Creation and Analysis of a Medical Loss Ratio Dataset

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Background

- Reinsurance = payment to plans with higher-cost individuals
- Risk Adjustment = redistribution of money from plans with lower-cost individuals to plans with higher-cost individuals through “transfer payments”
- Medical Loss Ratio (MLR) = benchmark for insurers to provide value to enrollees
  - If an insurer uses 80 cents per premium dollar to pay for its customer’s medical claims, the MLR will be 80%; Gov’t sets MLR minimums

Motivation and Goal

- Original Project: A Big Data Examination of the Accuracy of Risk Adjustment under the Affordable Care Act (ACA)

- Original Goal: Backwards engineer the plan liability risk score, risk adjustment transfer payment formula, and actuarial value calculation

- Motivation: Understand how transfer payment formula works

Motivation and Goal

- New Project: Creation and Analysis of a Medical Loss Ratio (MLR) Dataset

- New Goal: Create a clean, new dataset from all of the data online and do some preliminary analysis on it

- Motivation: Data has never been cleaned/analyzed before; analyzing this new data may provide insights into how to make risk adjustment more efficient

Significance

- Online “Public Use Files” Excel files are incomplete
- Online “Summary Report” PDF files are hard to parse
- Online “Insurer Report” Excel files are split between >20,000 files, one for each company, and only have the expected values of risk adjustment
- There is no easy way to analyze all of this data!

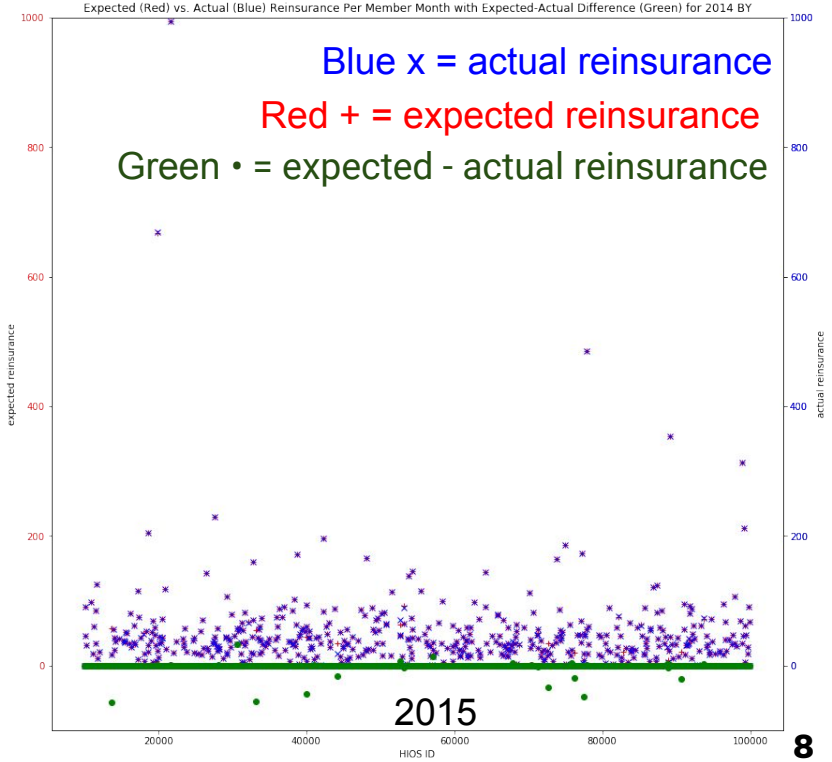
Approach: Data ETL

- Input: >20,000 “Insurer Report” Excel files, scraped from online by Jeremie Lumbroso
  - Take 5260 fields of expected values from each Excel file and add as a row into our CSV
  - … lots of technical errors along the way ...
  - Combine with PDF file which has the real values
  - Output: 1 CSV file for each year containing risk adjustment data with both expected and actual values for all companies

