HOMEWORK 4 BY AVANTH PAKANATI

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Question 1

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<Figure size 1200x600 with 0 Axes>
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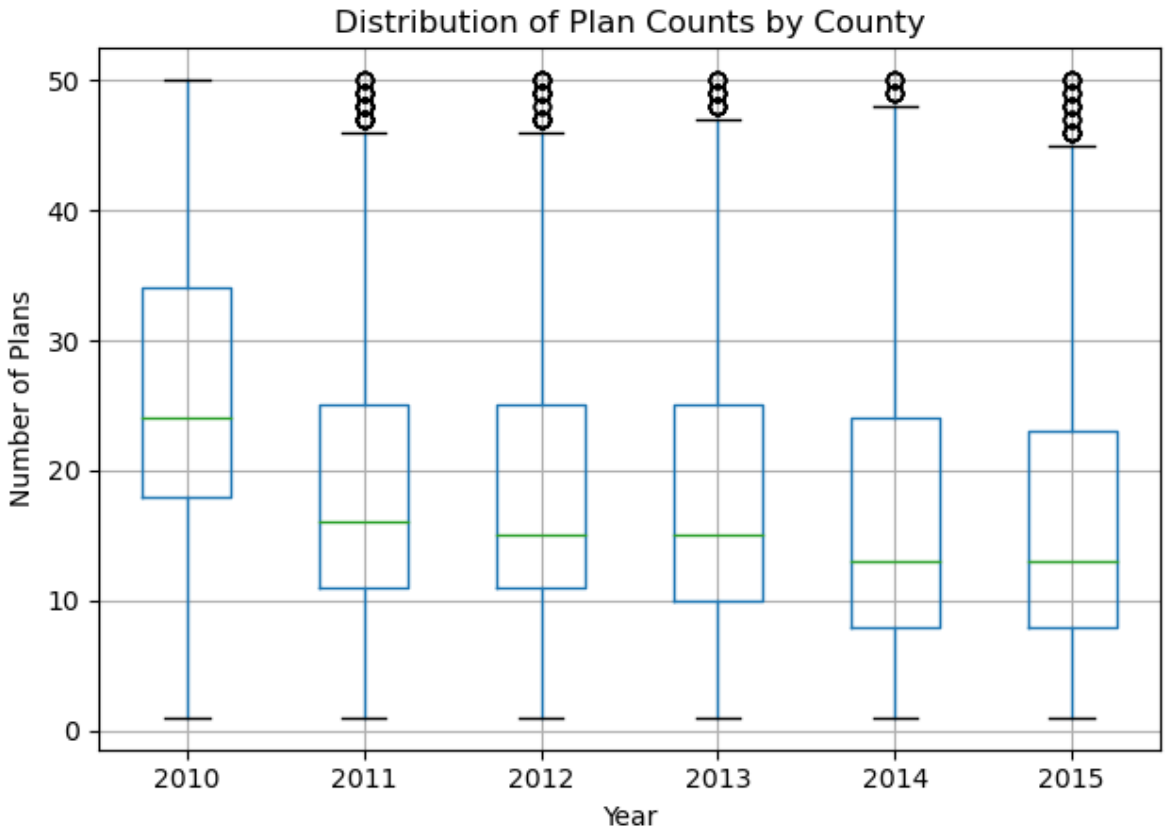
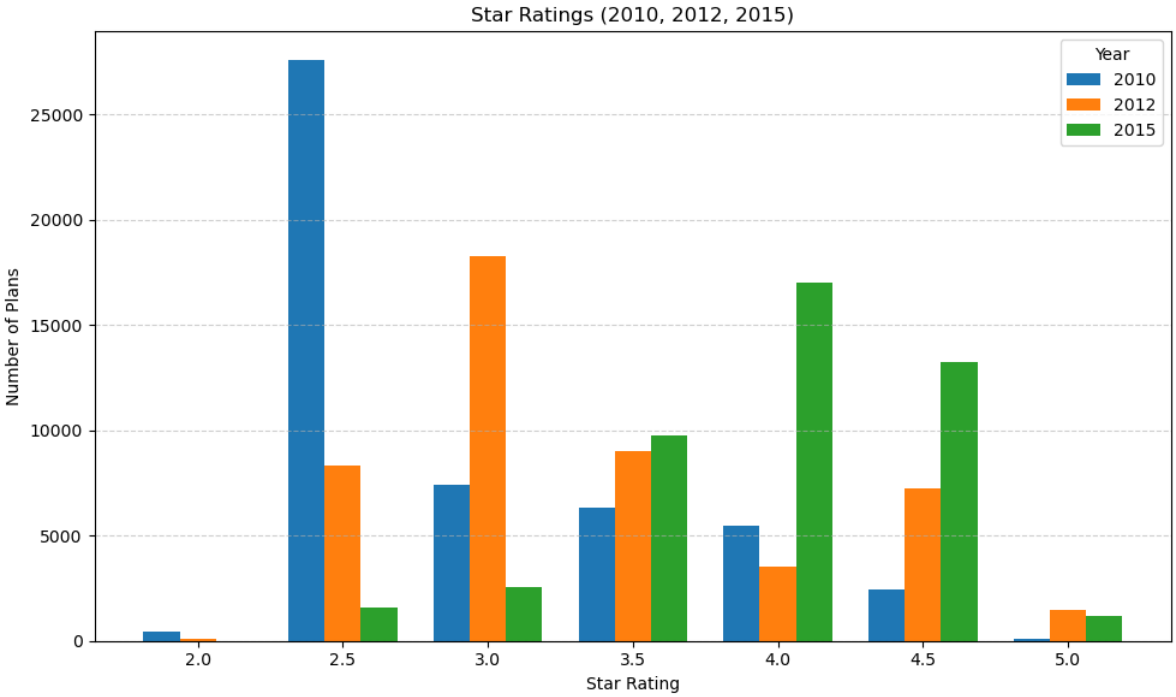


