

Homework 4

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Here is the link to my GitHub Repository: <https://github.com/kpollard8/Homework4>

Here are my answers for Homework 4. I do the coding in a separate R script, but here is the cleaned-up version. I run the analysis separately, save the workspace with only the summary stats, figures, and tables that I need, and then load the workspace in the final qmd. My analysis file with answers and code to all the questions is available in the analysis folder.

1. Remove all SNPs, 800-series plans, and prescription drug only plans (i.e., plans that do not offer Part C benefits). Provide a box and whisker plot showing the distribution of plan counts by county over time. Do you think that the number of plans is sufficient, too few, or too many?

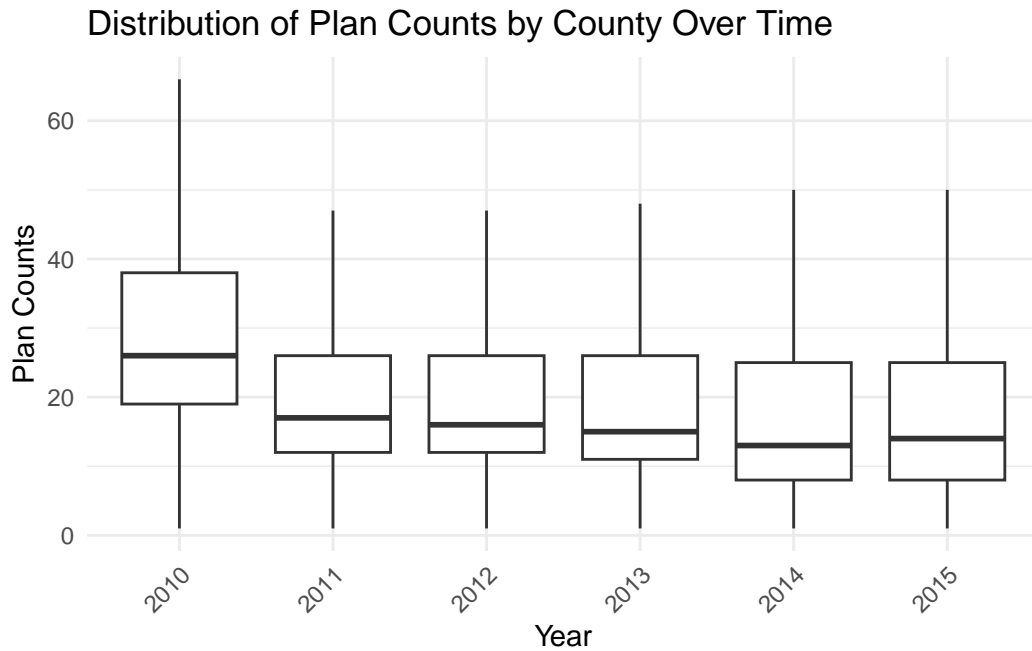


Figure 1: Question 1 Graph

I think the number of plans is sufficient. The fact that there are around 20 plans in each county suggests a reasonable level of choice and competition among healthcare plans. This number indicates that consumers have multiple options to choose from, which is generally considered beneficial as it allows them to select plans that best suit their needs in terms of coverage, cost, and provider network.

2. Provide bar graphs showing the distribution of star ratings in 2010, 2012, and 2015. How has this distribution changed over time?

