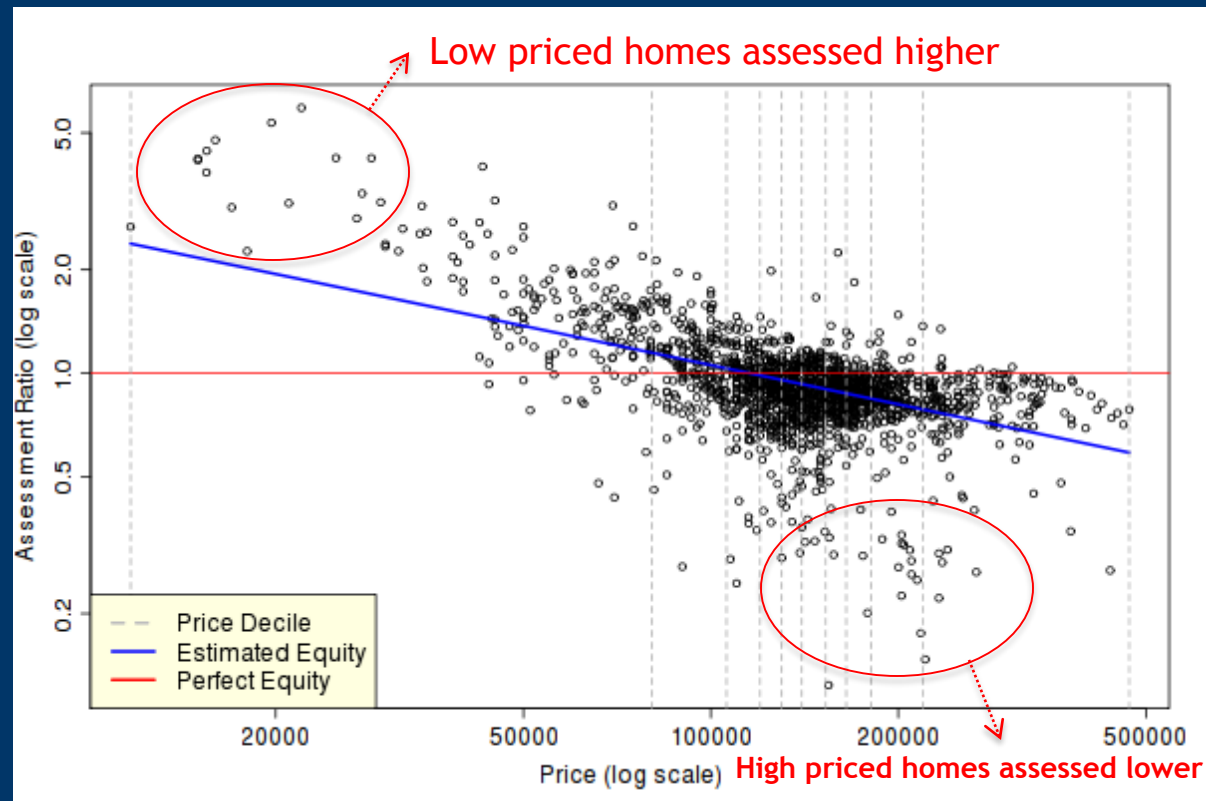# Project History

- Fixed foreclosure effects (award-winning)
- **Surfaced regressivity challenges**
- Applied next generation computer-based data-mining and statistical techniques to develop and test new models
- Provided implementation guide and training
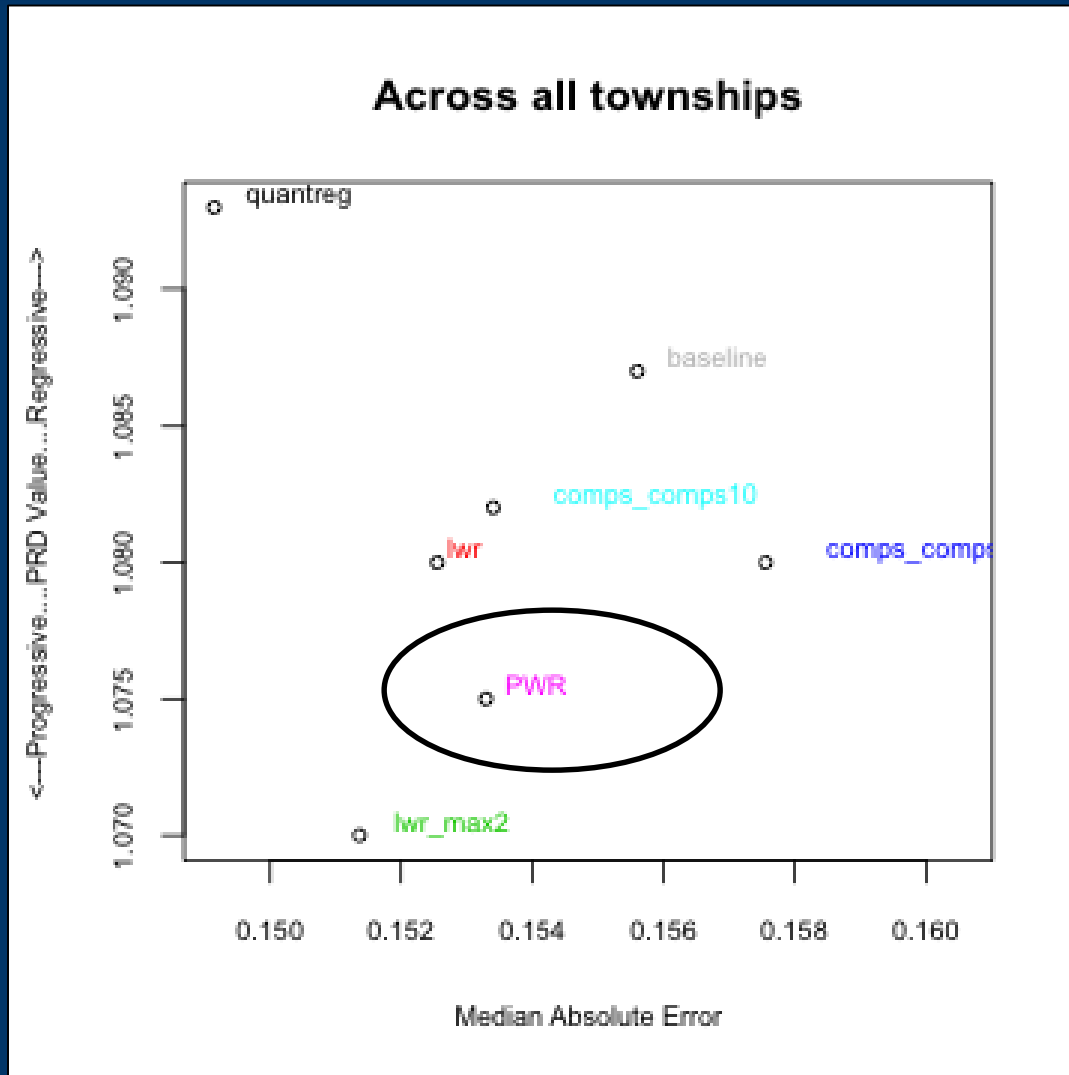- Improved assessment accuracy, fairness and efficiency

Difficult problem: regressivity

- Regressivity is a **complex** problem
- Existing models tend to under-assess high priced homes and over-assess low priced homes
- Mainly caused by unmeasured housing characteristics, random elements of the sales process

Low priced homes assessed higher

High priced homes assessed lower

Legend:
- Price Decile
- Estimated Equity
- Perfect Equity

Y-axis: Assessment Ratio (log scale)
X-axis: Price (log scale)