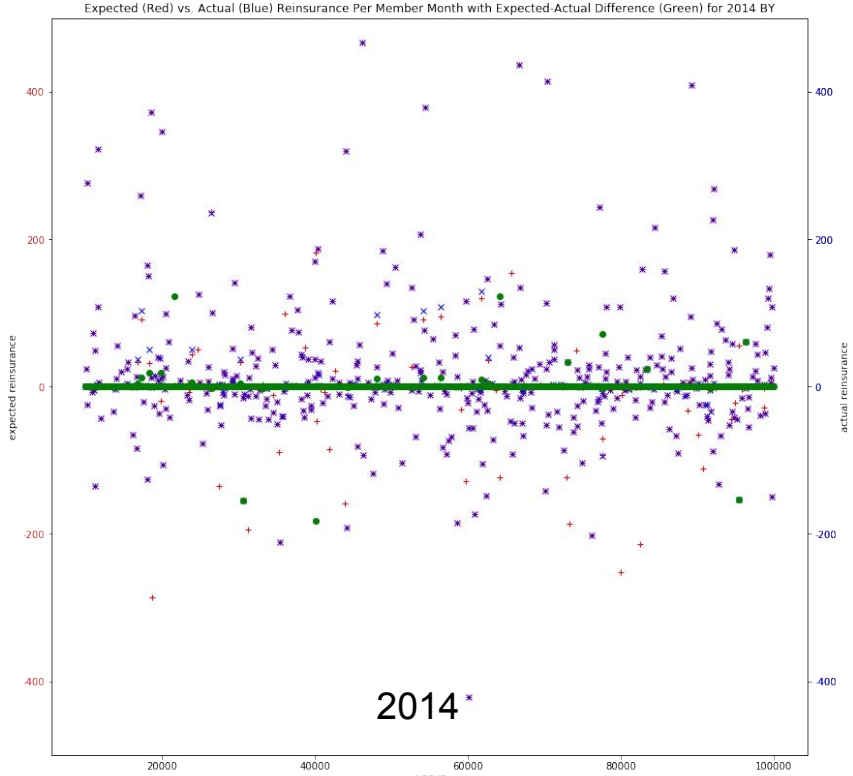
Data Analysis

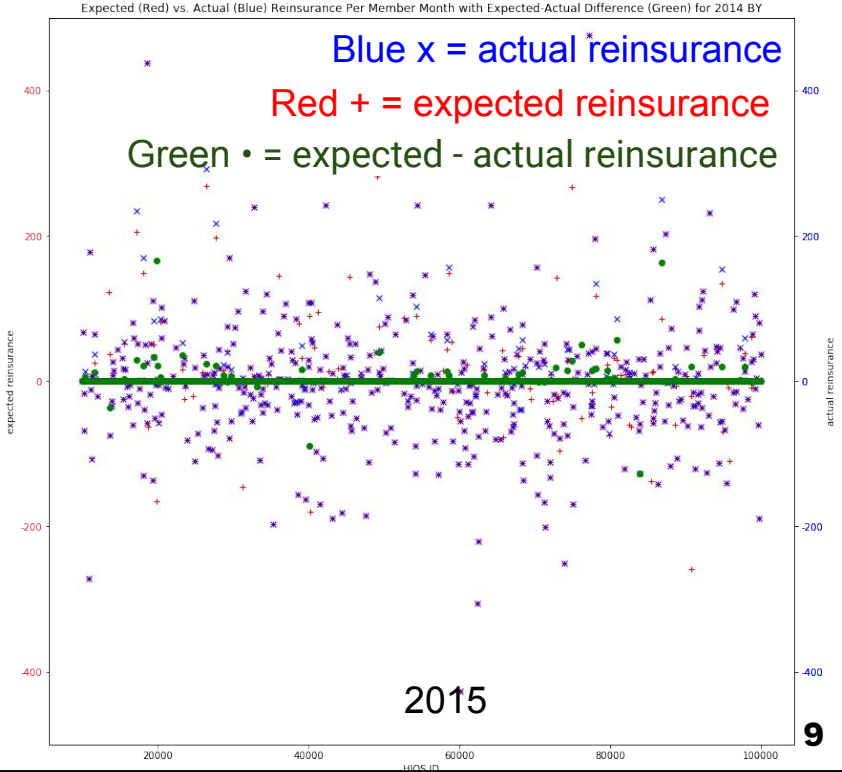
- Year to Year per member month (# enrollees * # months) analysis for reinsurance, individual risk adjustment, small group risk adjustment
- Mean/median/etc. Basic statistical analysis