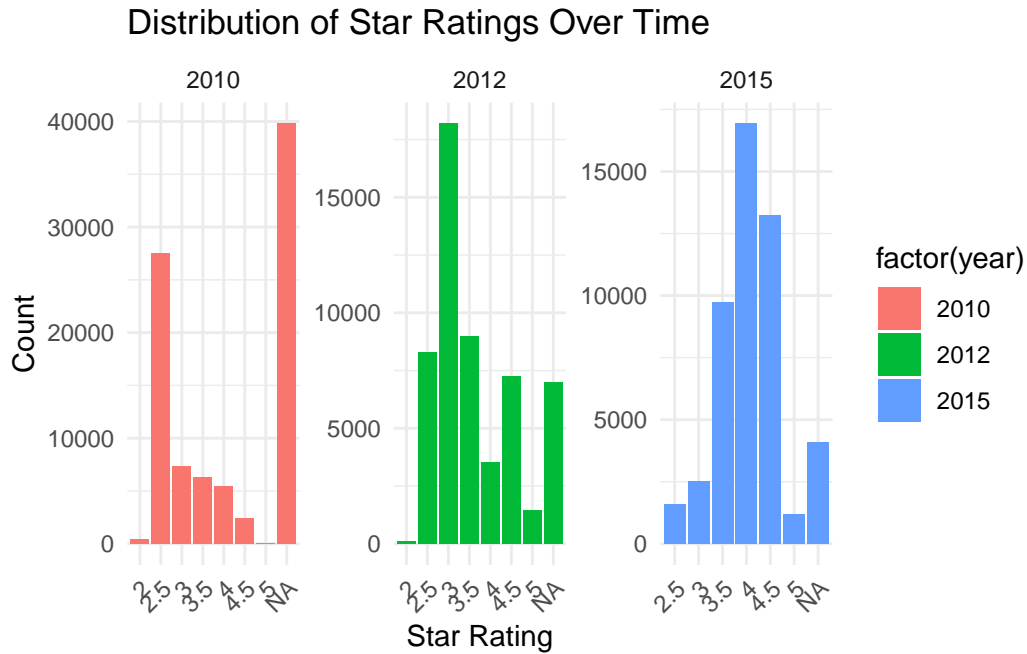


Figure 2: Question 2 Graph

The distribution has changed because the ratings have gotten higher over time. There were more 2.5s in 2010, then in 2012 it was concentrated in 3s, and then the most 4s were in 2015.

3. Plot the average benchmark payment over time from 2010 through 2015. How much has the average benchmark payment risen over the years?

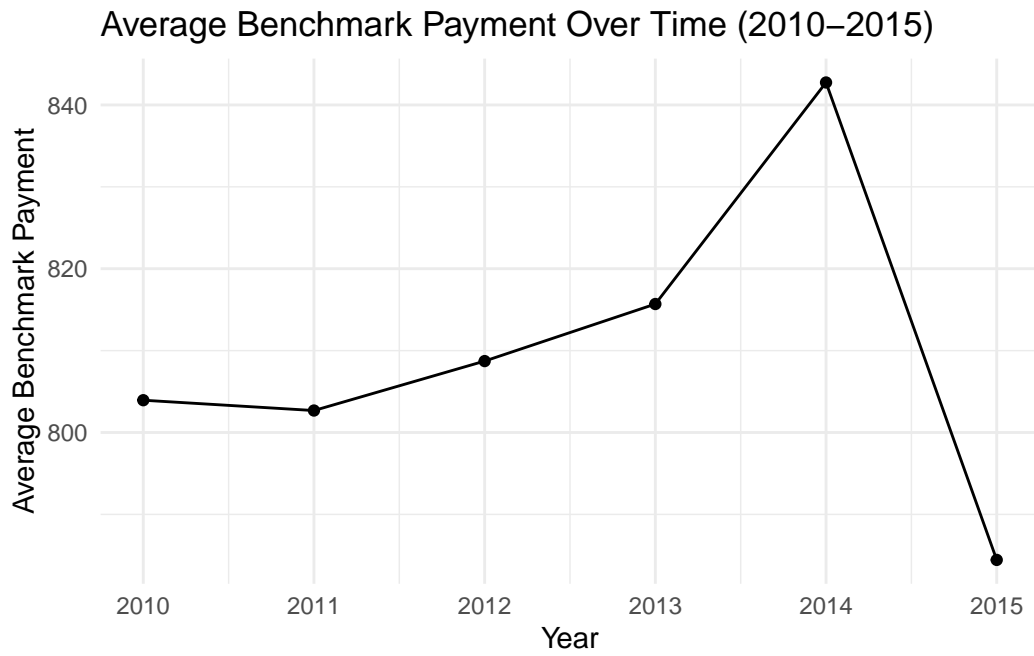


Figure 3: Question 3 Graph

4. Plot the average share of Medicare Advantage (relative to all Medicare eligibles) over time from 2010 through 2015. Has Medicare Advantage increased or decreased in popularity? How does this share correlate with benchmark payments?

