Homework 4

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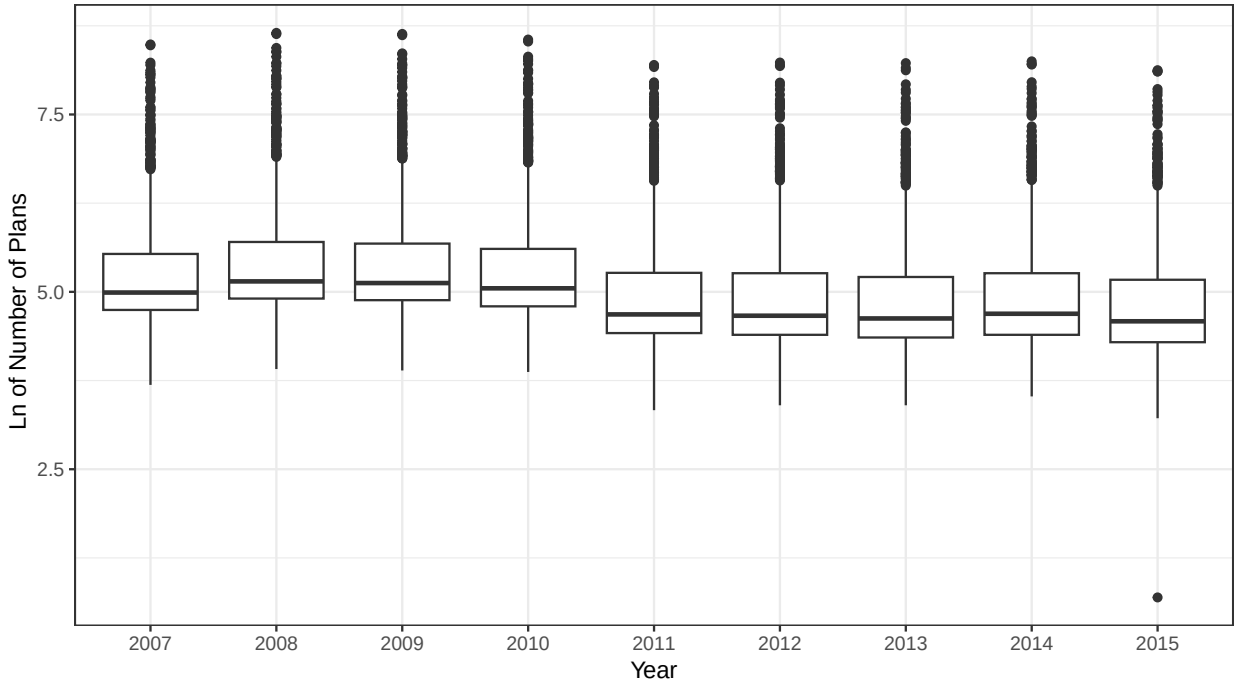
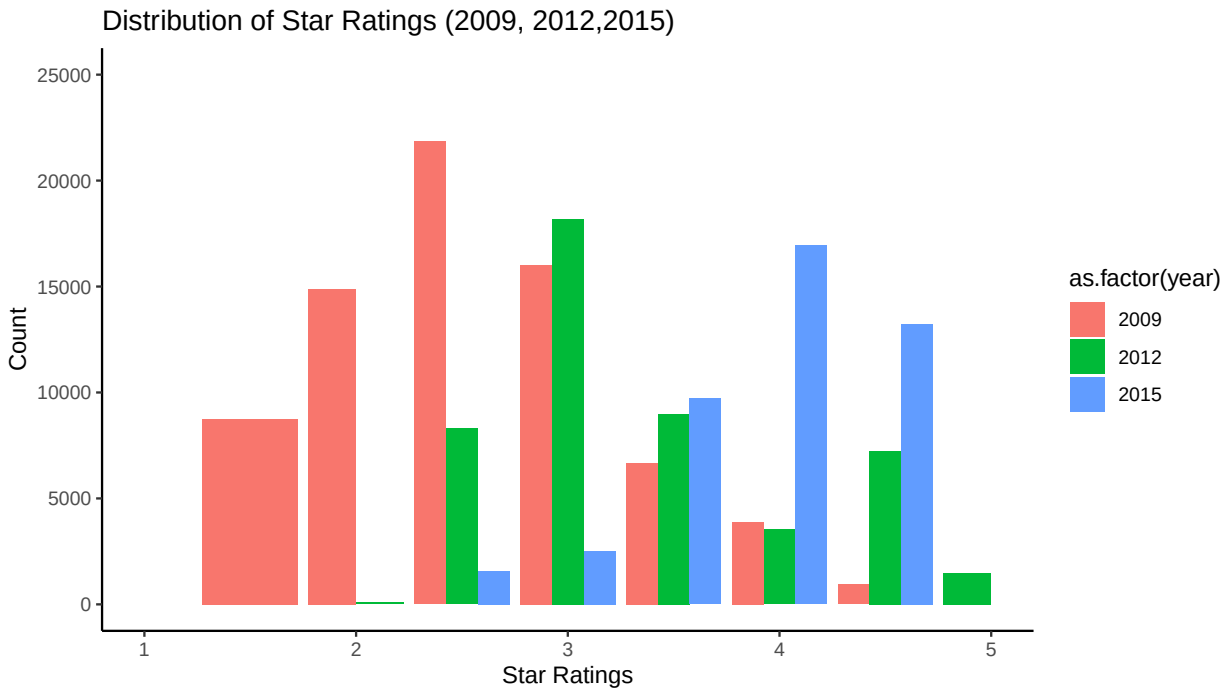
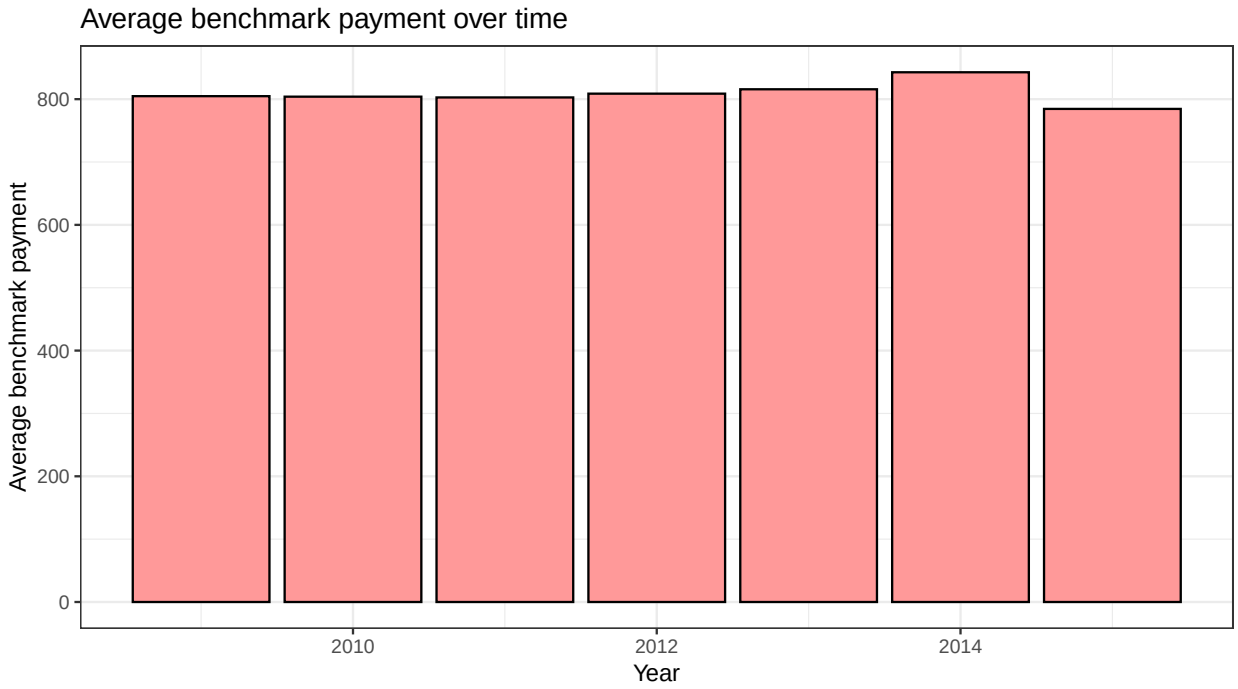
Summarize the data



