Homework 4
Econ 470 Spring 2025

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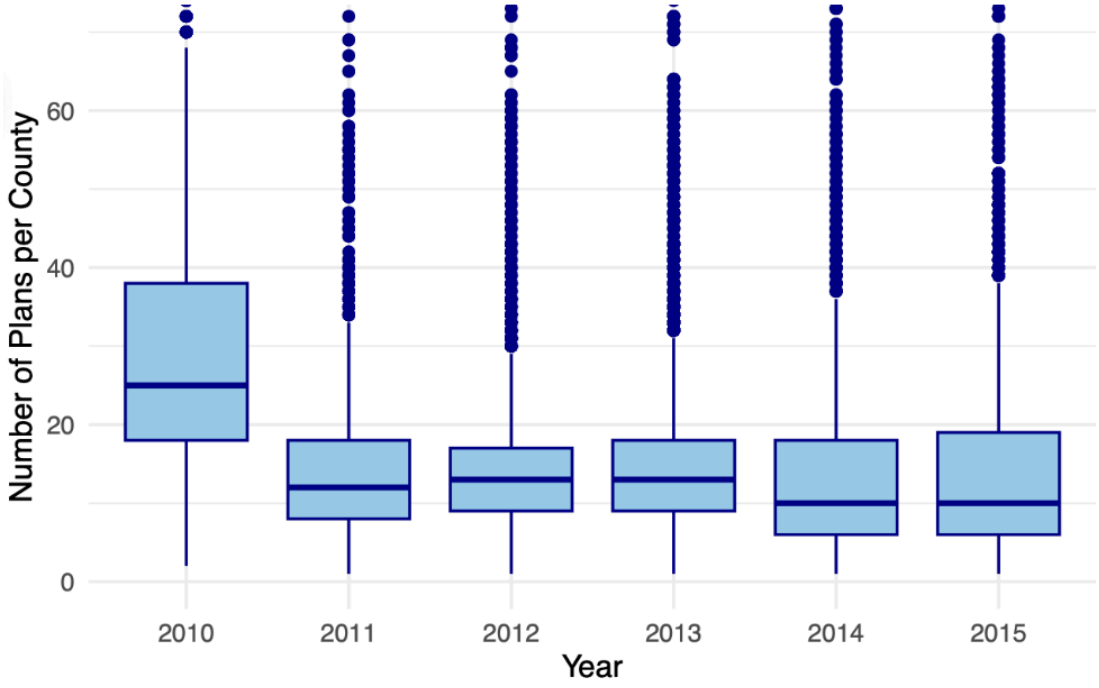
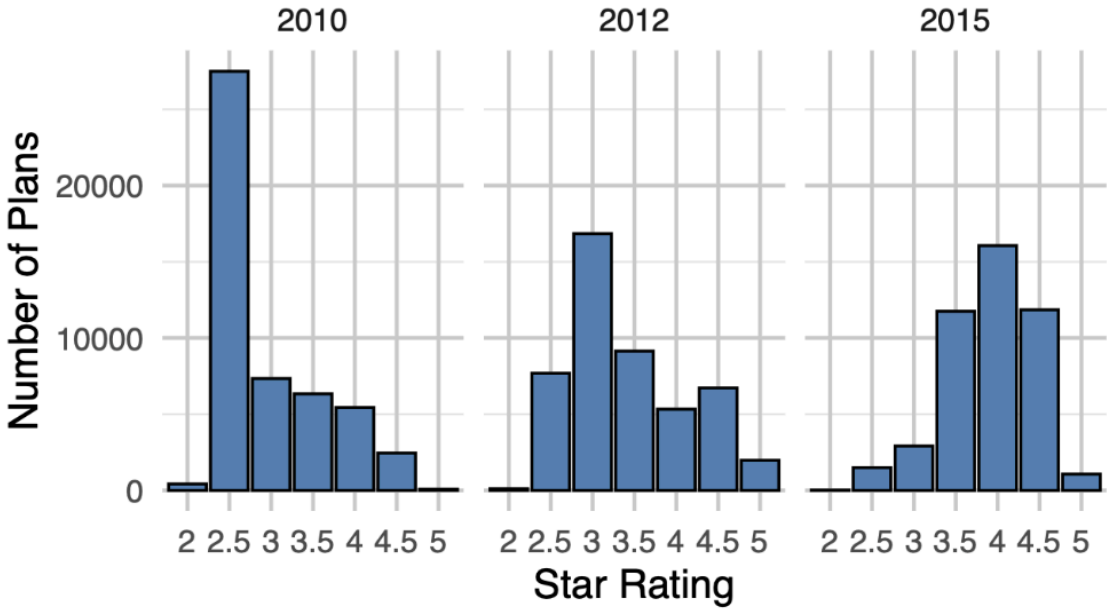
Here is the link to my repository: { https://github.com/ctcasta/homework4 }

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?



