Homework 4 - Research in Health Economics

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1 Summarise the Data

1.1 Question 1

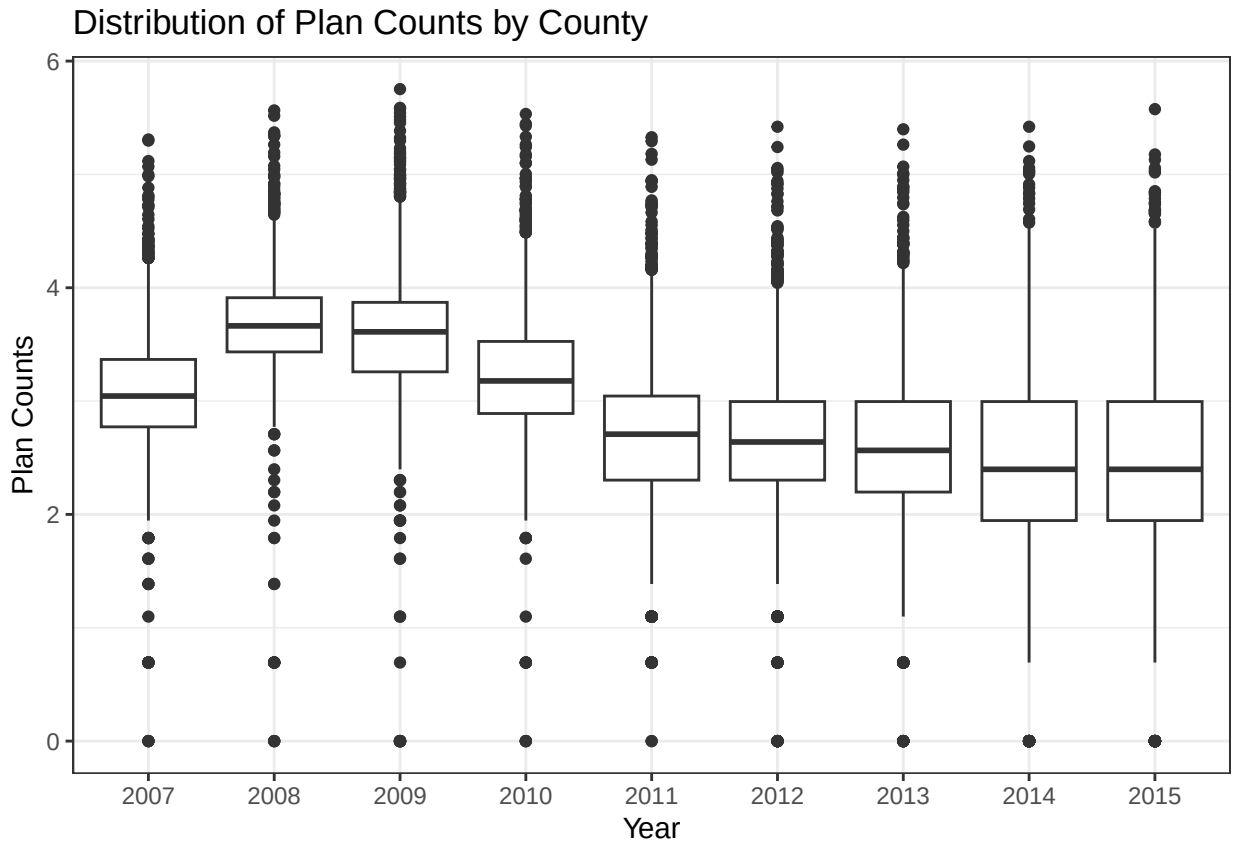

Figure 1: Distribution of Plan Counts by County

Figure 1 shows the distribution of plan counts by country per year. On average, each county has 3 plans or less which might be too few as these plans ight not cover everyone's needs regarding health insurance.