2014 vs. 2015 reinsurance PMM

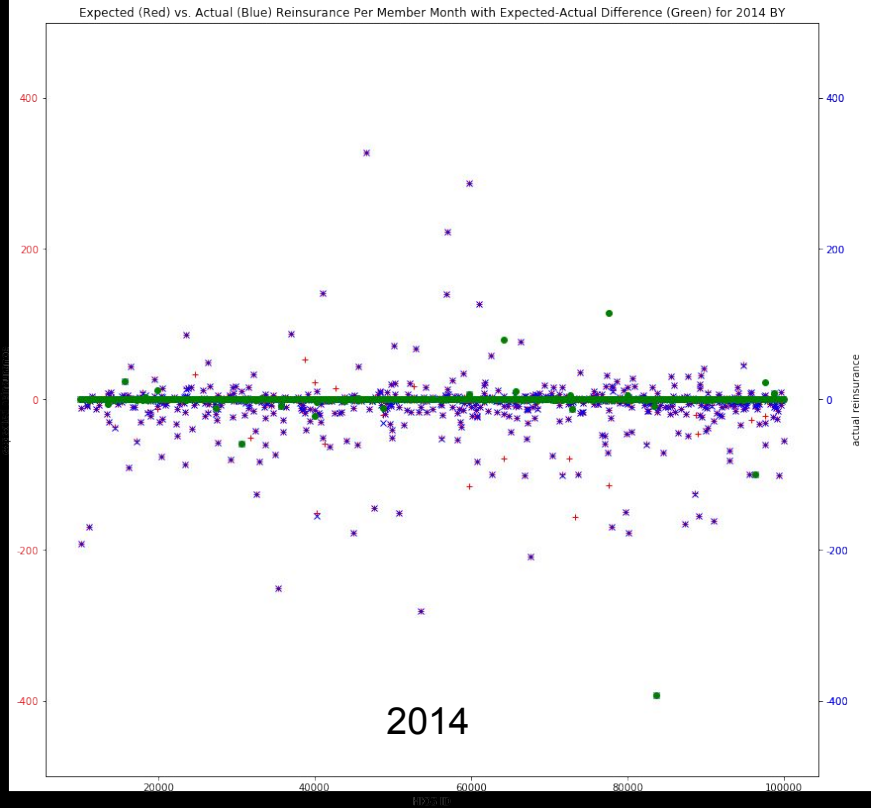


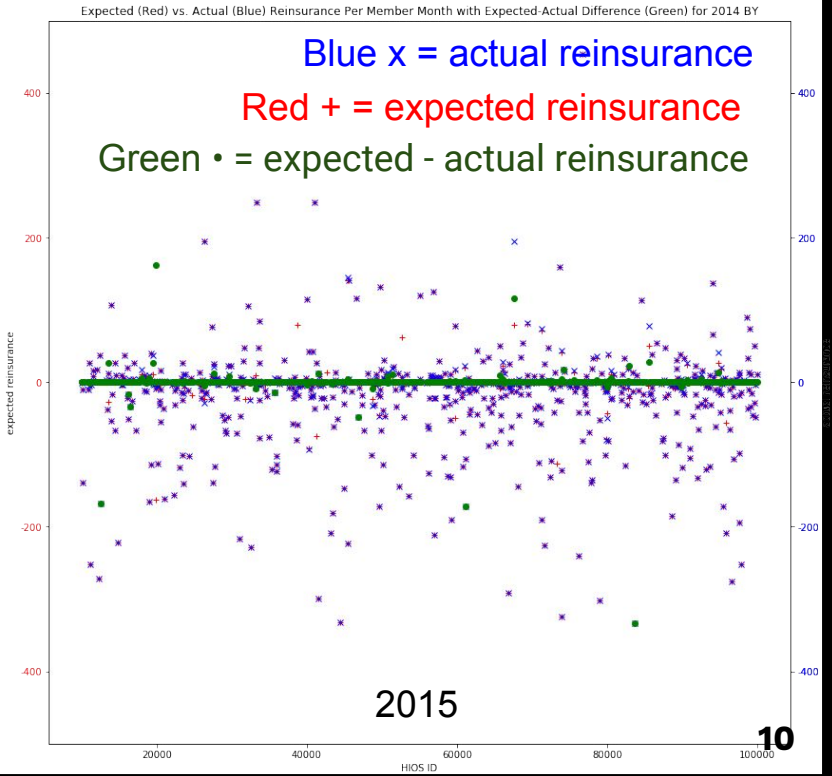
2014 vs. 2015 indiv. RA PMM





2014 vs. 2015 small grp RA PMM





Expected Minus Actual, PMM	Mean 2014	Mean 2015	Std Dev 2014	Std Dev 2015
Reinsurance	0.48	-0.17	19.31	3.23
Individual Risk Adjustment	0.03	1.26	9.18	21.14
Small Group Risk Adjustment	-0.42	-0.37	14.72	16.88

Does a bad prediction in 2014 lead to a better prediction in 2015?

- Hypothesis test with two means, H0: μ1 <= μ2
  - Reinsurance: p = 0.1018
  - Individual Risk Adjustment: p = 0.9744
  - Small Group Risk Adjustment p = 0.4747

Reinsurance was the closest, but none are significant at even α = 0.10. Standard Deviations are too large for the sample size

Conclusion

- Government “Public Use” data is relatively inaccessible
- Risk Adjustment can be made more efficient
- Tangible Result: Dataset CSV files on GitHub! And some analysis...

- GitHub: http://tiny.cc/riskadjustment
- Thanks to Prof. Braverman and Jeremie
- Questions?