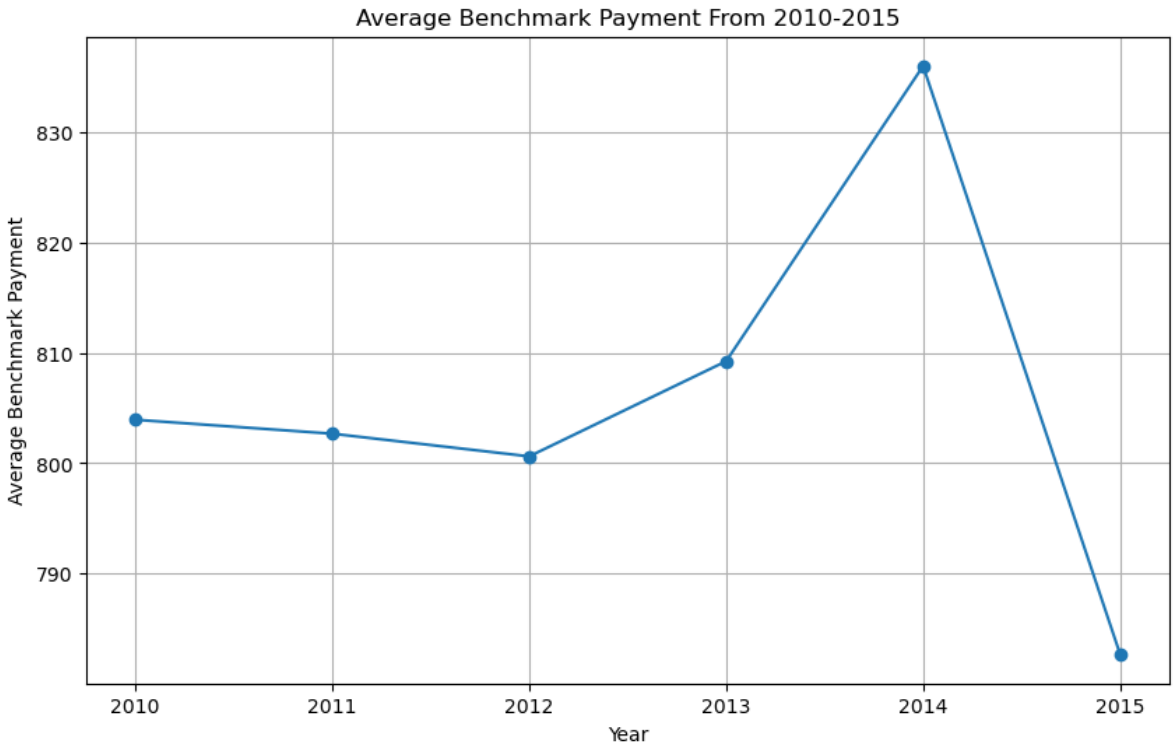
This figure shows that the number of plans is too few and shows that the market is concentrated within regions.