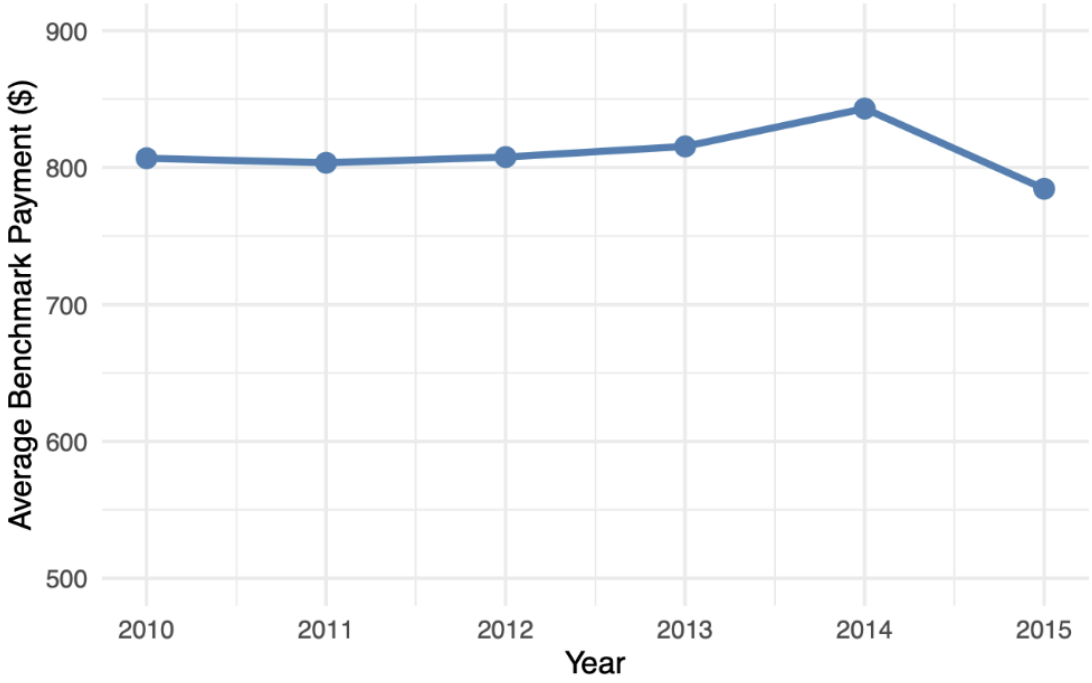
This figure shows that in 2010 counties had a higher and more varied number of plans, but after 2011, the median and variability decreased and stabilized. Most counties had about 10–15 plans, with a few outliers, but overall the number of plans seems sufficient.

