Creation and Analysis of a Medical Loss Ratio Dataset

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Background

- **Reinsurance** = payment to plans w/ higher-cost enrollees
- **Risk Adjustment** = redistribution of money from plans with lower-cost enrollees to plans with higher-cost enrollees 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

- No data! --> **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 (not actual) values of risk adjustment
- There is no easy way to analyze all of this data!

Data ETL

“Insurer Report” Excel Files
Contains insurer-reported estimates of risk adjustment data (10,000+ fields per sheet)

“Summary Report” PDF File
Contains accurate risk adjustment data

“Public Use” PDF File
Supposed to contain all risk adjustment data from “Insurer Report” files

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
- Combine with “Summary Report” PDF file
- Output: 1 CSV file for each year containing risk adjustment data with both expected and actual values for all companies

Data ETL

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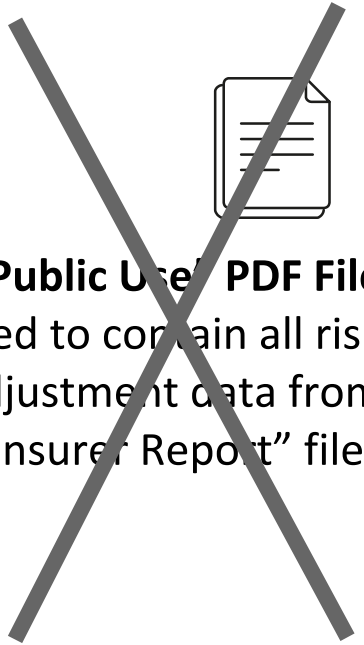
“Summary Report” PDF File
Contains accurate risk adjustment data



“Public Use” PDF File
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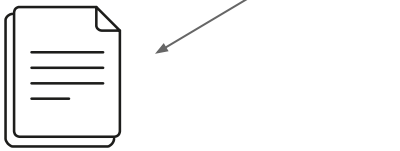
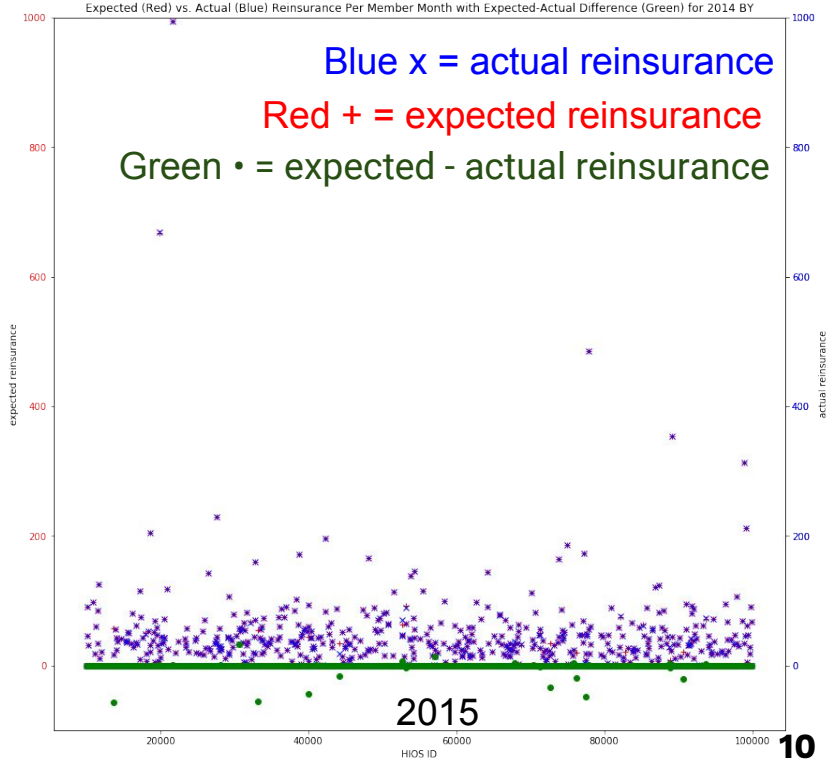


