk County study shows the difficulty of performing a complex sales ratio analysis on a national level
  - The median ASRs in the Harris School study likely used assessed values that were based on market conditions that existed 12 - 24 months earlier than the sales, which impact their relevance
  - The failure to account for homestead exemptions in the Suffolk County analysis led to an **incorrect finding of regressivity** in effective tax rates **when in fact the actual distribution is significantly progressive**
- Overall, the assessed values in Suffolk County demonstrate good performance with respect to assessment levels, consistency, and both horizontal and vertical equity
- Nevertheless, **both** the **Harris School** and **DOR** analysis find that lower-valued properties have slightly elevated ASRs when compared to higher-valued properties - ***an issue that warrants further study***
- If lower-valued properties present special valuation challenges that are inherent to real estate markets, properly structured and targeted exemption programs can help redress this imbalance and result in a property tax that is highly progressive

A few things to consider…..

- ***Is the analysis performed by the Harris School accurate for your City / County?***

- ***Given the complexity of performing a national ASR study, do local assessors need to play a greater role in providing guidance on assessment equity issues in their jurisdictions?***

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1. Measuring Equity in Assessments

Regressivity Measures

Price-Related Differential (PRD). Mean divided by value-weighted mean. Greater than 1.03 usually taken to imply regressivity for residential properties.

Regression-Based Methods:

Regress Assessed Values (A) on Sales Prices (P), test whether intercept > zero.

Regress ln(A) on ln(P), test whether slope < 1.

Regress A/P on P.

PRB: Regress percentage deviation of A/P from its median on ln((P+A)/2)/ln(2).

Gini Coefficients, other distributional-based measures.

Issues with Regressivity Measures

PRD: Very high-priced sales have a large effect on the statistic. Less sensitive to departures from proportionality for low-priced properties.

Regression-based measures: all are biased toward a finding of regressivity, sometimes severely so.

Gini coefficients: potentially very useful but need more practical experience with them.

Academic studies all use regression-based measures, sometimes while also reporting the PRD. As a result, they overstate the tendency toward regressivity.

Conducting National Studies

Commercial providers like CoreLogic typically purchase data from assessors. Sales prices and dates are generally recorded accurately.

Some problems:

1. Timing of assessments is unclear. What is the origination date of an assessment that is recorded for 2020? It is not clear for commercially provided data, and analysts typically do not know the details of legal context and assessment practices for their entire data set.

2. Partly as a result of (1), academic researchers do not adjust sales prices for inflation. Tend to understate assessment ratios in inflationary times. Do low- and high-priced properties appreciate at the same rate?

3. Other variables often appear to be recorded inaccurately, particularly deeds and property use. Inaccurate recording of property use is a serious problem in districts with classification.

4. Geography. Should analyze a single assessment jurisdiction, but more likely to be done at the county level.

Gini Based Measures

- Gini based measures are well known inequality measure in economics
- Gini coefficient - Introduced in **1912** by Corrado Gini to measure income inequality
- Vertical Equity - Nanak Kakwani introduced in **1977** a measure of vertical regressivity or progressivity of income taxes
- Gini based indices versus PRD, PRB, Clapp, Sunderman et.al.
  - Current indices are based on assessment and prices co-movement
  - Gini measurement are based on shares
    - "Everyone pays their own share"
  - Gini analysis is based on measures that capture the *distributional behavior* of shares of assessments relative to the distributional behavior of shares of prices, at increasing price levels

Pros and Cons

Properties of Vertical Equity Index	Gini – KI	PRD	PRB and Assessment-Sales Regressions
Unitless	✓	✓	✗
Bounded	✓	✗	✗
Familiarity	✗	✓	✓
Ease of use	✗	✓	✓
Testing	✓	✗	✓
Robust method	✓	N/A	✗
Type I error			
Robustness to sales price distortion			

Statistical Tools and Measures Task Force is studying the performance of the Tests under Type I error and distortions to price