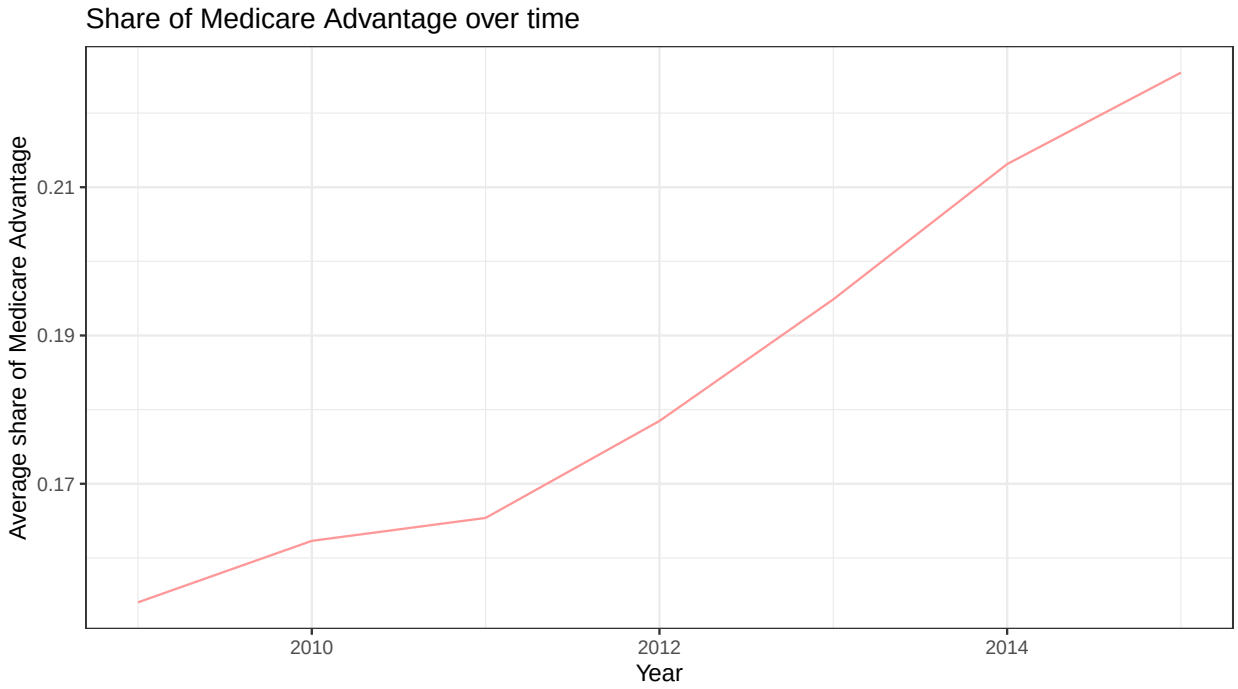
Given that most outliers are above, I would say there are too little plans.



