

Basics

Mass
appraisal

Assessment
issues

Reval issues

Reval effects

What to do?

Reval Jumps

8 November 2023

Tom Sgouros

Finding value

Basics

Mass appraisal

Assessment issues

Reval issues

Reval effects

What to do?

- Value is not well defined.
- Sales prices are measurements of value. But all measurements are imperfect.
- Use statistics to find good estimates from noisy data.
- Commodity pricing theory. Hedonic pricing to address non-commodity markets.
- Neoclassical perspective on prices and information.

Mass appraisal: Basics

Basics

Mass appraisal

Assessment issues

Reval issues

Reval effects

What to do?

- Mass appraisal: defining a formula (a “model”) for assessed value that can be applied consistently to all properties.
- For a set of N parameters (e.g. number of bedrooms, number of bathrooms, location rating, whatever) p_i and constants R_i , a model looks like this:

$$V_{\text{assessed}} = R_1 p_1 + R_2 p_2 + \dots + R_n p_n$$

- The appraisal company uses sales data to come up with the R_i for a given house with parameters p_i .

Mass appraisal: Judgment

Basics

Mass appraisal

Assessment issues

Reval issues

Reval effects

What to do?

- Mass appraisal goals: Fairness and consistency.
- Individual appraisal goals: accuracy, defensibility.
- Mass appraisal requires judgments about what's important, how much to weight it, what kind of fit to the data, how good a fit is adequate.
- And also judgment about what exactly is fairness and how to rank the different kinds.

Regressive assessment

Basics

Mass appraisal

Assessment issues

Reval issues

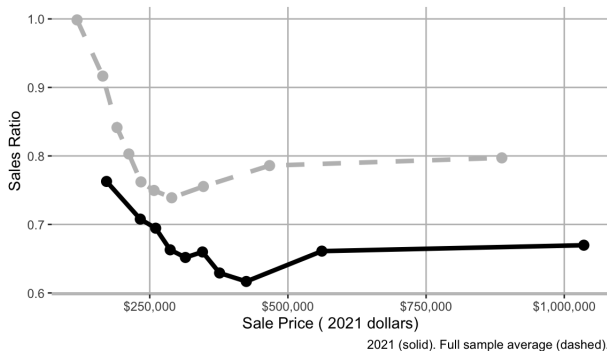
Reval effects

What to do?

- Study from The Property Tax Project of the Center for Municipal Finance at the University of Chicago.
- Assessments at the low end tend to overstate values compared to sales prices.
- Sales at middle and top end tend to understate.
- National trend, widely true.

Regressive assessment

Providence assessment data compared with sales prices, by decile.



Data and graphic provided by The Property Tax Project of the Center for Municipal Finance at the University of Chicago. See <https://sgouros.com/taxcommission/Providence.html>.

Basics

Mass appraisal

Assessment issues

Reval issues

Reval effects

What to do?

Overfitting data

Basics

Mass appraisal

Assessment issues

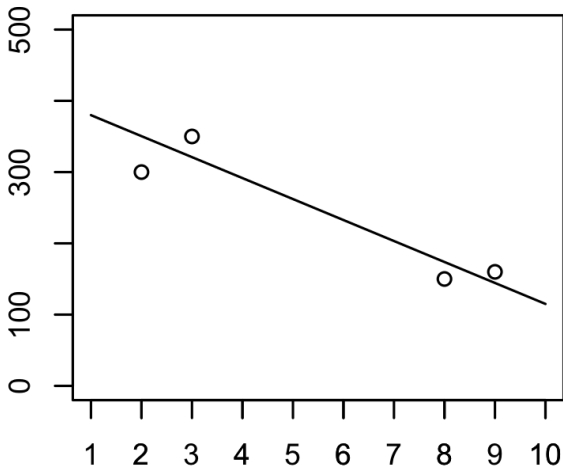
Reval issues

Reval effects

What to do?

- Linear fit in many dimensions.
- Simpler to consider a one-dimensional case, with many terms.
- Imagine small town, ten identical houses on a single street with a nice lake at the 1 end and the town dump at the 10 end.

Sample town



Circles are the sales data. A one-dimensional linear fit is shown that might be used to assign values to the houses that didn't sell.