Potential Solution: **Price Segmentation**

Multiple Approaches Tested
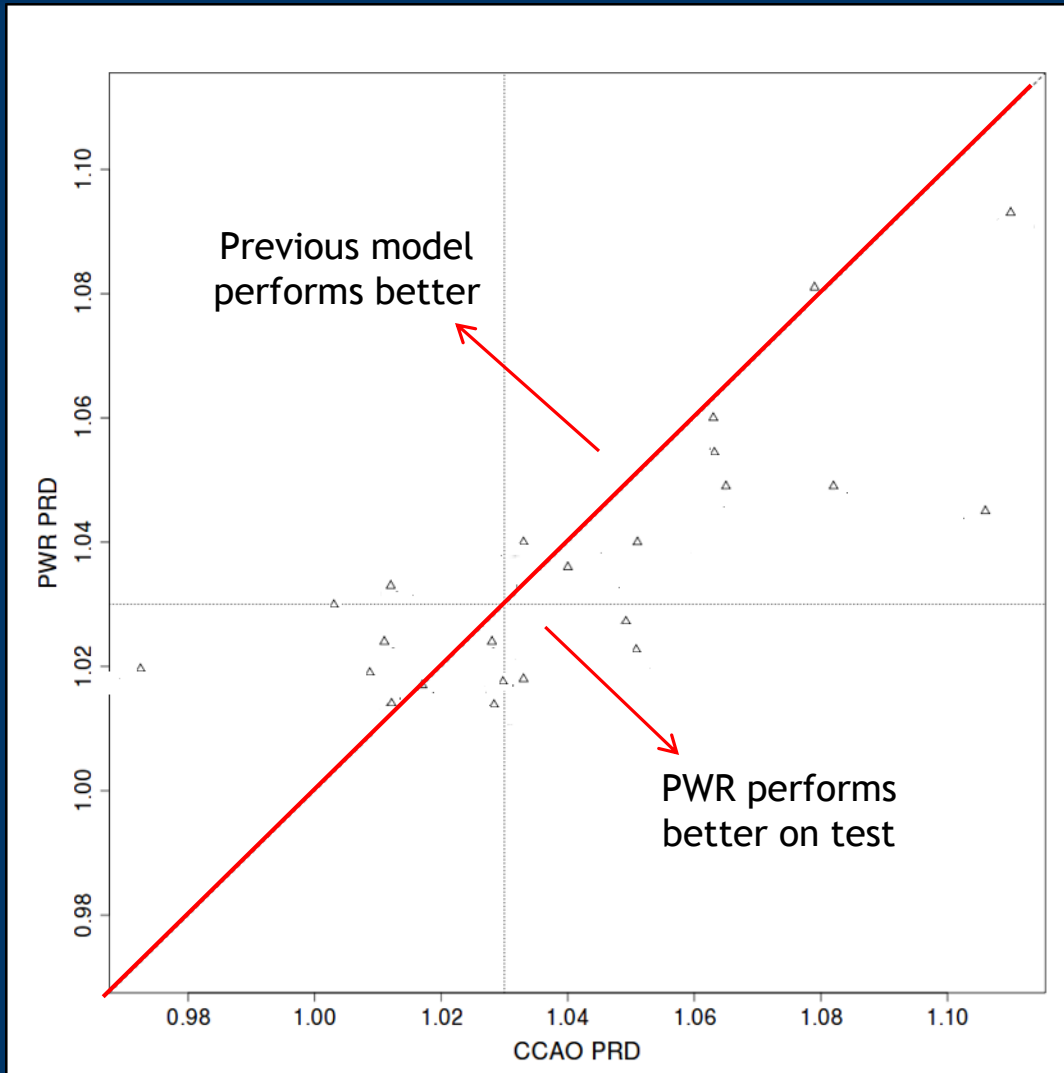

Across all townships

Metrics

- Regressivity: Price Related Differential (PRD) = (ideally from 0.98 to 1.03)
- Accuracy: Median Absolute Error (MAE) = (ideally low)