1.2 Question 2

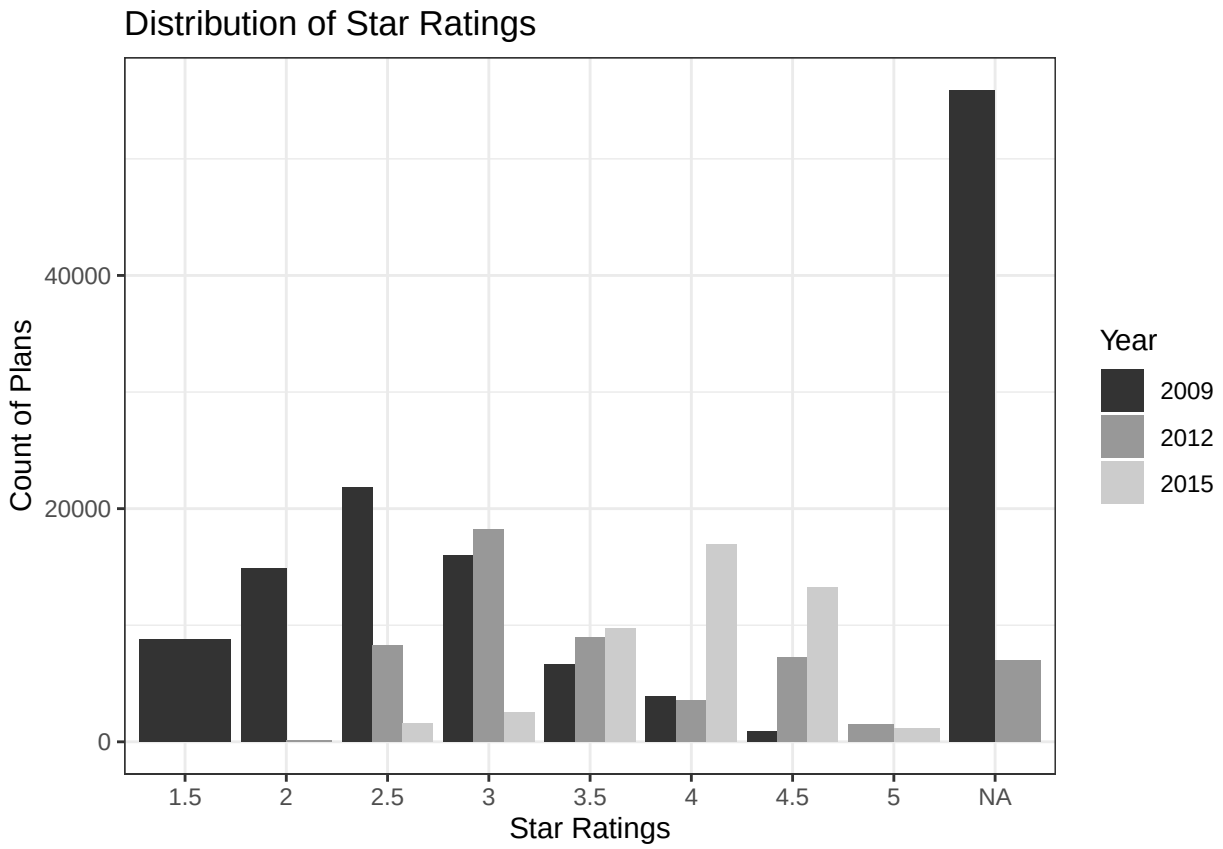

Figure 2: Distribution of Star Ratings (2009, 2012 & 2015)

The Distribution of Star Ratings for the years 2009, 2012 and 2015 are shown in Figure 2. It shows that plans with higher star ratings became more prevalent in 2015 compared to 2009 which could suggest that the helath insurance plans have been improving in quality over time.