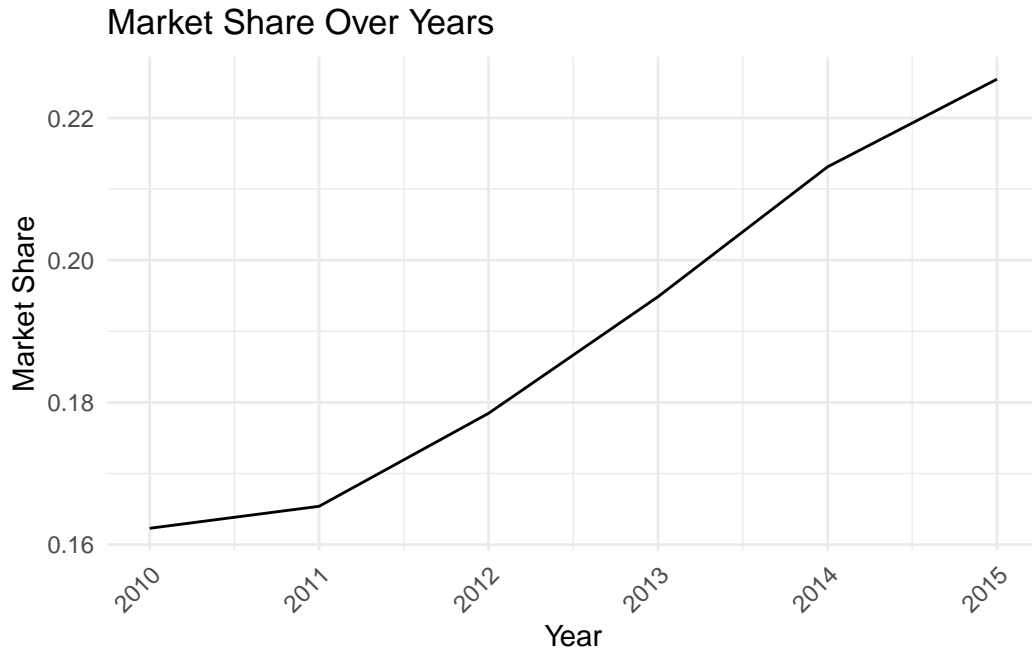


Figure 4: Question 4 Graph

It has overall increased in popularity from 2010-2015. It somewhat correlates with the benchmark payment because it also increased until 2014, but then they seem to not correlate after 2014.

5. Calculate the running variable underlying the star rating. Provide a table showing the number of plans that are rounded up into a 3-star, 3.5-star, 4-star, 4.5-star, and 5-star rating.

Table 1: Number of rounded plans

3-star	3.5-star	4-star	4.5-star	5-star
1,734	1,815	606	0	0

6. Using the RD estimator with a bandwidth of 0.125, provide an estimate of the effect of receiving a 3-star versus a 2.5 star rating on enrollments. Repeat the exercise to estimate the effects at 3.5 stars, and summarize your results in a table.

Table 2: Table 3 star vs 2.5 star

	Rating	Coeff	Std..Err.	z	P.Value
Conventional	3 vs 2.5	-0.0049040	0.0033526	-1.462718	1
Bias-Corrected	3 vs 2.5	-0.0337209	0.0033526	-10.058014	1
Robust	3 vs 2.5	-0.0337209	0.0055193	-6.109645	1

Table 3: Table 3.5 star vs 3 star

	Rating	Coeff	Std..Err.	z	P.Value
Conventional	3 vs 3.5	0.0013883	0.0029540	0.4699752	1
Bias-Corrected	3 vs 3.5	-0.0106484	0.0029540	-3.6047154	1
Robust	3 vs 3.5	-0.0106484	0.0049341	-2.1581298	1

7. Repeat your results for bandwidths of 0.1, 0.12, 0.13, 0.14, and 0.15 (again for 3 and 3.5 stars). Show all of the results in a graph. How sensitive are your findings to the choice of bandwidth?