Outcomes

- Compared to other methods, PWR offers **higher accuracy and lower regressivity**, while being relatively inexpensive computationally
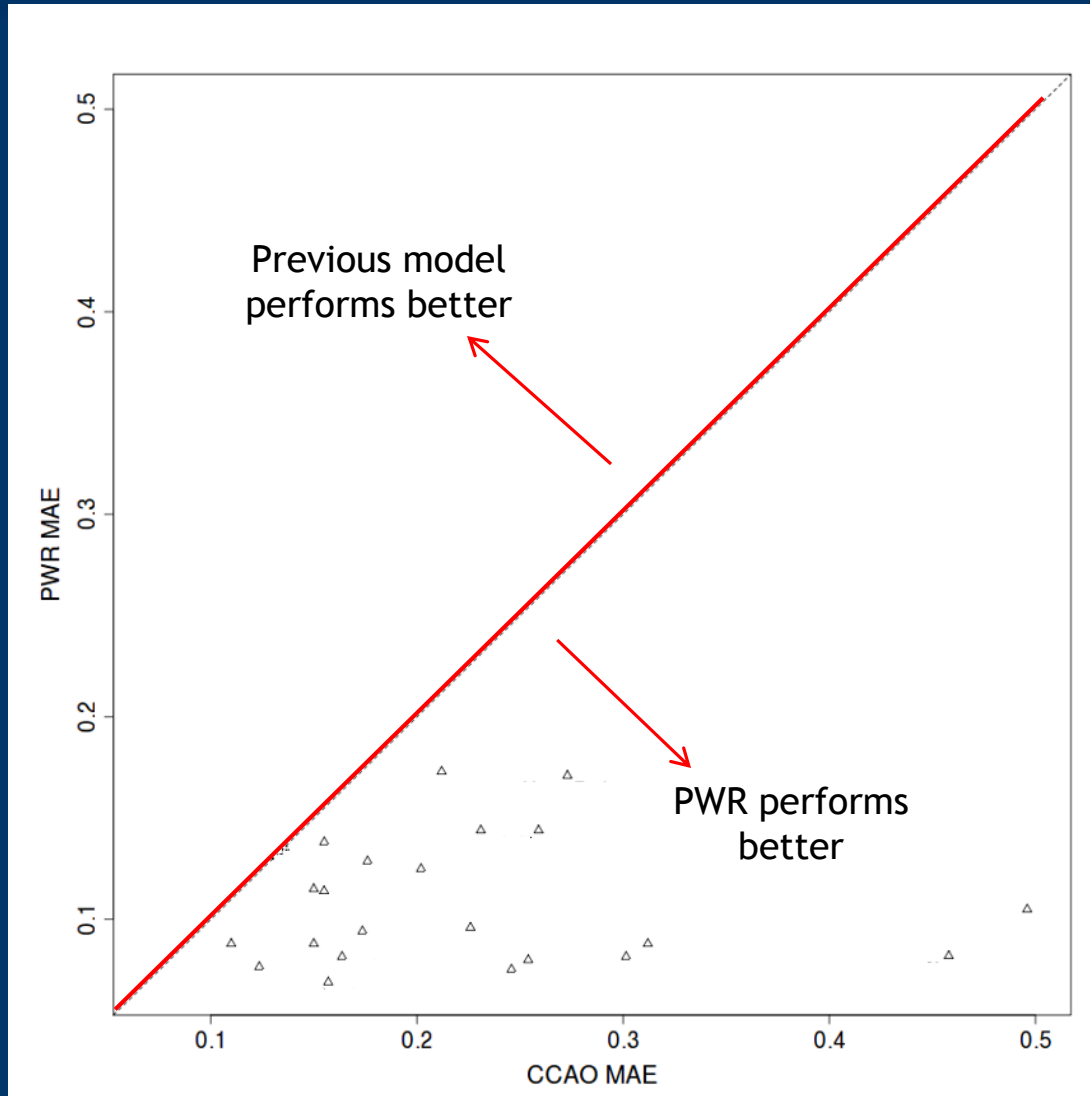
Regressivity Mostly Improved

Regressivity

- For 17 out of 26 townships, PWR is less regressive
- For 6 of the 9 remaining townships, PWR is below the recommended PRD upper limit of 1.03
- Most townships considered regressive under previous model (PRD > 1.03) improve under PWR