1.3 Question 3

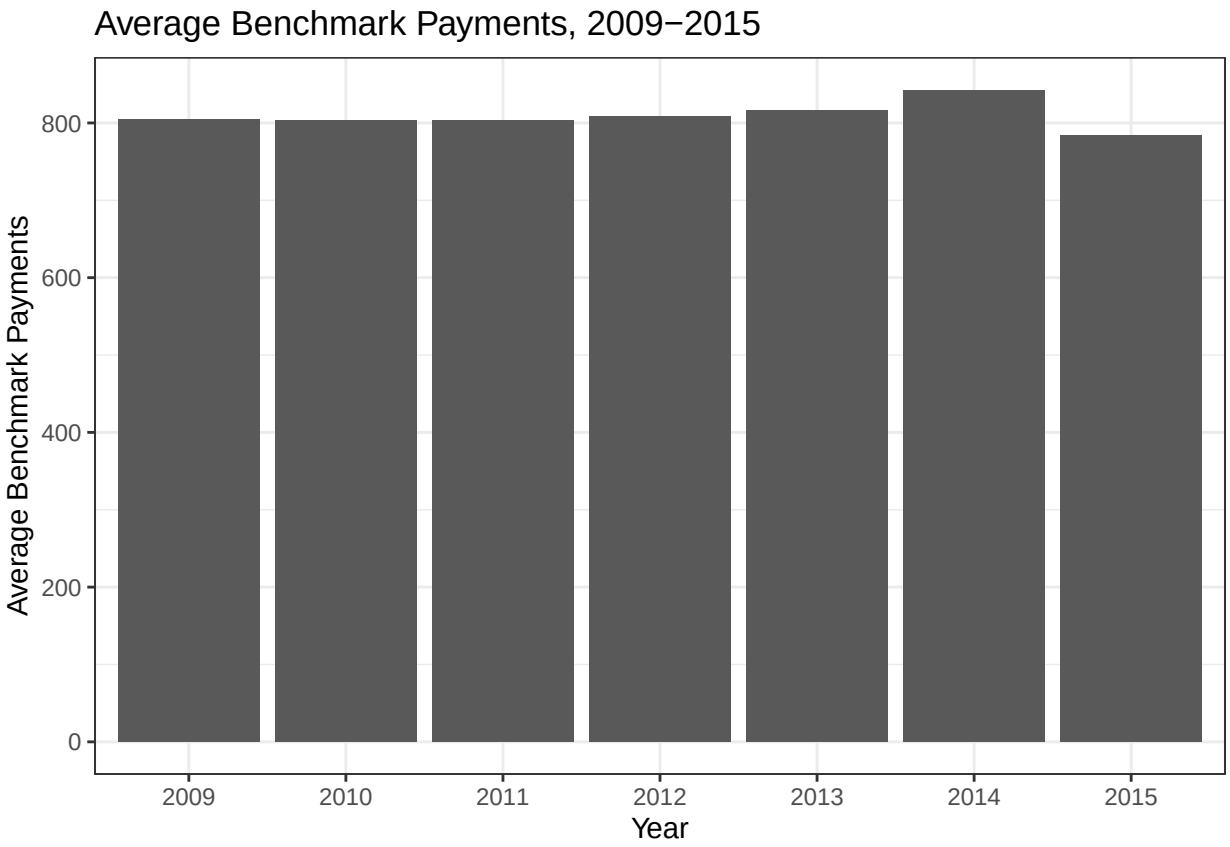

Figure 3: Average Benchmark Payments, 2009-2015

The change in average benchmark payments from 2009 to 2015 is shown in Figure 3 which shows that the average benchmark payment has remained constant at $800 from 2009 till 2012, after which it increased in 2013 and 2014, before falling again in 2015.