Question 2



From 2010-2015, Star Rating counts have increased with higher ratings

Question 3

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-21.236870591187085
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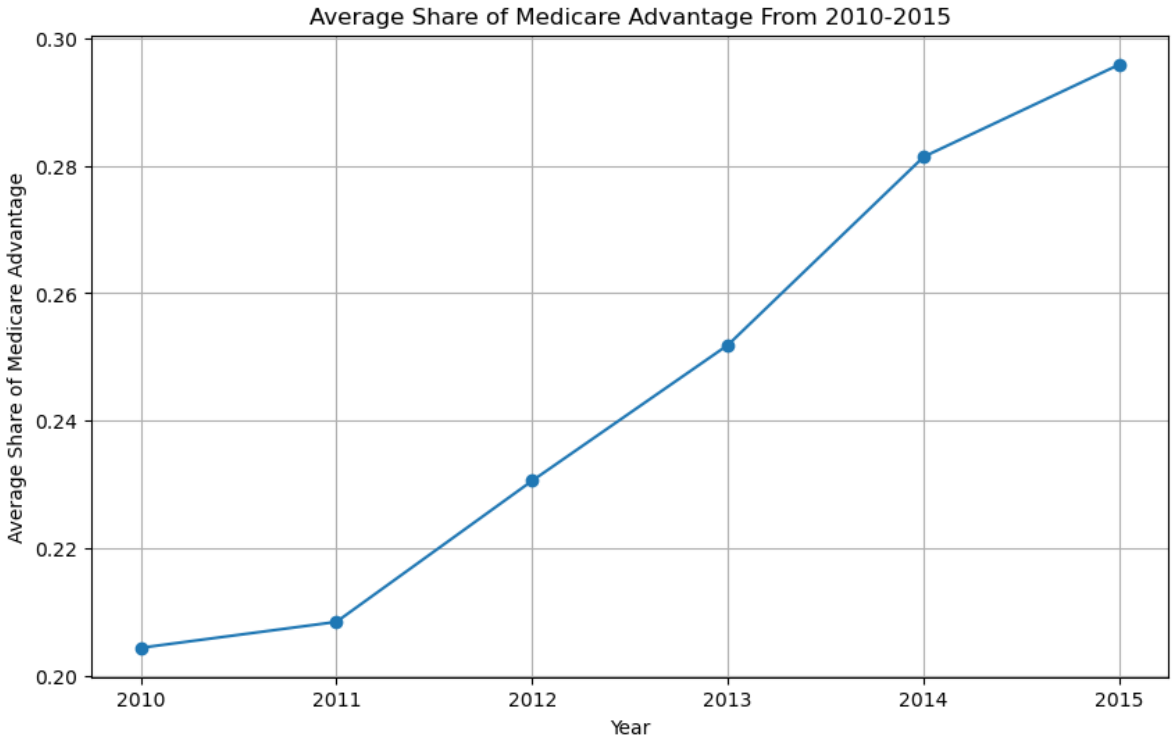
The average benchmark payment has fallen by $21.24 from the years 2010-2015. Through the years, there wasn't much change from 2010-2012, but 2012-2014 saw a sharp increase. There was a sharp drop off in from 2014-2015.

Question 4



The share of Medicare Advantage increased from 2010-2015, but there is no obvious correlation between this and benchmark payments.