Our output file, one per year, easier to analyze

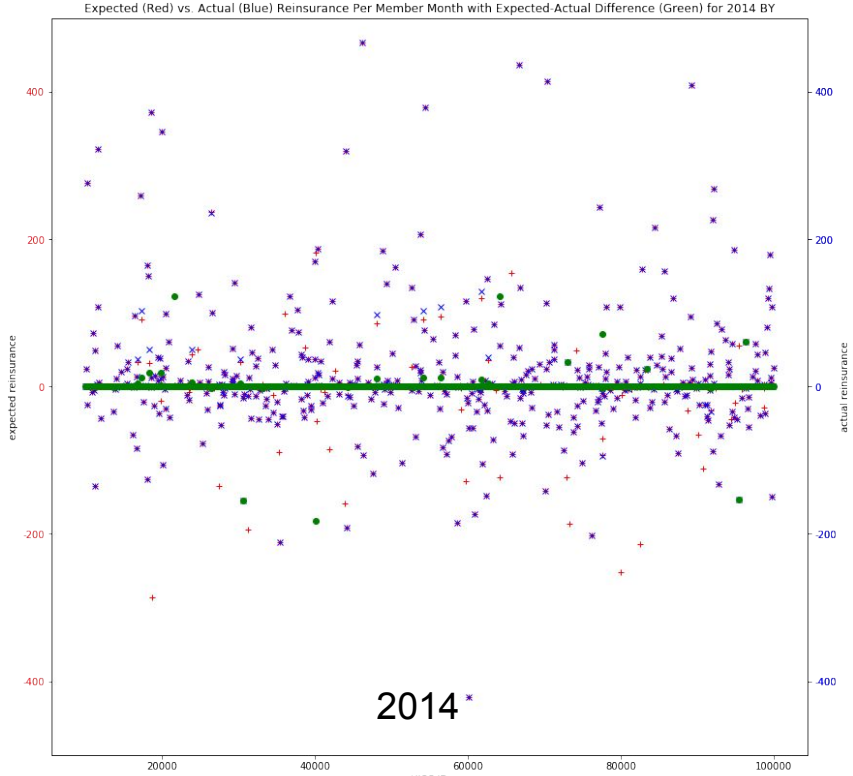
Data Analysis

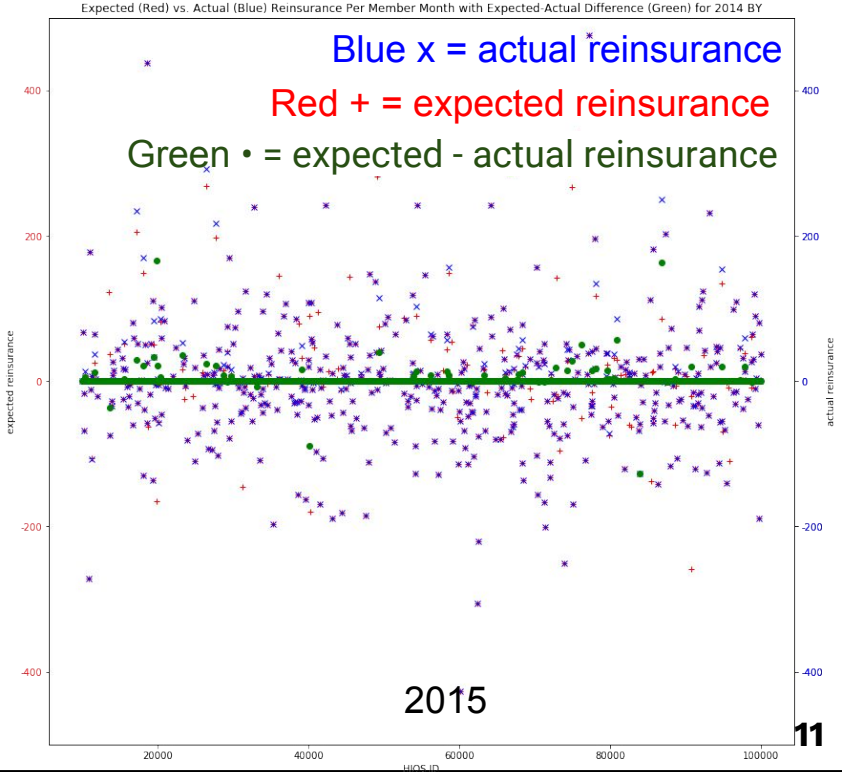
- Year to Year (YTY) per member month analysis for reinsurance, individual risk adjustment, small group risk adjustment
  - Member month = # enrollees * # months covered
- Mean/median/etc. basic statistical analysis
- Correlation between risk adjustment in previous year & change in risk adjustment