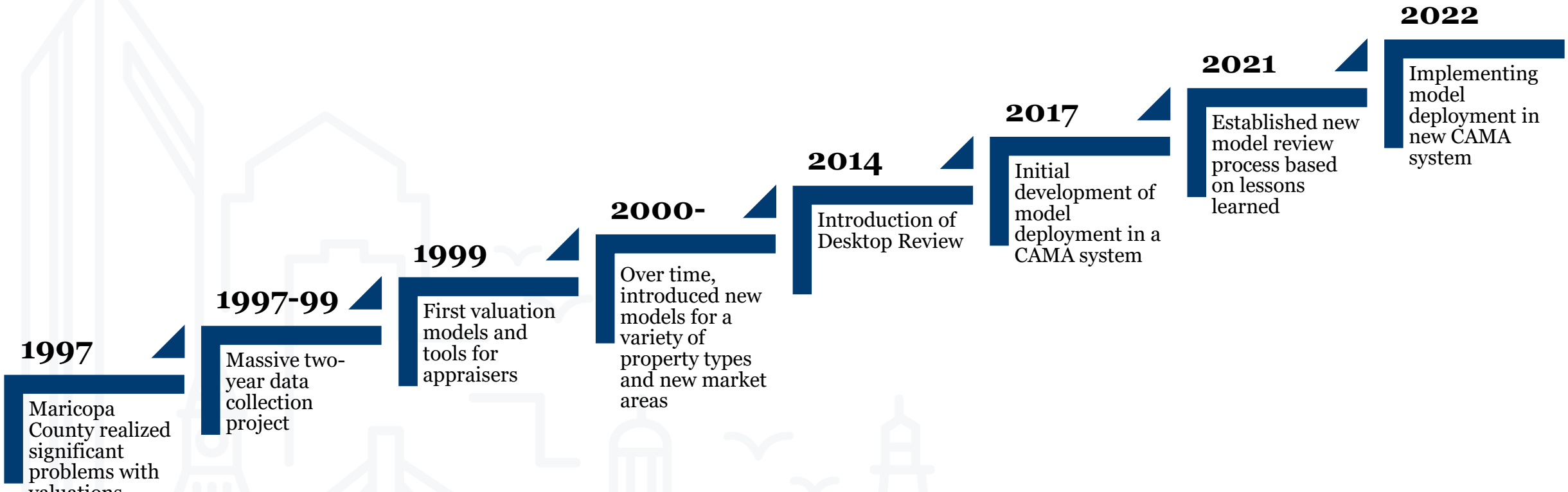
The Assessor's Role: The Netherlands

Four roles to consider:

- Proof of quality to oversight agency
- Explaining the assessed value to the taxpayer
- Defending the assessed value to the tax court
- Accountability to the public