Hopspitals seem to have higher ratings overall. The average rating seems to increase year by year.



Benchmark prices have increased significantly from 2011-2014 and have decreased drastically in 2015.



Medicare has increased in popularity. However, the slope seems to decrease over time. This might be correlated with the fact that Benchmark Payment has decreased in recent years.

Estimate ATE's

Question1

Question 2

```
## Sharp RD estimates using local polynomial regression.
##
## Number of Obs.                18986
## BW type                      Manual
## Kernel                      Uniform
## VCE method                      HC0
##
## Number of Obs.                11208         7778
## Eff. Number of Obs.             270         1683
## Order est. (p)                    1            1
## Order bias  (q)                   2            2
## BW est. (h)                   0.125        0.125
## BW bias (b)                   0.125        0.125
## rho (h/b)                     1.000        1.000
##
## ================================================================================
##         Method     Coef. Std. Err.         z     P>|z|      [ 95% C.I. ]
## ================================================================================
##   Conventional     0.017     0.004     4.277     0.000     [0.009 , 0.025]
##         Robust         -         -     2.554     0.011     [0.007 , 0.052]
## ================================================================================
```

```
## Sharp RD estimates using local polynomial regression.
##
## Number of Obs.                18986
## BW type                      Manual
## Kernel                      Uniform
## VCE method                      HC0
##
## Number of Obs.                15331         3655
## Eff. Number of Obs.             914          664
## Order est. (p)                    1            1
## Order bias  (q)                   2            2
## BW est. (h)                   0.125        0.125
## BW bias (b)                   0.125        0.125
## rho (h/b)                     1.000        1.000
##
## ================================================================================
##         Method     Coef. Std. Err.         z     P>|z|      [ 95% C.I. ]
## ================================================================================
##   Conventional     0.013     0.003     3.961     0.000     [0.006 , 0.019]
##         Robust         -         -     6.899     0.000     [0.021 , 0.037]
## ================================================================================

## Sharp RD estimates using local polynomial regression.
##
## Number of Obs.                18986
## BW type                      Manual
## Kernel                      Uniform
## VCE method                      HC0
##
## Number of Obs.                17640         1346
## Eff. Number of Obs.             646          640
## Order est. (p)                    1            1
## Order bias  (q)                   2            2
## BW est. (h)                   0.125        0.125
## BW bias (b)                   0.125        0.125
## rho (h/b)                     1.000        1.000
##
## ================================================================================
##         Method     Coef. Std. Err.         z     P>|z|      [ 95% C.I. ]
## ================================================================================
##   Conventional    -0.003     0.002    -1.255     0.210    [-0.008 , 0.002]
##         Robust         -         -    -2.096     0.036    [-0.017 , -0.001]
## ================================================================================
```