YTY analysis: reinsurance PMM

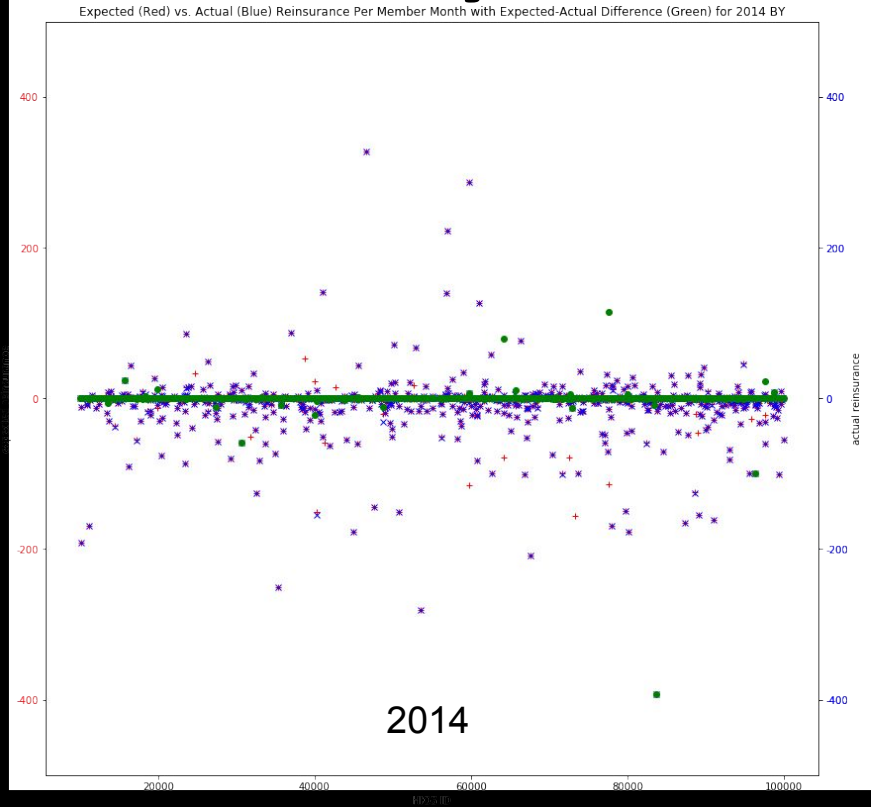


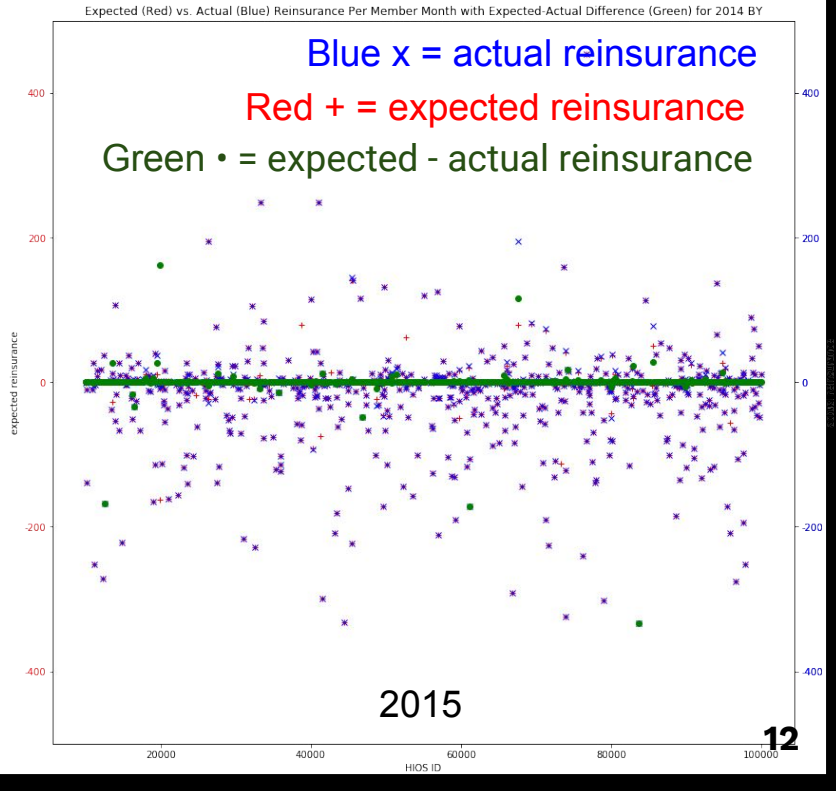
YTY analysis: indiv. RA PMM





YTY analysis: small group RA PMM





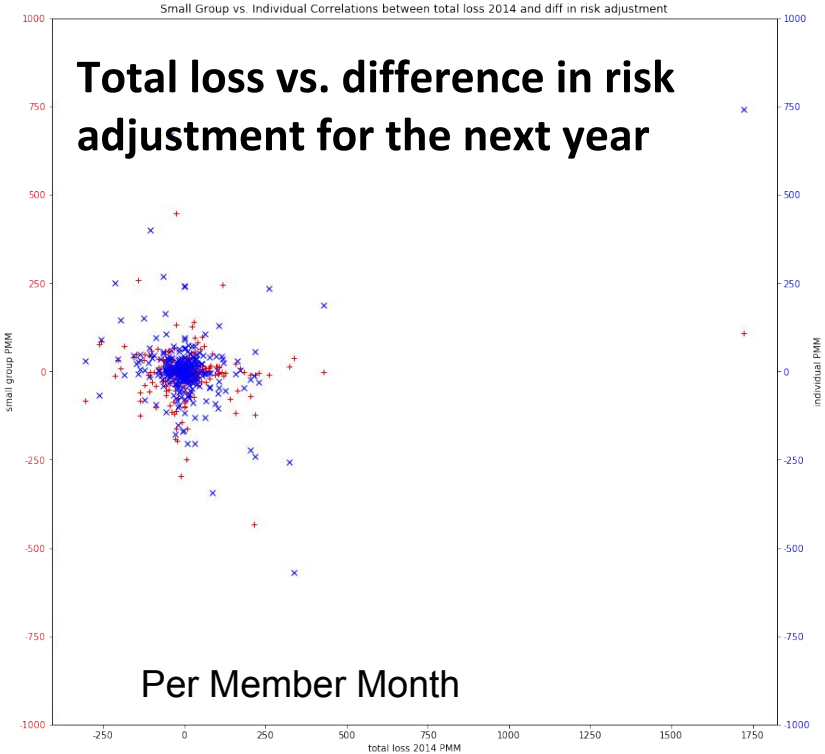
Expected Minus Actual, PMM	Mean 2014	Mean 2015	Std Dev 2014	Std Dev 2015
Reinsurance	0.48	-0.17	19.31	3.23
Individual Risk Adjustment	0.03	1.26	9.18	21.14