Question 5

	star_rating	rounded
0	3.0	2434
1	3.5	1632
2	4.0	65
3	4.5	0
4	5.0	0

Question 6

OLS Regression Results

Dep. Variable:	mktshare	R-squared:	0.007
Model:	OLS	Adj. R-squared:	0.005
Method:	Least Squares	F-statistic:	5.188
Date:	Fri, 11 Apr 2025	Prob (F-statistic):	0.00568

Time:	18:40:04	Log-Likelihood:	1013.6
No. Observations:	1588	AIC:	-2021.
Df Residuals:	1585	BIC:	-2005.
Df Model:	2		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	0.2623	0.022	11.827	0.000	0.219	0.306
score_3	0.2364	0.074	3.213	0.001	0.092	0.381
treat_3	-0.0118	0.023	-0.518	0.604	-0.056	0.033

Omnibus:	50.054	Durbin-Watson:	1.267
Prob(Omnibus):	0.000	Jarque-Bera (JB):	53.846
Skew:	0.443	Prob(JB):	2.03e-12
Kurtosis:	2.830	Cond. No.	32.3

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

OLS Regression Results

Dep. Variable:	mktshare	R-squared:	0.048
Model:	OLS	Adj. R-squared:	0.047
Method:	Least Squares	F-statistic:	49.91
Date:	Fri, 11 Apr 2025	Prob (F-statistic):	7.18e-22
Time:	18:40:04	Log-Likelihood:	1154.9
No. Observations:	1979	AIC:	-2304.
Df Residuals:	1976	BIC:	-2287.
Df Model:	2		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	0.2709	0.010	26.902	0.000	0.251	0.291
score_35	0.4593	0.052	8.875	0.000	0.358	0.561
treat_35	-0.0350	0.010	-3.414	0.001	-0.055	-0.015

Omnibus:	105.979	Durbin-Watson:	1.018
Prob(Omnibus):	0.000	Jarque-Bera (JB):	118.554
Skew:	0.584	Prob(JB):	1.80e-26