1.4 Question 4

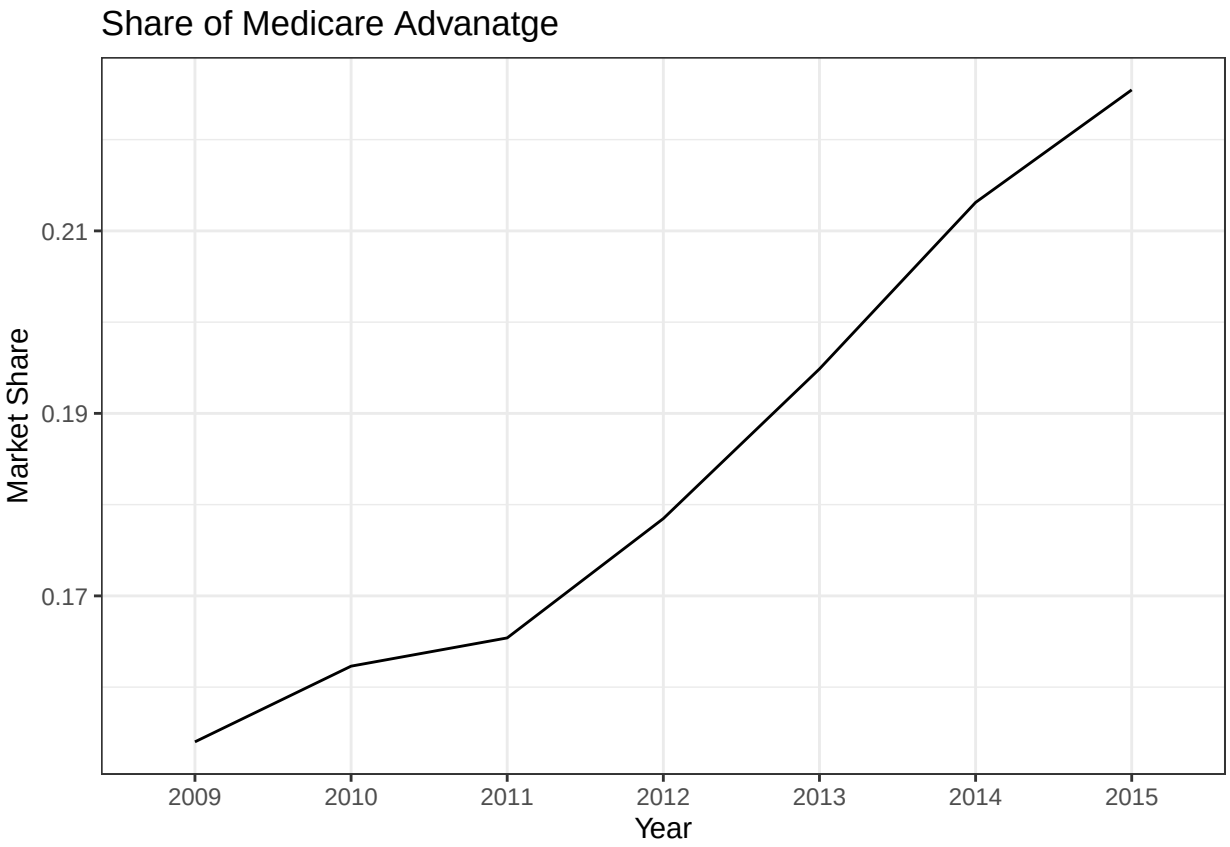

Figure 4: Share of Medicare Advanatge, 2009-2015

As shown in Figure 4, the average share of Medicare Advantage has increased significantly from 2009 to 2015, indicating an increase in its popularity over time. As the benchmark payments have remained more or less constant during this time period, it suggests that more people preferred Medicare Advantage compared to other options probably due to factors such as better quality or coverage.

2 Estimate ATE

2.1 Question 1

Table 1: Number of Plans with Rounded up Ratings

Star Rating	Rounded to 3	Rounded to 3.5	Rounded to 4	Rounded to 4.5	Rounded to 5
3	2,278	0	0	0	0
3.5	0	1,157	0	0	0
4	0	0	767	0	0
4.5	0	0	0	0	0

2.2 Question 2

Table 2: Star Rating Estimate

	Estimate	Standard Error	T-Statistic	P-value	Confidence Interval	Confidence Interval	Star
(Intercept)	923.23975	192.35051	4.7997781	0.0000017	546.00554	1,300.4740	
treatTRUE	-109.51434	349.45332	-0.3133876	0.7540197	-794.85566	575.8270	
score	-6,296.53192	1,841.79309	-3.4186967	0.0006422	-9,908.62204	-2,684.4418	
(Intercept)	553.41857	78.89516	7.0146070	0.0000000	398.66797	708.1692	
treatTRUE	-61.28695	101.80680	-0.6019927	0.5472656	-260.97807	138.4042	
score	-343.82366	791.55587	-0.4343644	0.6640834	-1,896.43780	1,208.7905	
(Intercept)	923.23975	192.35051	4.7997781	0.0000017	546.00554	1,300.4740	
treatTRUE	-109.51434	349.45332	-0.3133876	0.7540197	-794.85566	575.8270	
score	-6,296.53192	1,841.79309	-3.4186967	0.0006422	-9,908.62204	-2,684.4418	
(Intercept)	175.09039	42.15486	4.1535042	0.0000587	91.69802	258.4828	
treatTRUE	0	0	0	0	0	0	
score	729.92058	765.84639	0.9530901	0.3422997	-785.10626	2,244.9474	