2. Valuation Methods and Processes to Improve Assessment Equity

Implementing AVMs in Maricopa County



AVMs and Equity: Insights from the IAAO–Lincoln Institute Survey

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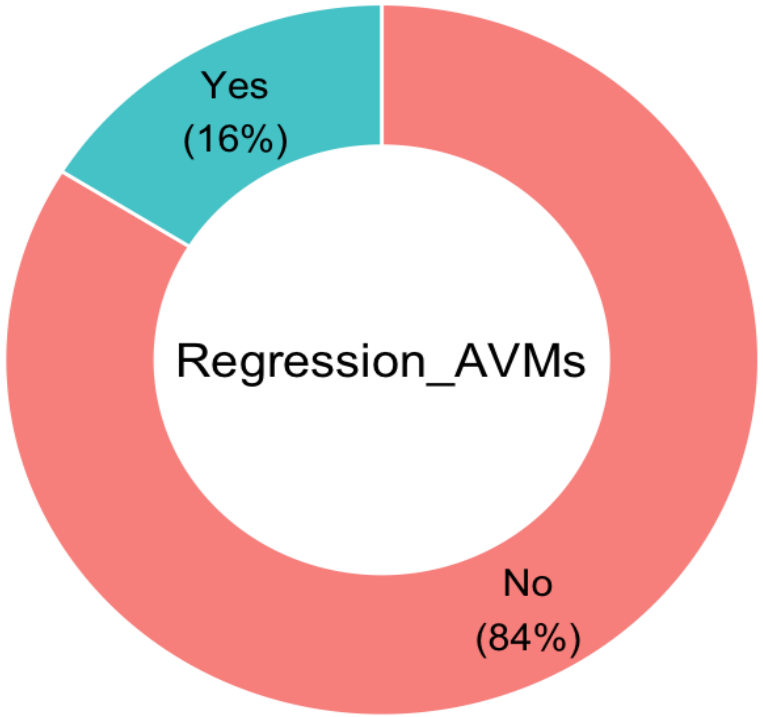
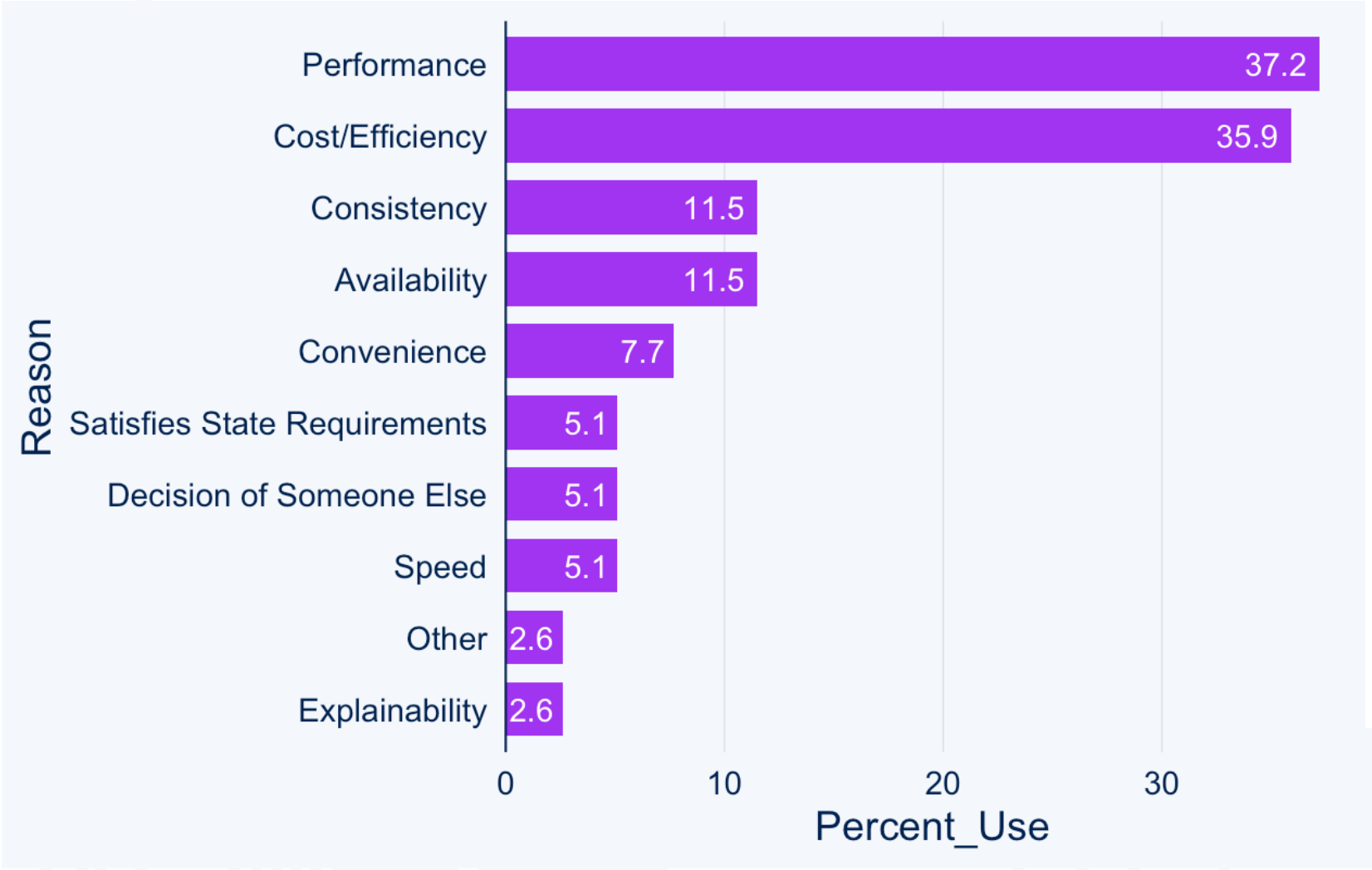
AVM Use