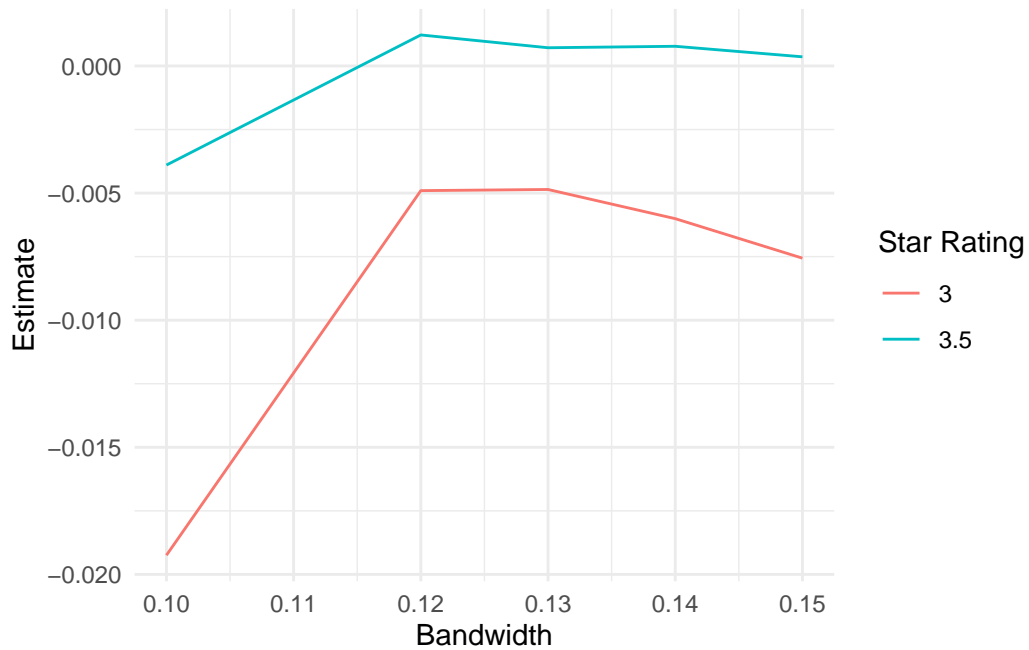


Figure 5: Question 7 Graph

The findings are sensitive as the estimates get higher with larger bandwidth. A rating of 3 increases at a more drastic rate than 3.5. People care about avoiding “bad” plans but don’t necessarily care if their plan is only marginally worse than another, if they both have “good” ratings.

8. Examine (graphically) whether contracts appear to manipulate the running variable. In other words, look at the distribution of the running variable before and after the relevant threshold values. What do you find?