2.3 Question 3

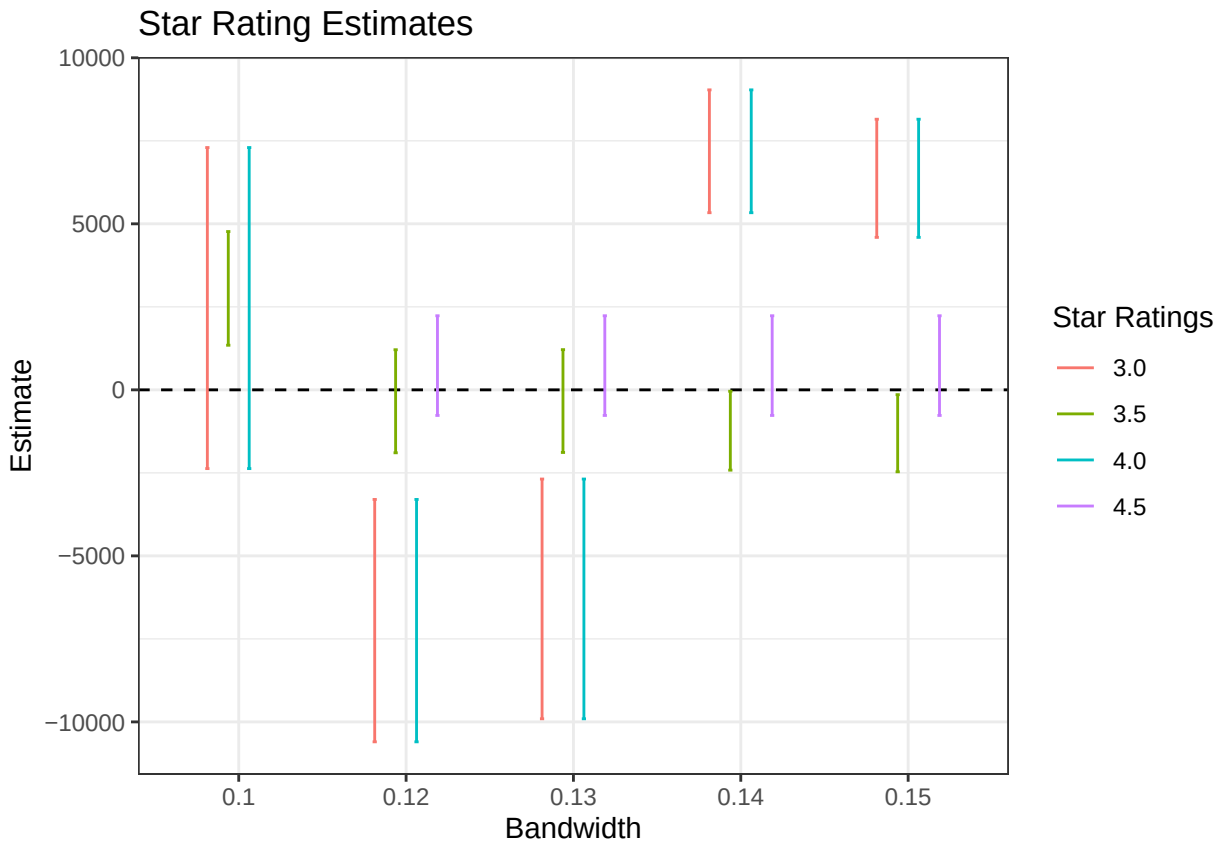

Figure 5: Estimate of Star Rating Effects

Figure 5 shows the estimates for the effect of star ratings for different bandwidths.

2.4 Question 4

```
## $Estl
## Call: lpdensity
##
## Sample size                                    270
## Polynomial order for point estimation    (p=)  2
## Order of derivative estimated            (v=)  1
## Polynomial order for confidence interval (q=)  3
## Kernel function                                triangular
## Scaling factor                                 0.13780737704918
## Bandwidth method                               user provided
##
## Use summary(...) to show estimates.
##
## $Estr
## Call: lpdensity
##
## Sample size                                    1683
## Polynomial order for point estimation    (p=)  2
## Order of derivative estimated            (v=)  1
## Polynomial order for confidence interval (q=)  3
## Kernel function                                triangular
## Scaling factor                                 0.861680327868853
## Bandwidth method                               user provided
##
## Use summary(...) to show estimates.
##
## $Estplot
```

```
## $Estl
## Call: lpdensity
##
## Sample size                                    964
## Polynomial order for point estimation    (p=)  2
## Order of derivative estimated            (v=)  1
## Polynomial order for confidence interval (q=)  3
## Kernel function                                triangular
## Scaling factor                                 0.610653138871275
## Bandwidth method                               user provided
##
## Use summary(...) to show estimates.
##
## $Estr
## Call: lpdensity
##
## Sample size                                    664
## Polynomial order for point estimation    (p=)  2
## Order of derivative estimated            (v=)  1
## Polynomial order for confidence interval (q=)  3
## Kernel function                                triangular
## Scaling factor                                 0.420418516169943
## Bandwidth method                               user provided
##
## Use summary(...) to show estimates.
```