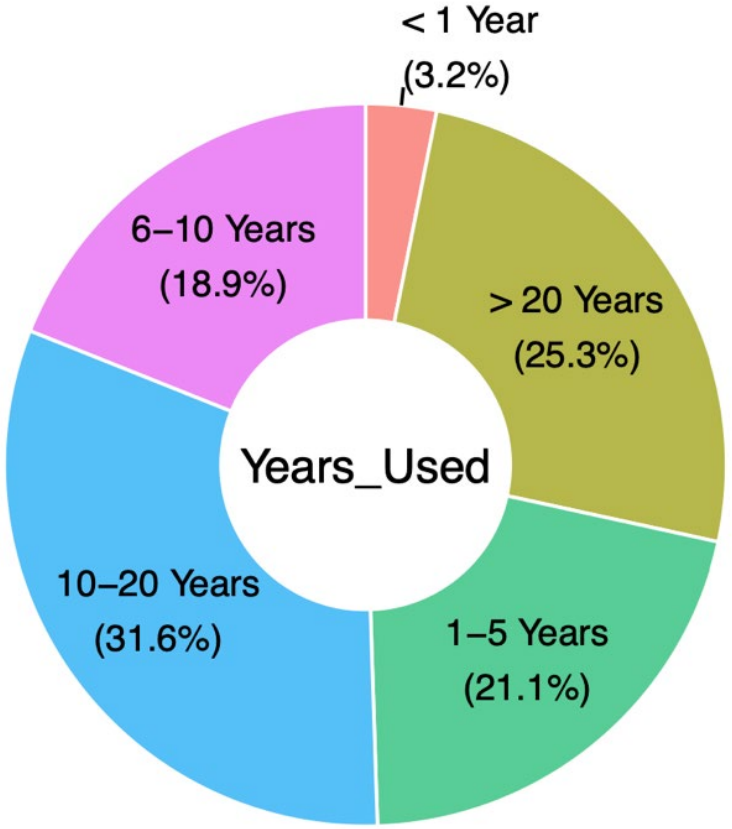


Barriers to AVM Implementation

AVM Survey Results – Reason to Use AVMs

Benefits of AVM Implementation





- AVMs aren't new and have staying power once implemented

The Use of AVMs in The Netherlands

The experience:

- 25 years, with 15 years of annual revaluations
- Decentralized
- But centralized system for special properties
- Market competition
- AVMs for sales comparison use MRA or clustering
- Valuation report

The Use of AVMs in The Netherlands

The developments:

- Artificial Intelligence and Machine Learning (AI/ML)
  - Easier to calibrate, harder to explain
- Open data and use of GIS
- Using (AI/ML) models for validating appraisals

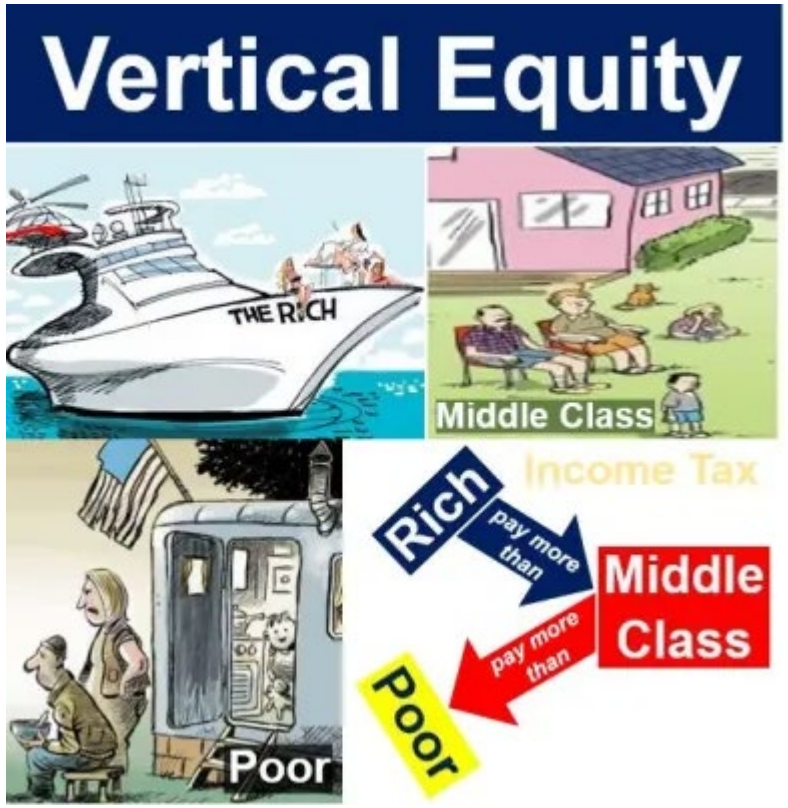
The background:

- Trust in government is diminishing (but in general sufficient)
- Cost of handling objections and appeals over 30% of total costs and rising
- Accountability

The Use of AVMs in the Netherlands

Risk of vertical inequity in current residential market:

- Market value increases of 15 – 20%
- Small number of sales for high-value property
- Professional valuers/tax advisors for objection/appeal of high-value properties
- Measures
  - Sales price ratio analysis
  - Model-to-model ratio analysis

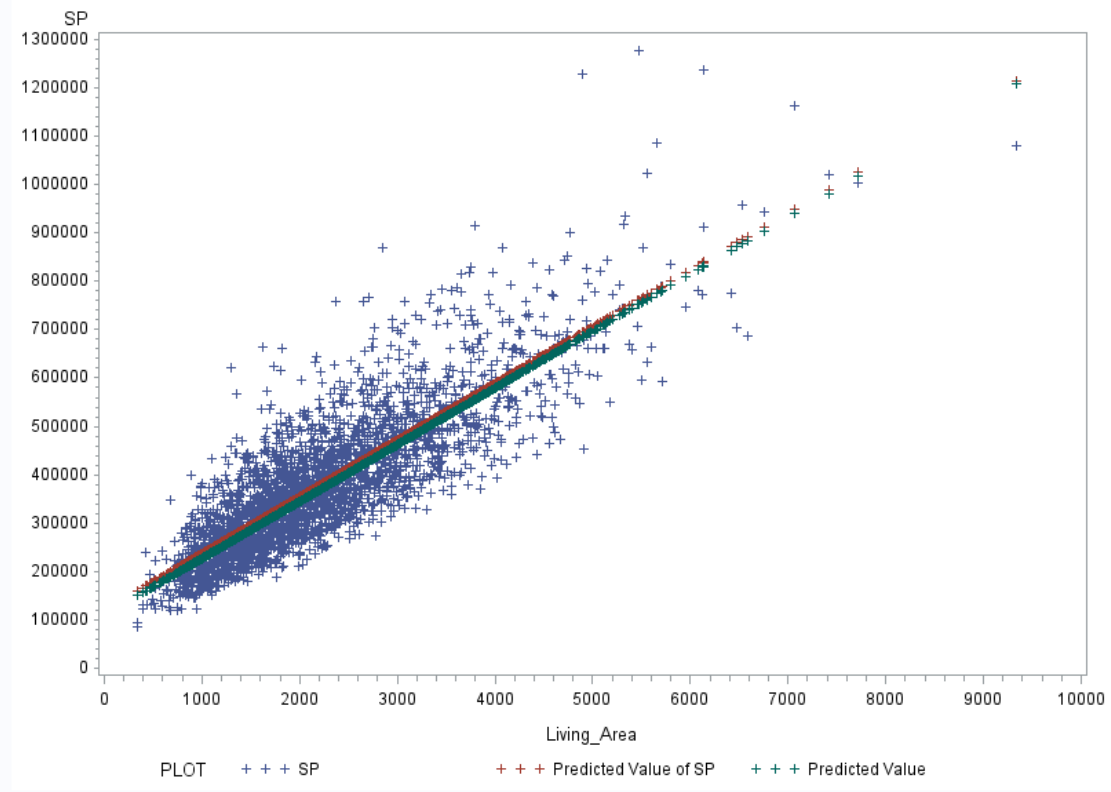


Addressing Valuation Issues

- No single ultimate type of valuation model
  - combine MRA, clustering, GWR, ML
- GIS and open data
  - location characteristics
  - analyze quality of data (including AI techniques)
- 3D important ?!
  - new specific market analyses (view from apartment, effectivity of solar panels)
  - quality of object characteristics (floor area calculated from a 3D model)

Valuation Methods to Improve Assessment Equity: Quantile Regressions

- Median regression is a special case of a quantile regression
- OLS estimates the mean response of the dependent variable on the independent variables
- For dependent variables that are skewed, quantile regression is a useful alternative because it is:
  - More robust to outliers



OLS mean regression is "pulled up" by outliers

What's New?