Basics

Mass appraisal

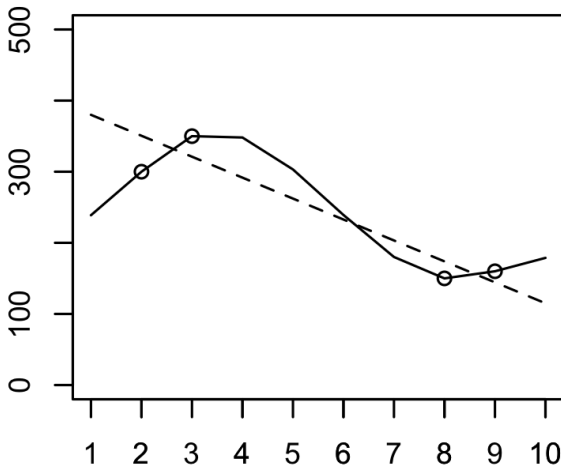
Assessment issues

Reval issues

Reval effects

What to do?

Sample town



One could also use a more complicated polynomial, that fits the data better, but offers some offenses to people's intuition about values, e.g. houses 1 and 10.

Basics

Mass appraisal

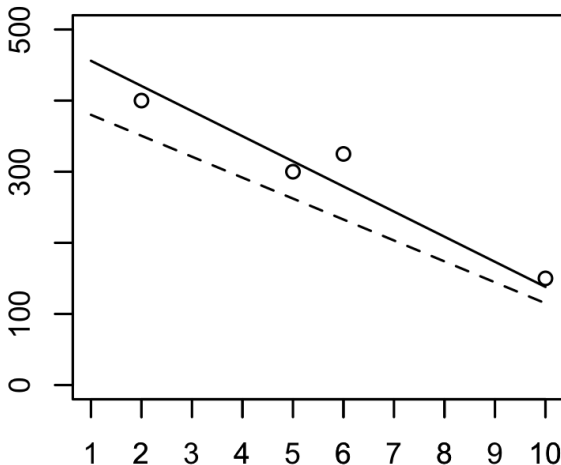
Assessment issues

Reval issues

Reval effects

What to do?

Sample town



Three years later, new sales data. One could simply draw a different line. But if you were used to the polynomial approach, you might be dissatisfied with the fit.

Basics

Mass appraisal

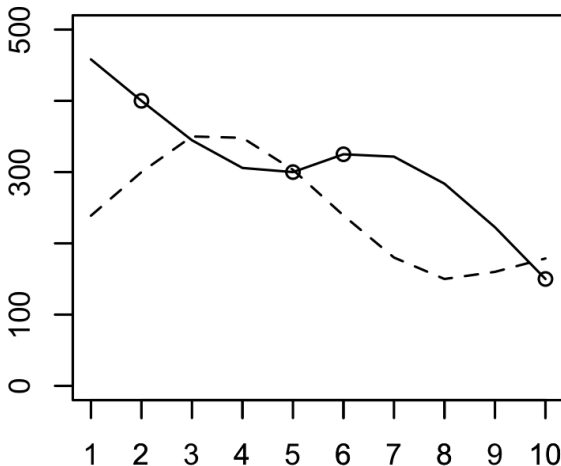
Assessment issues

Reval issues

Reval effects

What to do?

Sample town



Applying the polynomial, the fit is much better, but look at the swings in assessment experienced by houses 1, 7, 8, and 9.

Basics

Mass appraisal

Assessment issues

Reval issues

Reval effects

What to do?

Real Providence

Basics

Mass appraisal

Assessment issues

Reval issues

Reval effects

What to do?

- Tax assessor data 2003-2023. 7 revals

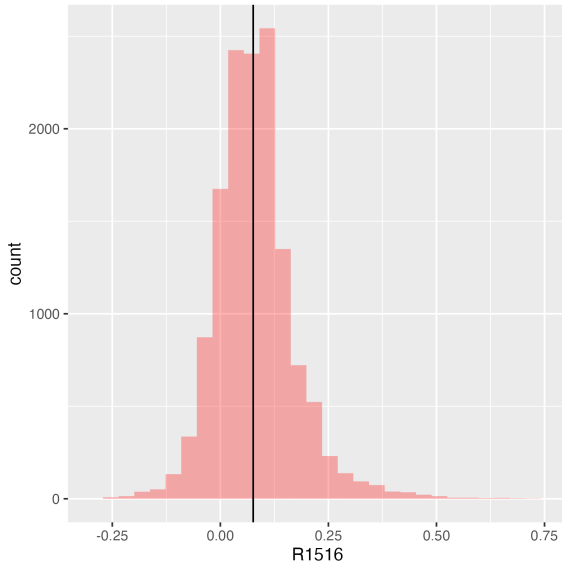
- Median changes in assessed value.