Figure 6: Manipulation of Running Variable, 2.5 vs 3 Stars

```
##
## $Estplot

## $Estl
## Call: lpdensity
##
## Sample size                                        714
## Polynomial order for point estimation    (p=)      2
## Order of derivative estimated            (v=)      1
## Polynomial order for confidence interval (q=)      3
## Kernel function                                    triangular
## Scaling factor                                     0.554863813229572
## Bandwidth method                                   user provided
##
## Use summary(...) to show estimates.
##
## $Estr
## Call: lpdensity
##
## Sample size                                        640
## Polynomial order for point estimation    (p=)      2
## Order of derivative estimated            (v=)      1
## Polynomial order for confidence interval (q=)      3
## Kernel function                                    triangular
## Scaling factor                                     0.49727626459144
## Bandwidth method                                   user provided
```

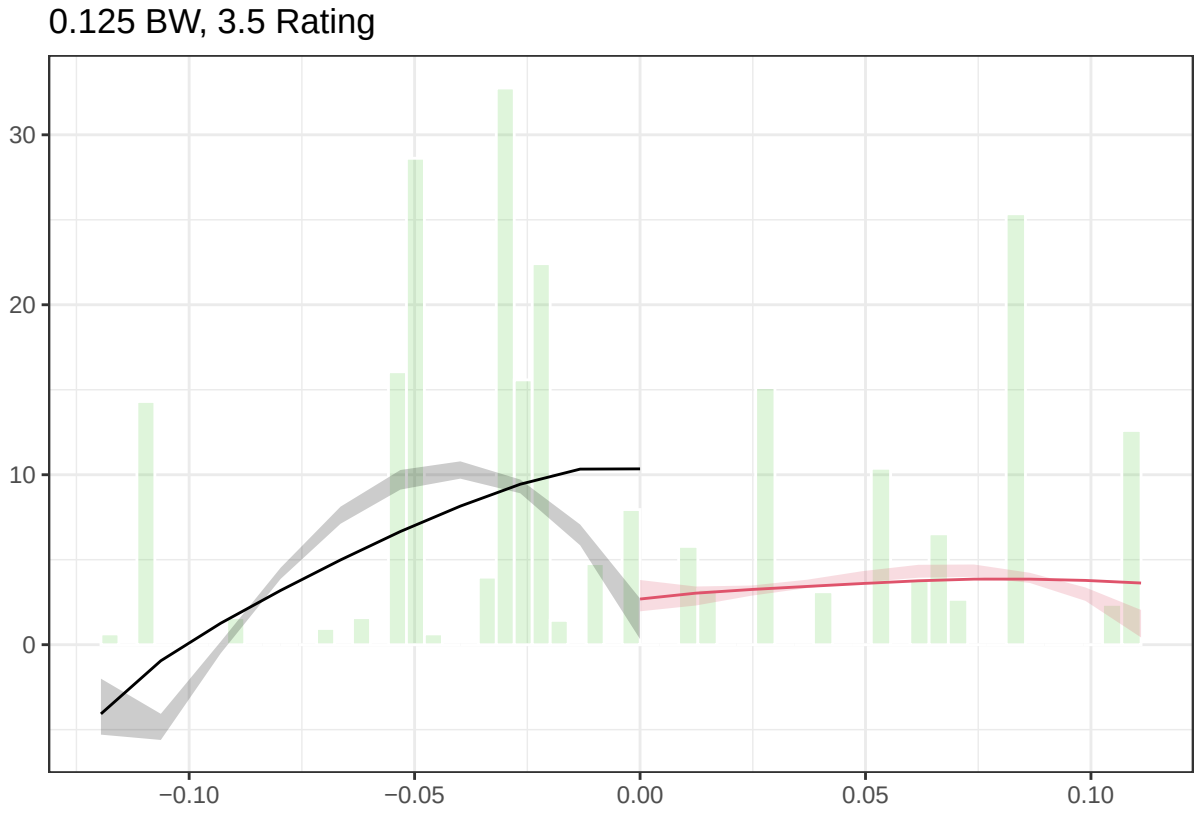

Figure 7: Manipulation of Running Variable, 3 vs 3.5 Stars

```
##
## Use summary(...) to show estimates.
##
## $Estplot
```

The results from in Figures 6-8 show that

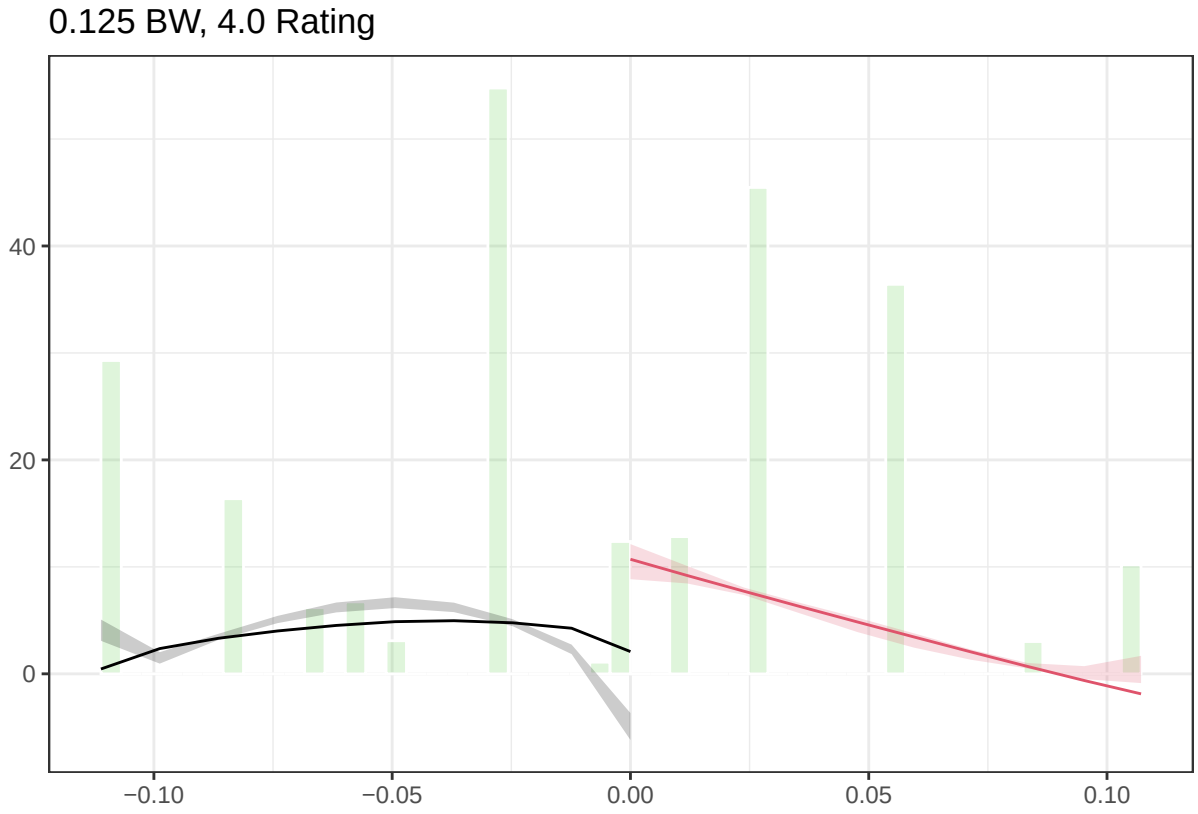

Figure 8: Manipulation of Running Variable, 3.5 vs 4 Stars

2.5 Question 5

Not sure how to check for manipulation of running variable with specific plan characteristic.

2.6 Question 6

I have incomplete or incorrect answers for some of the questions so I am unable to answer this properly