Data Collection

Data Testing

Valuation Review Procedures

Map Visualization and Geocode

How: Use address or street to assign XY coordinates (e.g., latitude & longitude)

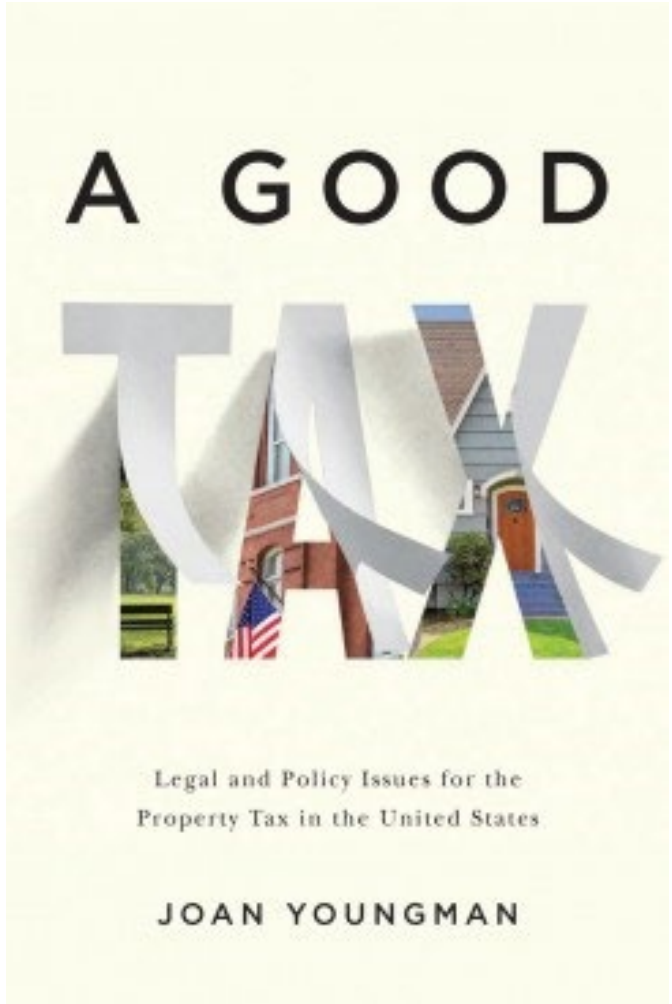
Why: This allows for location to be plotted on map, as well as all GIS-related calculations, functions, and variables to work

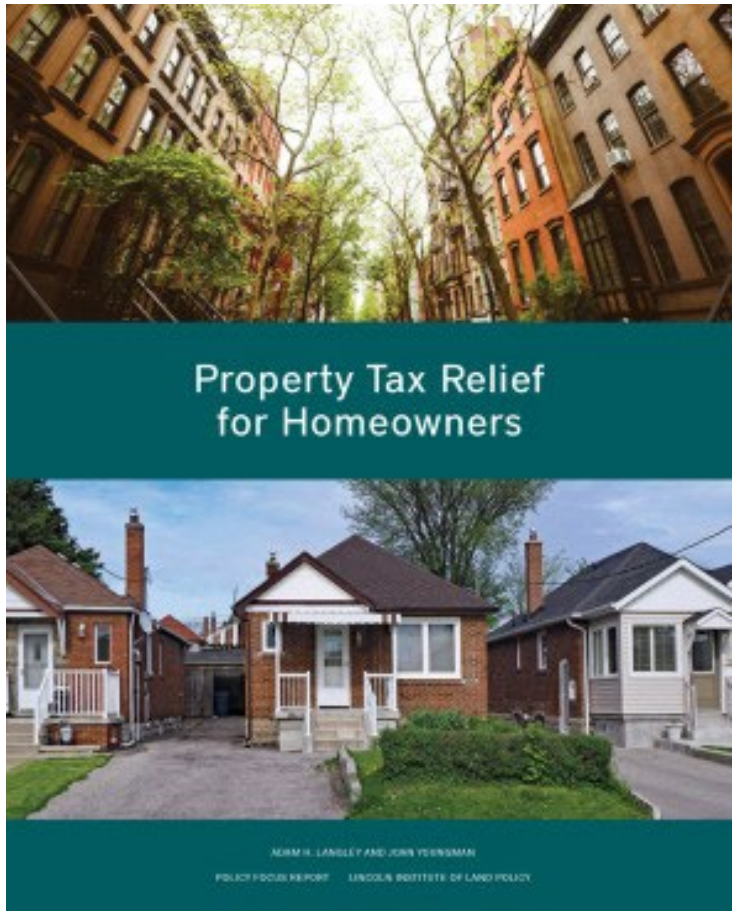
Emerging Geographically Weighted Regression