PWR Improves Accuracy in All Towns

Figure showing scatter plot with axes "CCAO MAE" (x-axis) and "PWR MAE" (y-axis), with a red diagonal line. Labels: "Previous model performs better" (above the line) and "PWR performs better" (below the line).
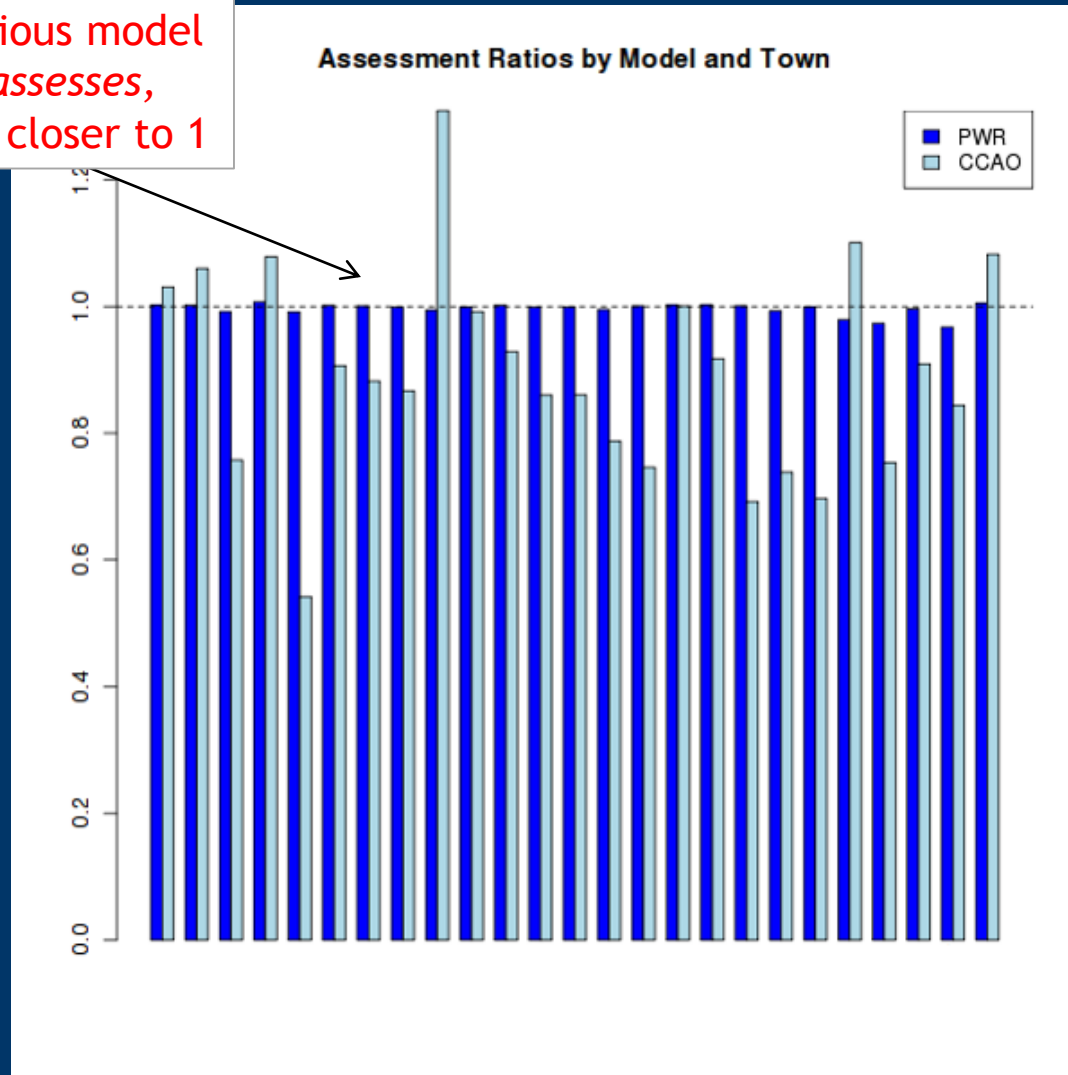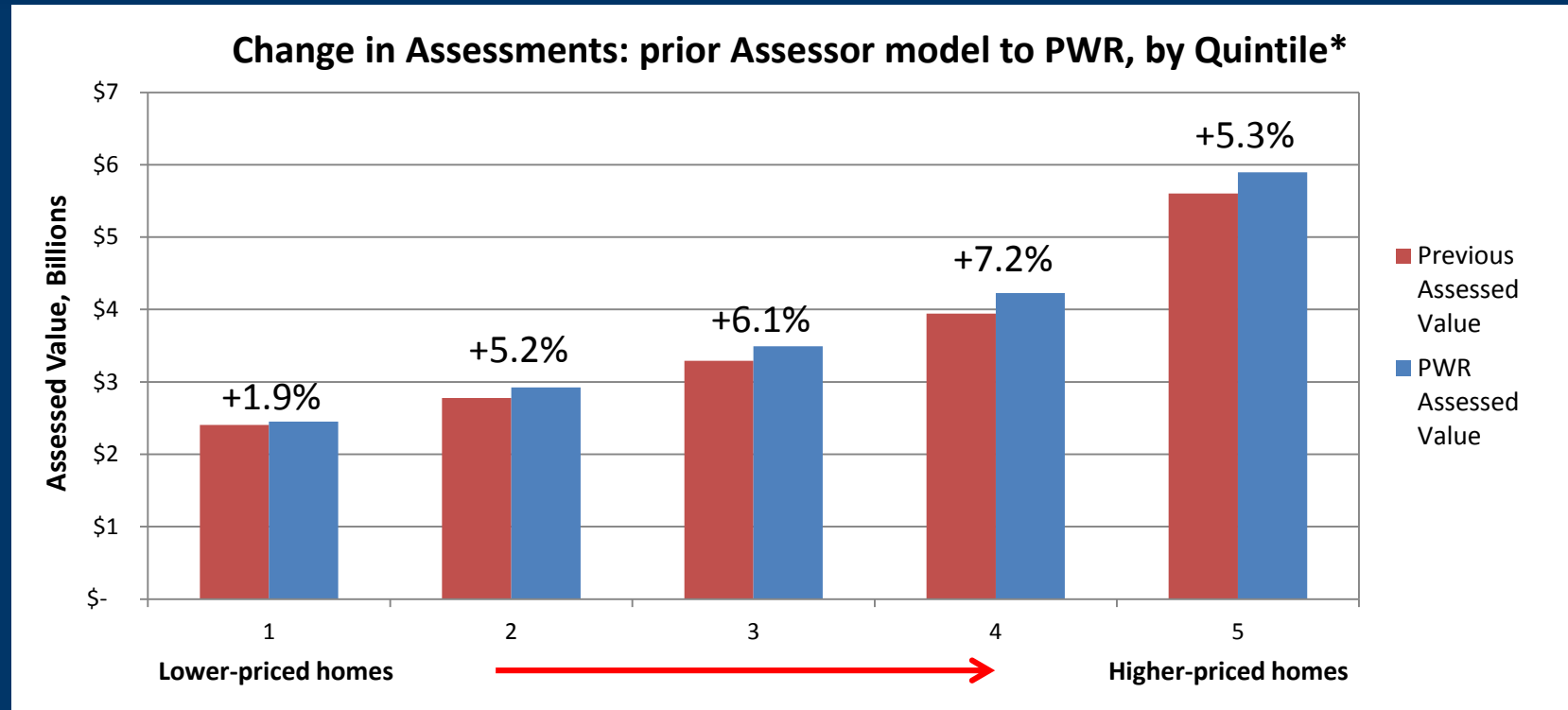
Accuracy

- For all 26 townships, PWR is more accurate (has a lower MAE value)
- **NOTE:** for this test and those that follow, results are based on a **sample** of properties from 26 Cook County townships

Better Accuracy ~ Higher Assessments

Relative to 1, previous model generally *underassesses*, while PWR is much closer to 1

Assessment Ratios by Model and Town

Legend: PWR, CCAO

Assessment Change Distribution

Change in Assessments: prior Assessor model to PWR, by Quintile*

*Results shown for properties in study sample only; properties are grouped based on each township's sales prices

On average, PWR raises assessments more on higher-priced homes than lower-priced homes

Results: Fairness and Performance

- Reduced regressivity

- Improved accuracy and uniformity

- Much more transparent assessment process

- Efficient: easy and fast to implement; requires fewer post-modeling checks

- Customized assessment by township and by price category of housing

- Diagnostics are more reliable and generalizable

What Needs to Happen?

- Fix it – and do even better this time
- Urgently – restore trust in this bedrock function and office of government; avoid potentially massive liability
- Transparently –
  - Tell us how our assessments are being determined now!
  - Make sure process, results and implementation are open (remember what just happened)