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Kurtosis:                       2.727   Cond. No.                         23.3
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Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
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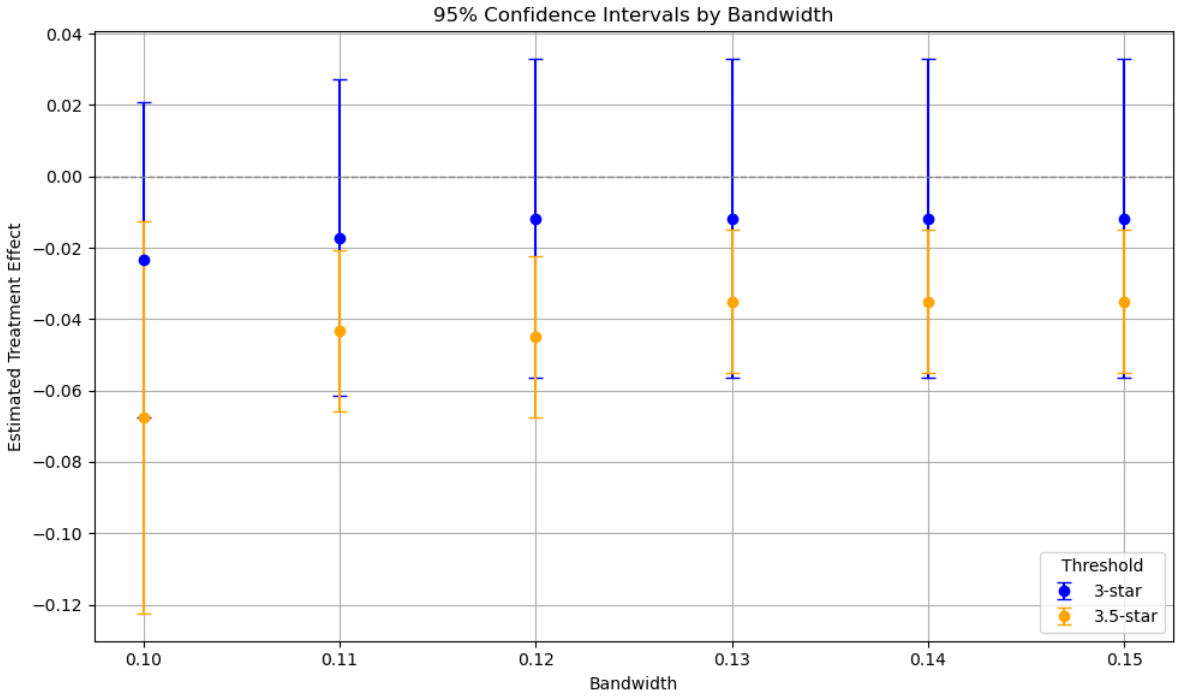
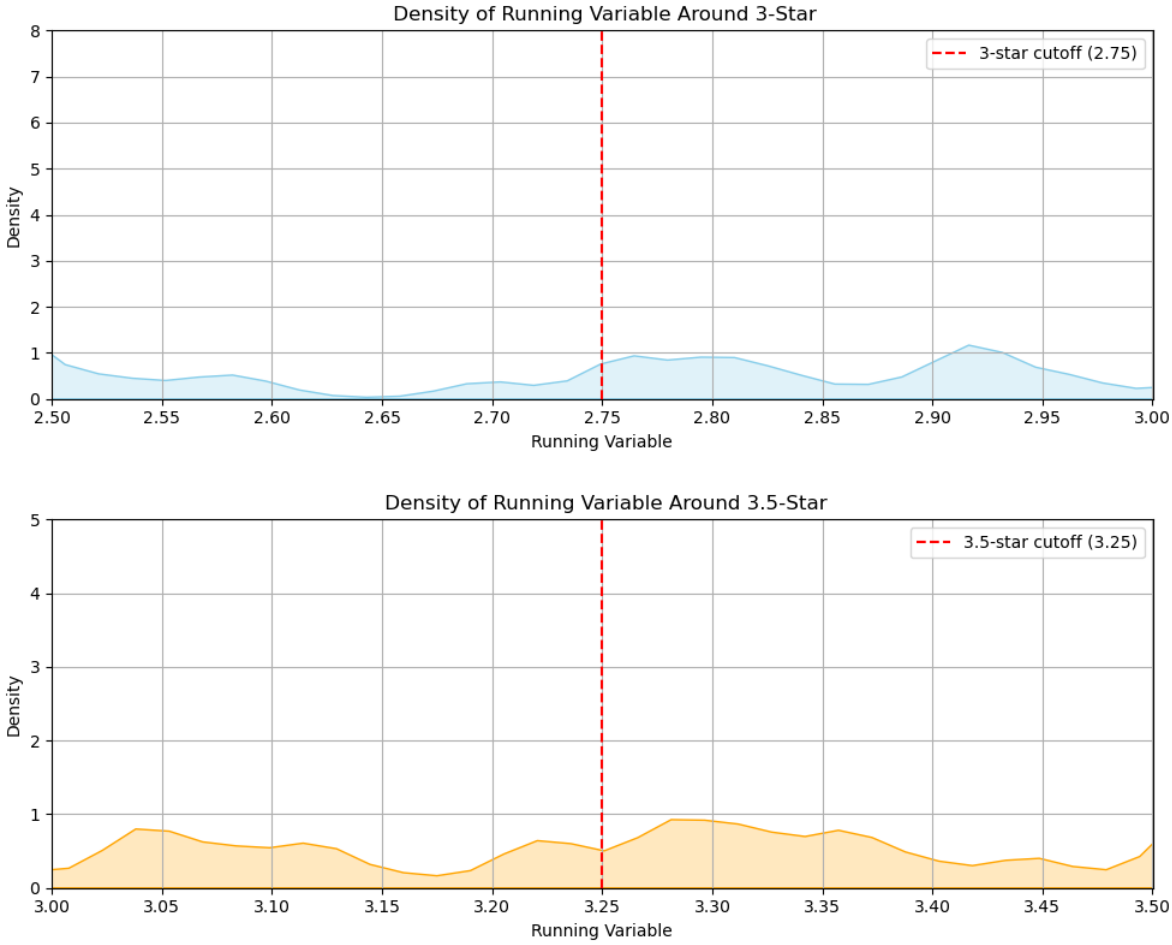
	3-Star Threshold	3.5-Star Threshold
Intercept	0.262 (0.022)	0.271 (0.010)
Rounded	-0.012 (0.023)	-0.035 (0.010)
Running Score	0.236 (0.074)	0.459 (0.052)
N	1588	1979
R2	0.006503	0.048083