How: Creates regression model at each specified point (could be each sale, could be each street, could be each neighborhood)

Why: Improves accuracy and uniformity

3. Policies to Promote Property Tax Equity





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The Role of Tax Policy in Assessment Equity

- The importance of quality assessment practices
- The need for state oversight
- The problem of residual regressivity
- Policies to improve assessment equity

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Quality Assessment Practices

- Accurate assessments are essential for fairness

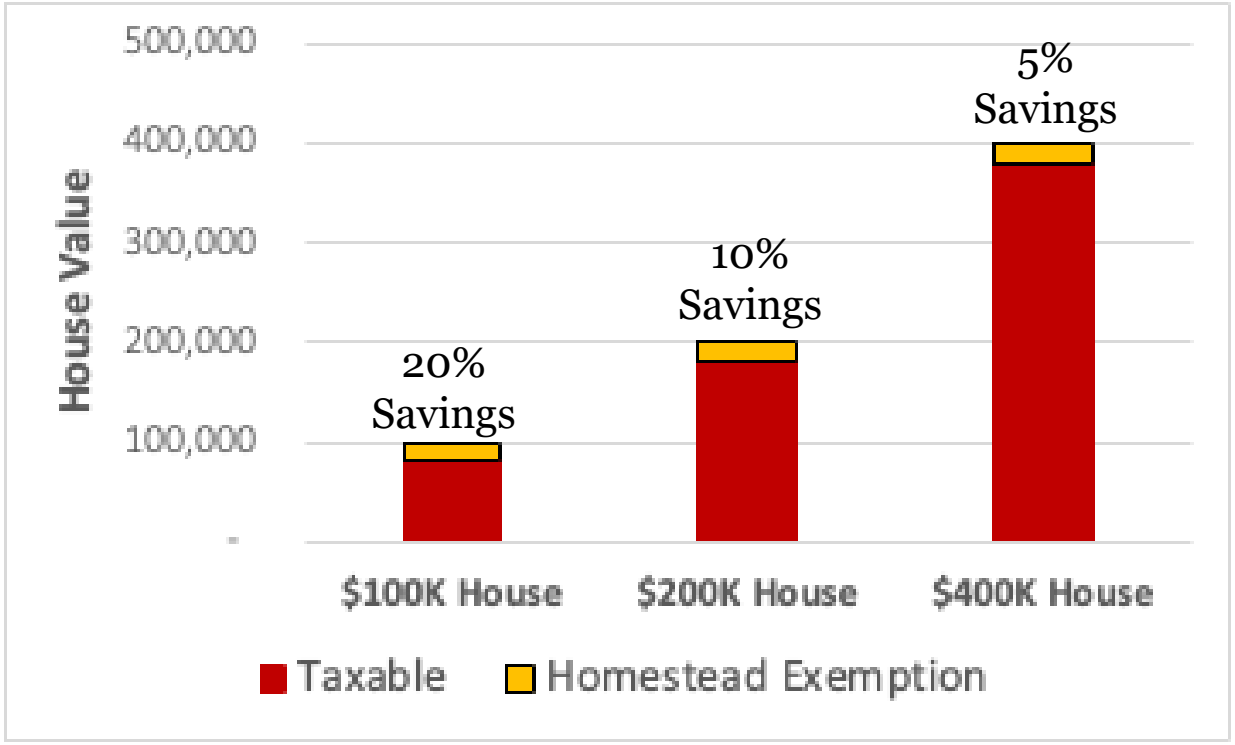
- Assessment accuracy requires:
  - Regular revaluations
  - Modern valuation techniques
  - State oversight
  - Effective appeals systems