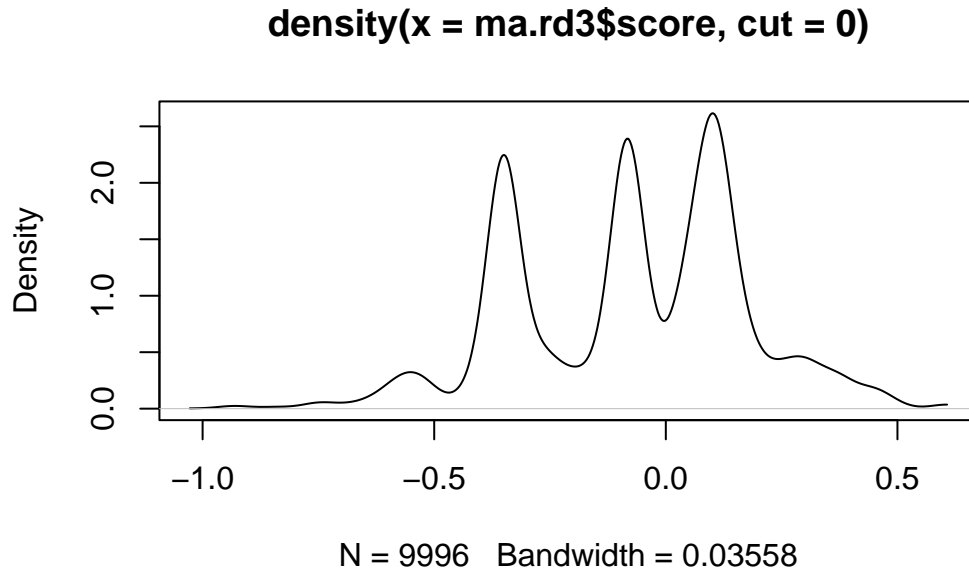


Figure 6: Question 8 First Graph

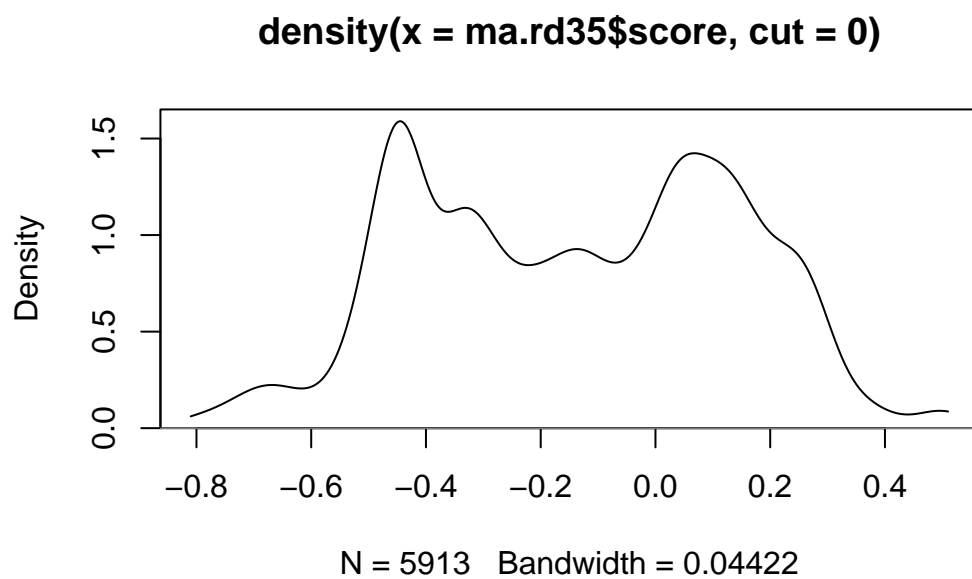


Figure 7: Question 8 Second Graph

9. Similar to question 4, examine whether plans just above the threshold values have different characteristics than contracts just below the threshold values. Use HMO and Part D status as your plan characteristics.