Question 7



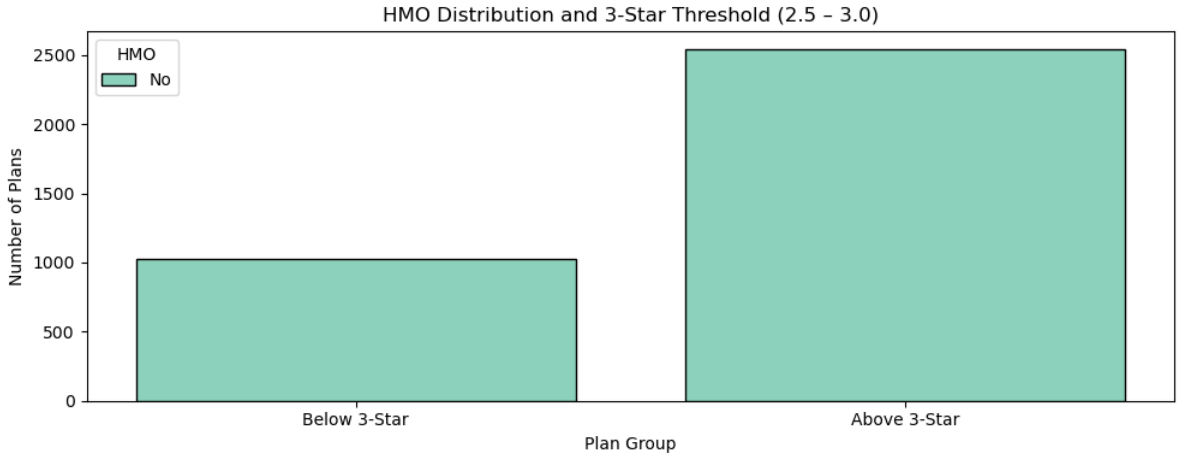
For the 3 star thresholds, the estimated treatment effect is consistently negative but is pretty stable. This means that it is not very sensitive to bandwidth choice. The 3.5 star threshold is also consistently negative, but there is a lot more variation meaning it is much morh sensitive to bandwidth choice.