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



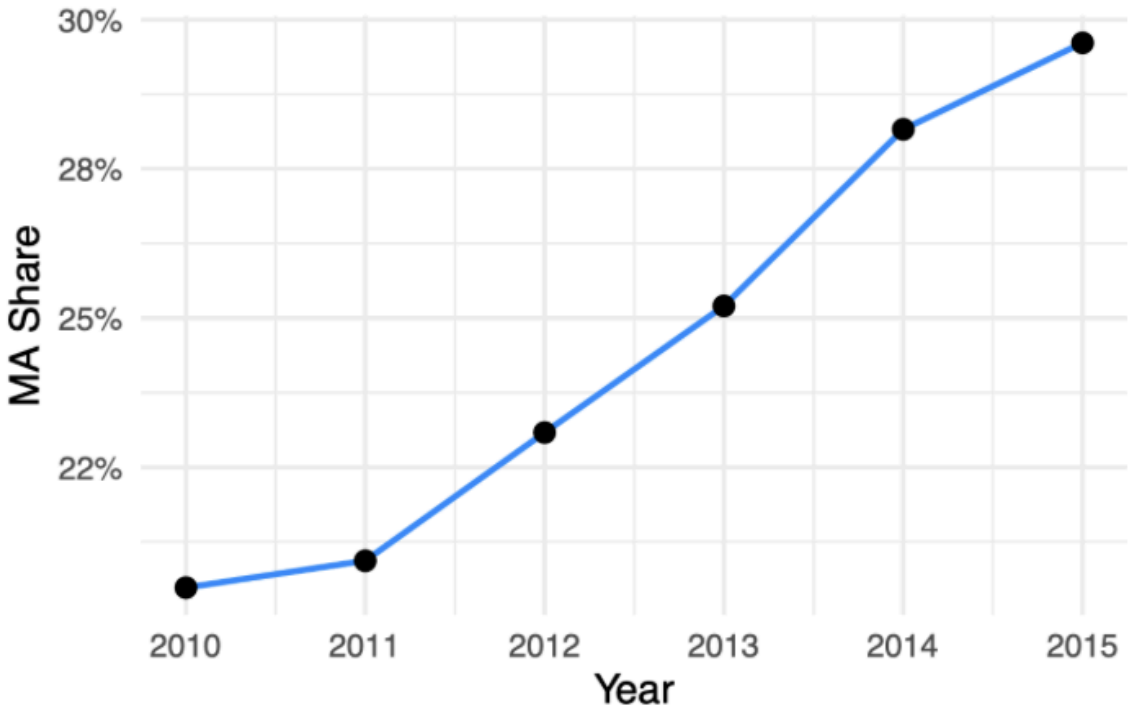
During this progression we can see how over time the distribution begins to shift towards the right, favoring higher rated plans.

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



The average benchmark payment rose slightly from 2010-2013. There was a slightly more dramatic increase from 2013-2014, before it dropped almost $100 in 2015.

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?



The steady increase in enrollments over the years shows an increase in Medicare Advantage popularity. This correlates with benchmark payments because as they increased, it allowed for MA plans to expand.

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.

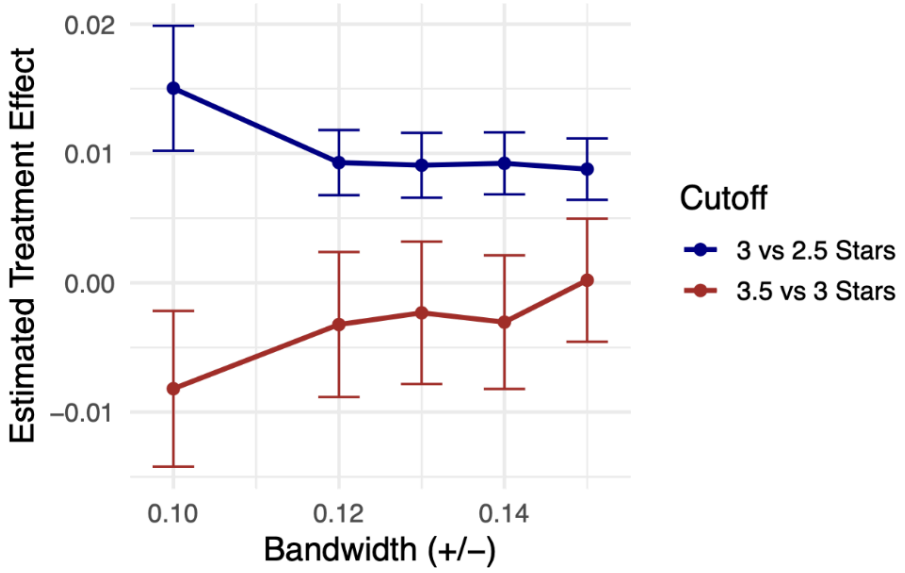
Star_Rating	rounded_up
3.0	1304
3.5	1547
4.0	1399
4.5	176
5.0	26

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.

	3 Stars	3.5 Stars
(Intercept)	0.009***	0.017***
	(0.001)	(0.002)
treatTRUE	0.009***	−0.003
	(0.001)	(0.003)
score	−0.022**	0.022
	(0.007)	(0.016)
Num.Obs.	4039	1656
R2	0.018	0.001
RMSE	0.02	0.03