%	0304	0607	0910	1213	1516	1819	2122
Res	77.5	35.0	-29.9	-9.6	7.6	30.1	43.0
Mul	91.9	54.9	-43.2	-17.3	13.0	41.8	58.3
Apt	54.9	60.3	-23.1	-6.1	14.2	8.4	53.7

- Individual properties that change near the average rate have continuity in their tax bill.
- Anomalies from the mean produce changes in tax bills.

Real Providence

- Basics
- Mass appraisal
- Assessment issues
- Reval issues
- Reval effects
- What to do?



Real example: [redacted] Street

Basics

Mass appraisal

Assessment issues

Reval issues

Reval effects

What to do?

- West End, value \$77,100 in 2003. \$380,400 in 2023.
- Tax bill \$2593 in 2003, \$1497 in 2010, \$2672 in 2012, \$3978 in 2023.
- Tax bill swings: -\$1200 in 2010, +\$800 in 2016, +\$900 in 2022.

Real example: [redacted] Street

Basics

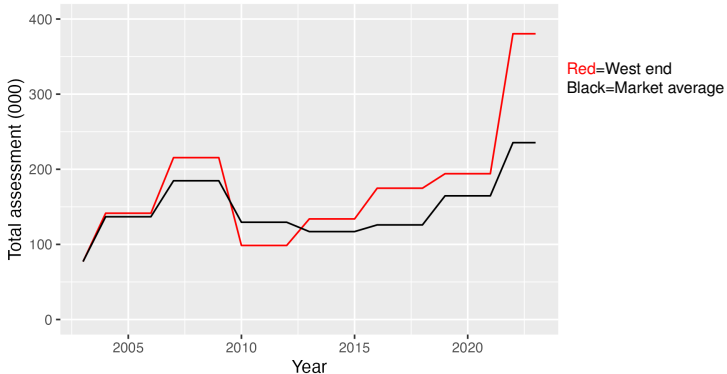
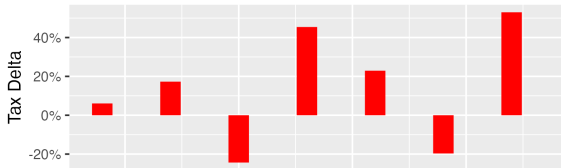
Mass appraisal

Assessment issues

Reval issues

Reval effects

What to do?



Real example: [redacted] Avenue

Basics

Mass
appraisal

Assessment
issues

Reval issues

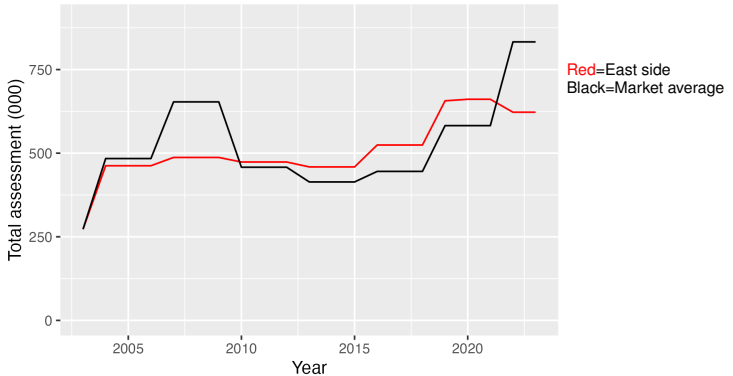
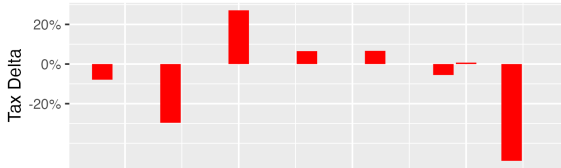
Reval effects

What to do?