Small Group Risk Adjustment	-0.42	-0.37	14.72	16.88

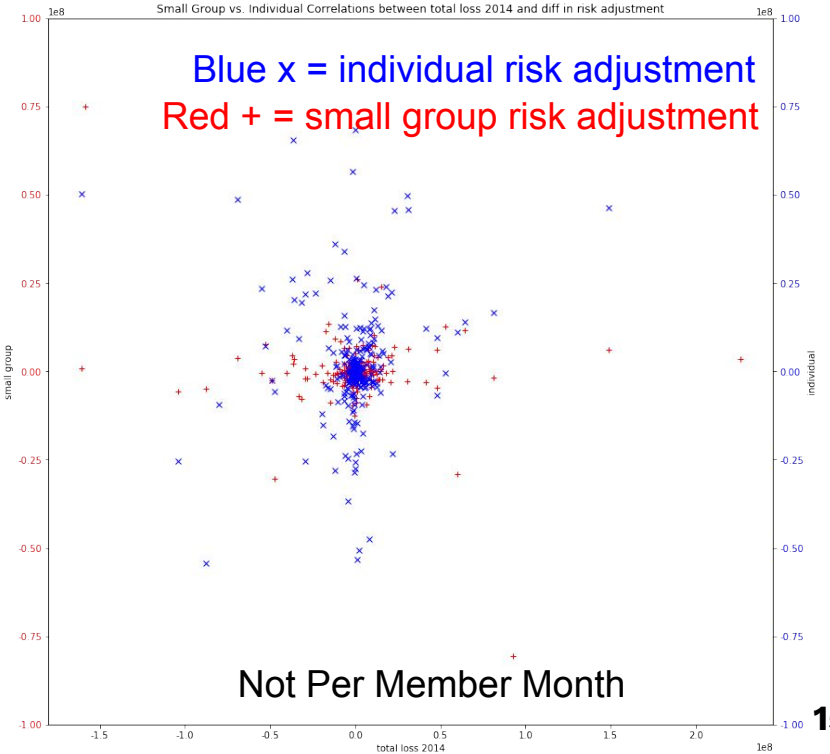
Is Total Loss in 2014 Correlated with Change in Risk Adjustment, 2015 - 2014?

- Basically no correlation! Not what we expected

	Individual RA	Small Group RA	Individual PMM RA	Small Group PMM RA
Correlation (r) w/ Total Loss	-0.091	-0.013	0.193	0.024

Can you see a correlation?





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?