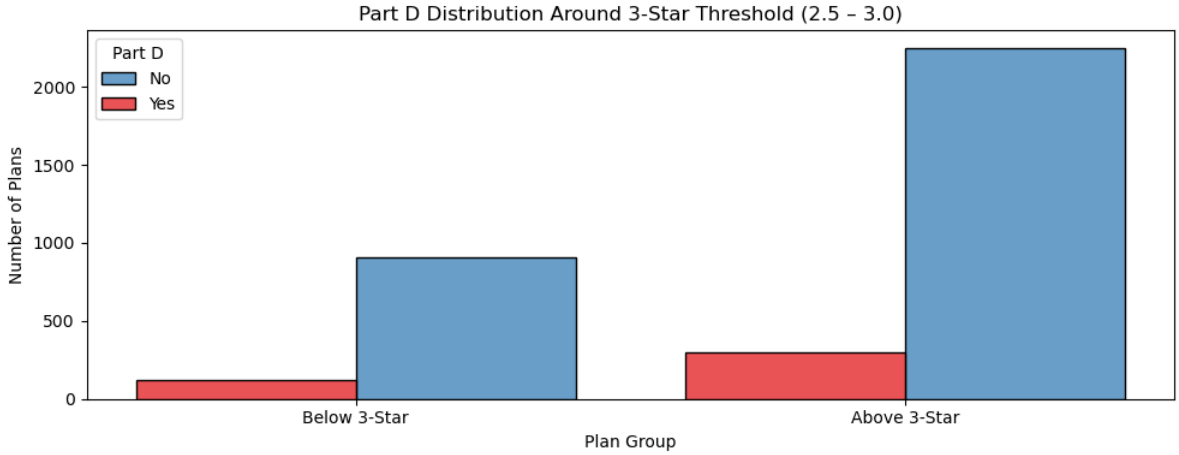
Question 8

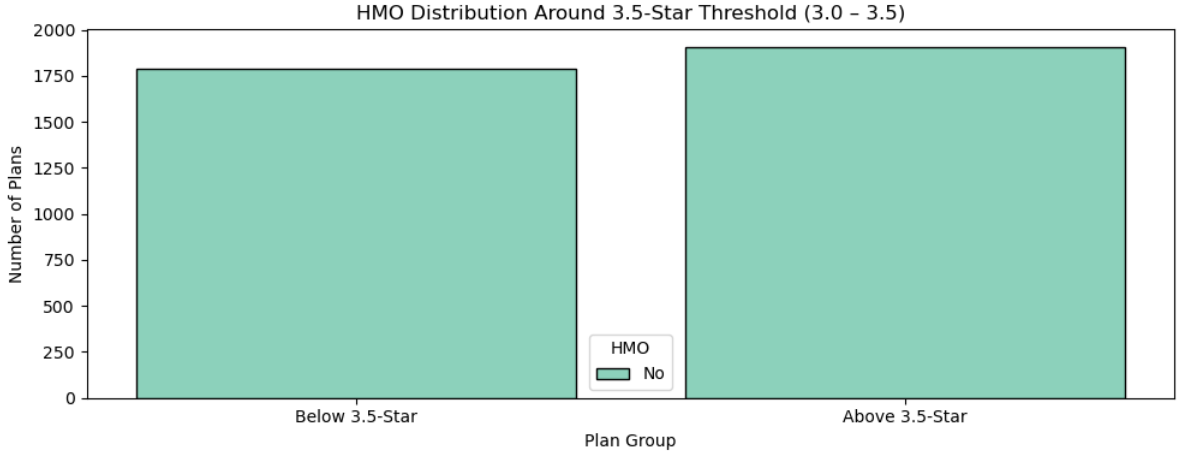


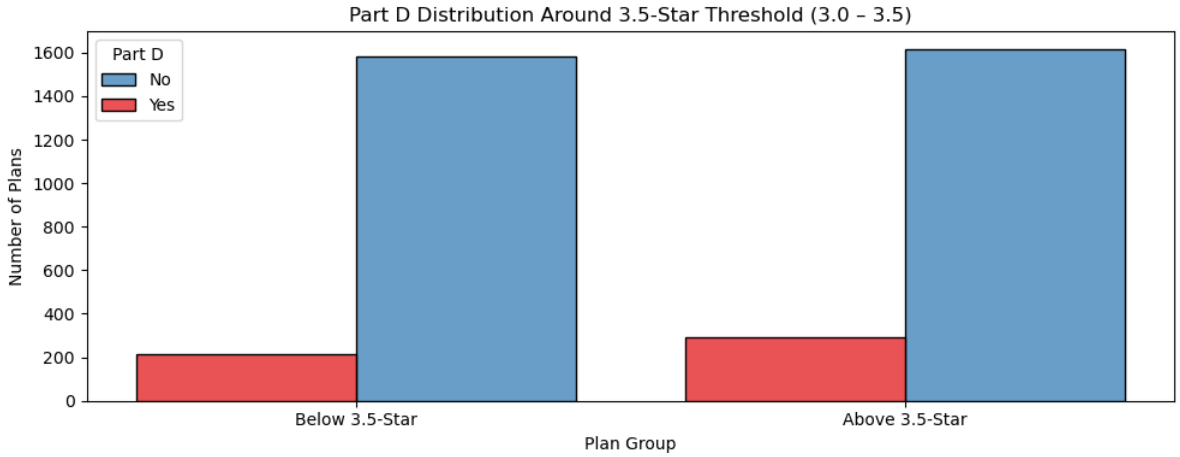
Both the 3 star and 3.5 star levels are both fairly stable, with few spikes. This means that there wasn't much of a manipulation effect.

Question 9


HMO Distribution and 3-Star Threshold (2.5 – 3.0)
HMO
No
Number of Plans
2500
2000
1500
1000
500
0
Below 3-Star
Above 3-Star
Plan Group


Part D Distribution Around 3-Star Threshold (2.5 – 3.0)
Part D
No
Yes
Number of Plans
2000
1500
1000
500
0
Below 3-Star
Above 3-Star
Plan Group


HMO Distribution Around 3.5-Star Threshold (3.0 – 3.5)
Number of Plans
2000
1750
1500
1250
1000
750
500
250
0
HMO
No
Below 3.5-Star
Above 3.5-Star
Plan Group



For Plan D plan characteristics, at the 3 star level, there are more plans above the threshold than there are below the threshold. For 3.5 stars, theres a similar amount of plans both below and above the threshold.

Question 10:

Overall, we know that both enrollments ratings have increased over time as well as star ratings. The results found from Question 6 show us that that Star Rating has an effect on market share.