- East Side, value \$272,700 in 2003. \$661,000 in 2021, but \$622,500 in 2022.
- Tax bill \$7,056 in 2003, \$9,858 in 2016, \$6,094 in 2022. (Doubled in 2023, apparently lost homestead exemption after sale.)
- Tax bill swings: -\$1400 in 2007, +\$1400 in 2010, -\$3600 in 2022.

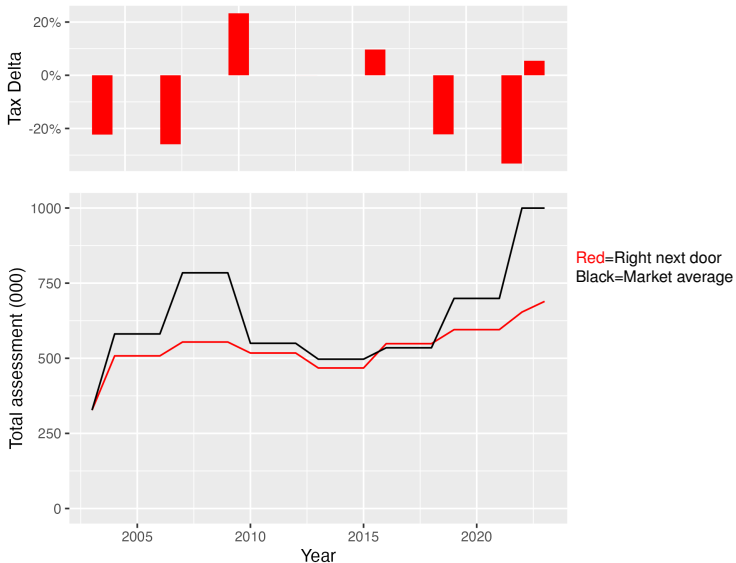
Real example: [redacted] Avenue

- Basics
- Mass appraisal
- Assessment issues
- Reval issues
- Reval effects
- What to do?



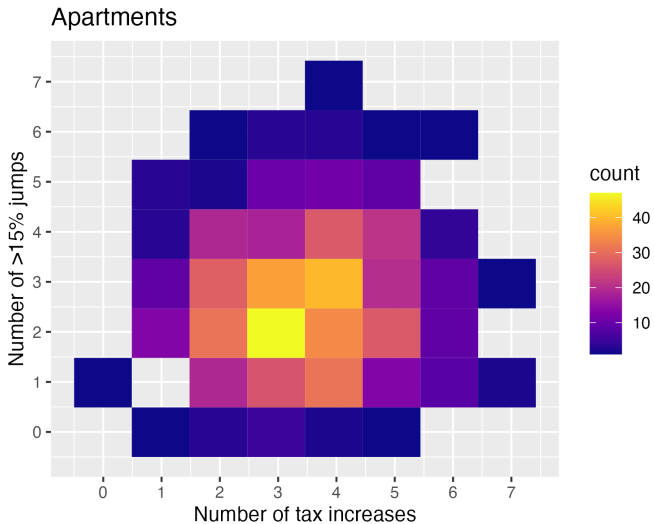
Real example: [redacted] Avenue

- Basics
- Mass appraisal
- Assessment issues
- Reval issues
- Reval effects
- What to do?



Real life: heat map

- Basics
- Mass appraisal
- Assessment issues
- Reval issues
- Reval effects
- What to do?



Real life: Big jumps

- The reform of the 1990s went from a decennial full revaluation to a three-year cycle of statistical and full revals to reduce the number of big jumps in tax bills.
- But the source of these jumps was as much the math as the market, so the reform did not fix the problem, and simply made it worse.
- Table below is the number of tax bill jumps greater than 15% (up or down) in the last 7 reval cycles, for each class of property.

Class	2 or more	4 or more
1	59.0%	19.1%
2	60.9%	18.7%
3	62.5%	19.3%

What can be done?

- Fewer variables, more emphasis on neighborhood and other broad conditions over components.
- Two levels, for land (location) and building.
- Smoothing from year to year, perhaps weighted to favor most recent.
- Use purchase price in some fashion as a factor in the assessment. (Not like Prop 13, though.)
- Use the statistical assessment as just a part of the valuation, along with a calculation based on a purchase price.

Basics

Mass appraisal

Assessment issues

Reval issues

Reval effects

What to do?

Basics

Mass
appraisal

Assessment
issues

Reval issues

Reval effects

What to do?

End