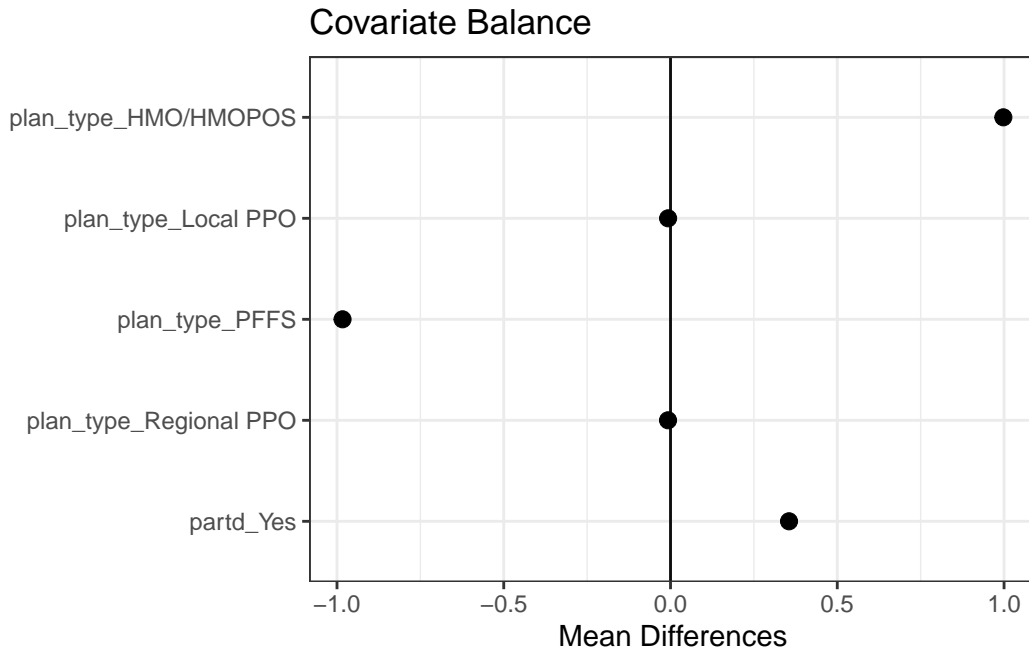


Figure 8: Question 9 First Graph

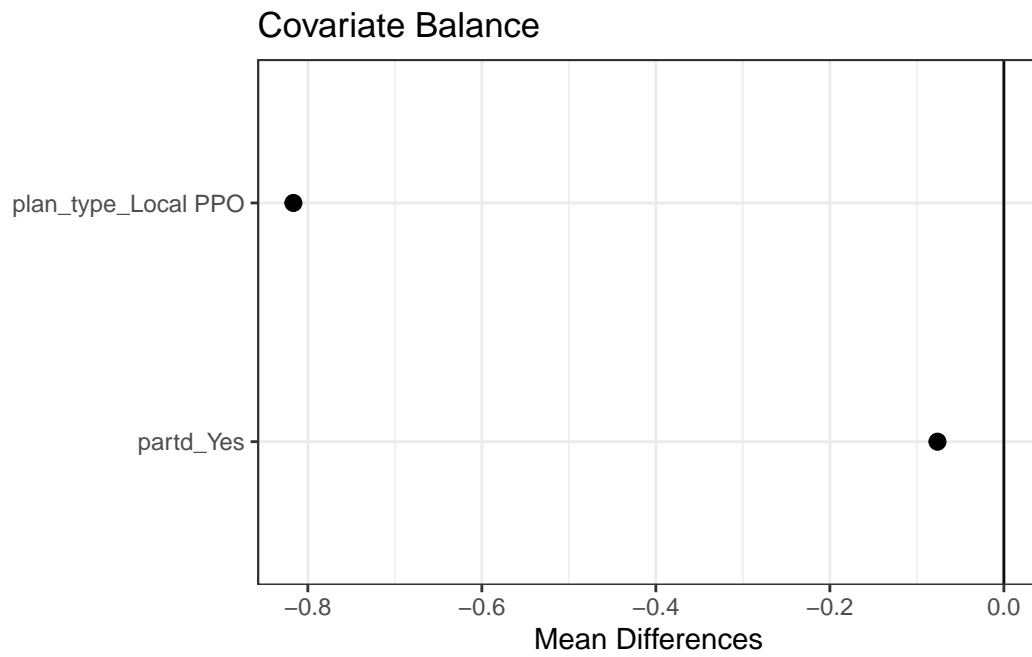


Figure 9: Question 9 Second Graph

10. Summarize your findings from 5-9. What is the effect of increasing a star rating on enrollments? Briefly explain your results.

The effect of increasing a star rating increases enrollment. This is intuitive because higher star ratings signal better quality and performance of the plan to beneficiaries. We can see that MA enrollment is increasing overtime, and you can infer this is because ratings are getting better.

Also, there is debate about whether MA saves the government money. If MA enrollment is increasing, and it's becoming more popular among healthy beneficiaries, this means the government may be losing money due to adverse selection of more sick patients enrolled in traditional medicare.

Also, we know that the jump from 2.5 to 3 may be more effective than the jump from 3 to 3.5. This is also intuitive because people want to avoid "bad plans" but may not care if two already "good" plans if one is marginally better.