- Adjust rates when values increase

Addressing Residual Regressivity: Circuit Breakers

- Designed to prevent households from being overburdened by property taxes
- Target relief to households with the heaviest tax burdens
- Provide relief from taxes above a threshold percentage of income

Addressing Residual Regressivity: Homestead Exemptions



Example: Impact of a $20k Homestead Exemption on 3 homes

Avoid Tax Limits, Especially Assessment Limits

- Shifts the tax burden to declining neighborhoods
- Large disparities in assessments of similar properties

Policies to Improve Assessment Equity

- The most important element: updated accurate value-based assessments
- The problem of residual regressivity
  - Challenges in accurately valuing low- and high-priced properties
- Examples of policy instruments to counter regressivity
  - Circuit breakers
  - Homestead exemptions or credits in dollar terms
- Important policies to avoid
  - Tax limitations, especially assessment limits
- Lessons from “big data” studies

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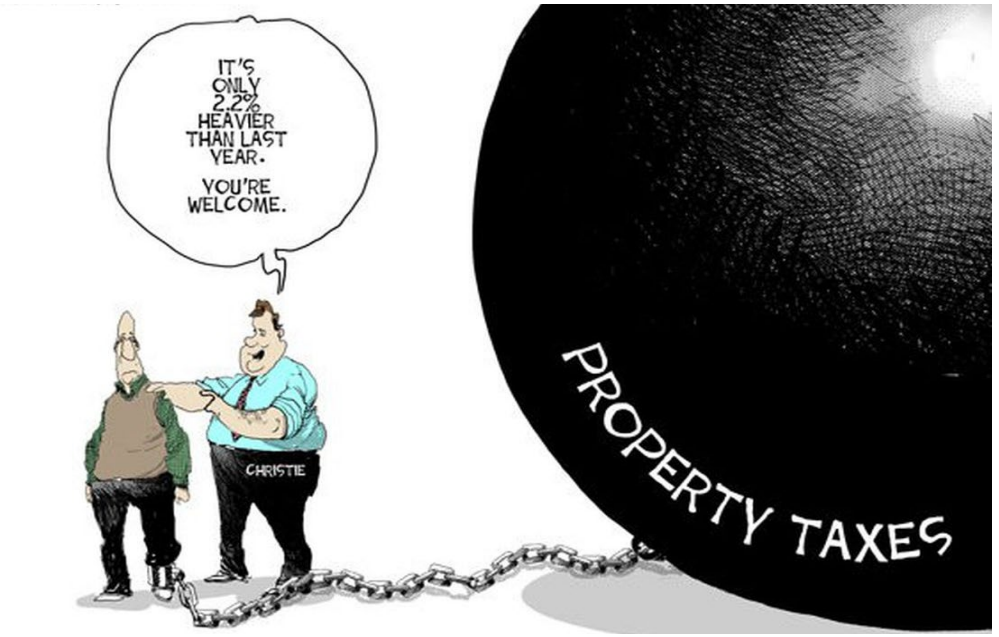
Policies to Promote Property Tax Equity: The Netherlands Experience

- Different tax rates for residential properties and non-residential properties
  - Difference tends to grow
- No exemptions for residential properties
  - Agricultural land is exempted
  - Remission of tax for low incomes



- Politicians are more interested in policies that favor certain groups than in equity of the system

4. Wrap up and Takeaways

- The Suffolk County study demonstrates the difficulty of performing a complex sales ratio analysis on a national level, however…..
- **….both** the **Harris School** and **DOR** analysis find that lower-valued properties have slightly elevated ASRs when compared to higher-valued properties - ***an issue that warrants further study.***
- There is not a single, definitive vertical equity measure, and must be aware of the strengths and limitations of each. It is important to consider multiple measures, including new options such as Ginis.
- AVMs are a major tool for producing equitable assessments, and advancements in this technology can lead to more widespread adoption and further improvements in valuation performance.
- Tax policy can play a key role in improving property tax equity.

For more resources: https://www.lincolninst.edu/courses-events/events/2022-lincoln-institute-sessions-iaao-annual-conference