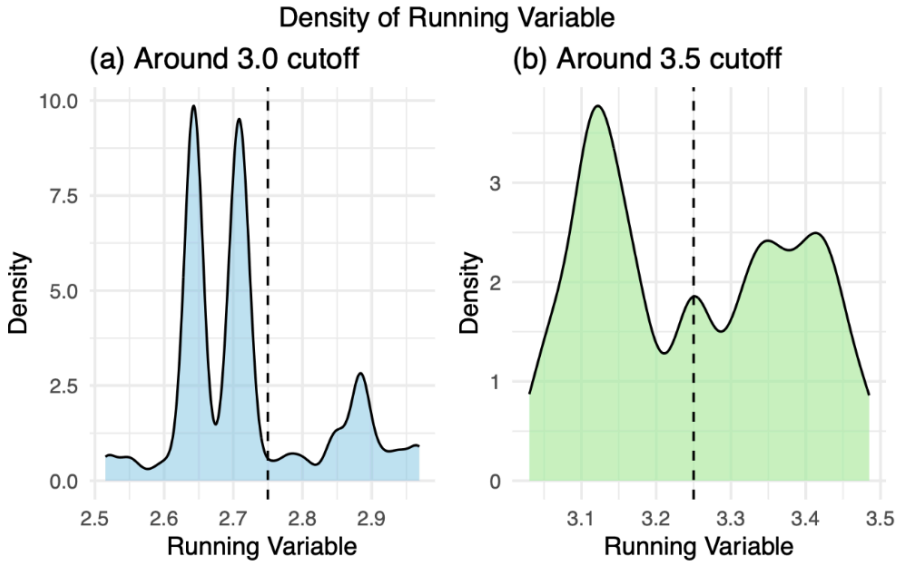
+ p \num{< 0.1}, * p \num{< 0.05}, ** p \num{< 0.01}, *** p \num{< 0.001}

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?



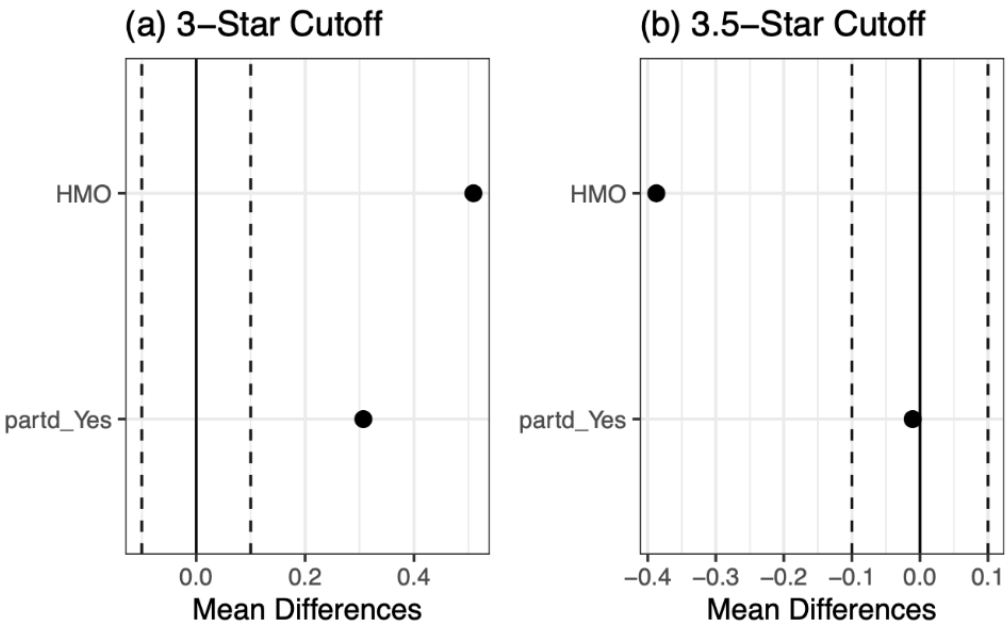
I would say the findings are not that sensitive to the choice of bandwidth.

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?



There isn't strong evidence of insurer manipulation in this case. If manipulation were happening, we could expect to see more plans just above the cutoff, but instead the distribution is mostly skewed to the left on both sides.

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.



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

Questions 5–9 suggest that star ratings have a notable effect on plan enrollment. Plans that increased from 2.5 to 3 stars experienced a significant boost in enrollment, suggesting that hitting the 3-star threshold matters to beneficiaries. Surprisingly, plans rated 3.5 stars saw a drop in market share, which may suggest that small increases within the same range (like 3 to 3.5) aren't as influential as hitting a full-star milestone. While there is some imbalance at the 3.0-star cutoff, especially for HMO plans, the 3.5-star threshold appears to meet RDD requirements better, reinforcing the idea that manipulation was unlikely, though 3.0 stars remains a key point that can shape consumer behavior.