It seems as if the higher the rating, the less of an influence the rating has over the market share. # Question 3

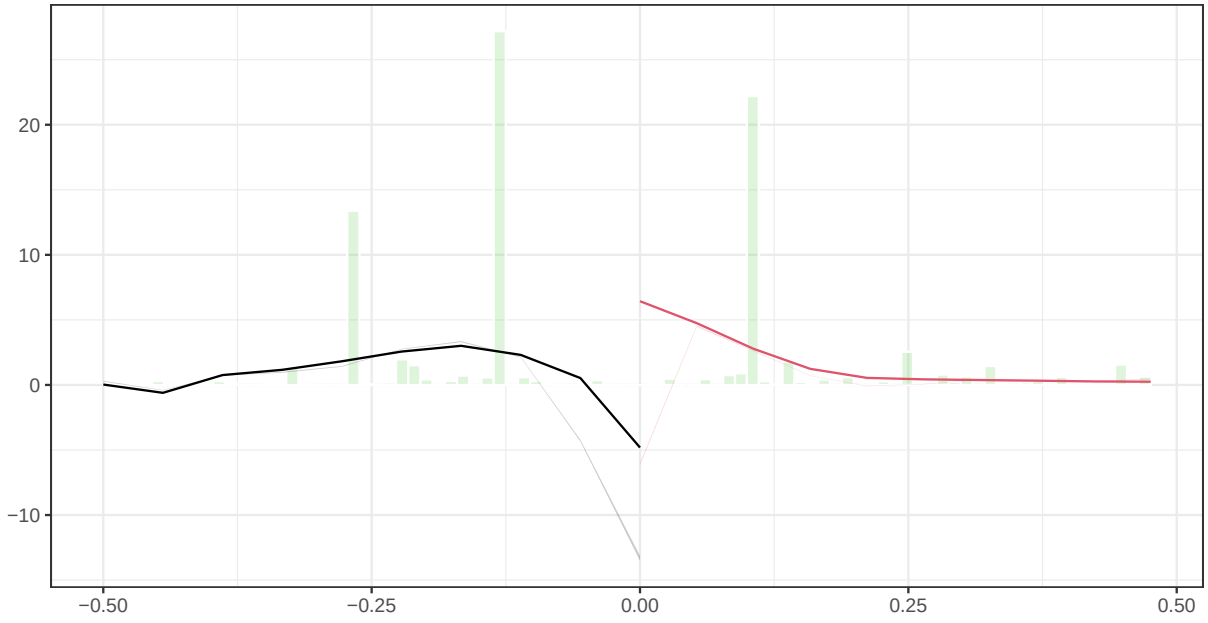
```
## Sharp RD estimates using local polynomial regression.
##
## Number of Obs.                18986
## BW type                      Manual
## Kernel                      Uniform
## VCE method                      HC0
```

```
##
## Number of Obs.                11208         7778
## Eff. Number of Obs.             181          522
## Order est. (p)                    1            1
## Order bias  (q)                   2            2
## BW est. (h)                   0.100        0.100
## BW bias (b)                   0.100        0.100
## rho (h/b)                     1.000        1.000
##
## ===============================================================================
##         Method     Coef. Std. Err.         z     P>|z|      [ 95% C.I. ]
## ===============================================================================
##   Conventional     0.012     0.004     3.480     0.001     [0.005 , 0.019]
##         Robust         -         -     2.310     0.021     [0.006 , 0.079]
## ===============================================================================

## Sharp RD estimates using local polynomial regression.
##
## Number of Obs.                18986
## BW type                      Manual
## Kernel                      Uniform
## VCE method                      HC0
##
## Number of Obs.                11208         7778
## Eff. Number of Obs.             260         1680
## Order est. (p)                    1            1
## Order bias  (q)                   2            2
## BW est. (h)                   0.120        0.120
## BW bias (b)                   0.120        0.120
## rho (h/b)                     1.000        1.000
##
## ===============================================================================
##         Method     Coef. Std. Err.         z     P>|z|      [ 95% C.I. ]
## ===============================================================================
##   Conventional     0.020     0.004     4.738     0.000     [0.012 , 0.029]
##         Robust         -         -     0.786     0.432    [-0.017 , 0.040]
## ===============================================================================

## Sharp RD estimates using local polynomial regression.
##
## Number of Obs.                18986
## BW type                      Manual
## Kernel                      Uniform
## VCE method                      HC0
##
## Number of Obs.                11208         7778
## Eff. Number of Obs.             270         1683
## Order est. (p)                    1            1
## Order bias  (q)                   2            2
## BW est. (h)                   0.130        0.130
## BW bias (b)                   0.130        0.130
## rho (h/b)                     1.000        1.000
##
## ===============================================================================
```

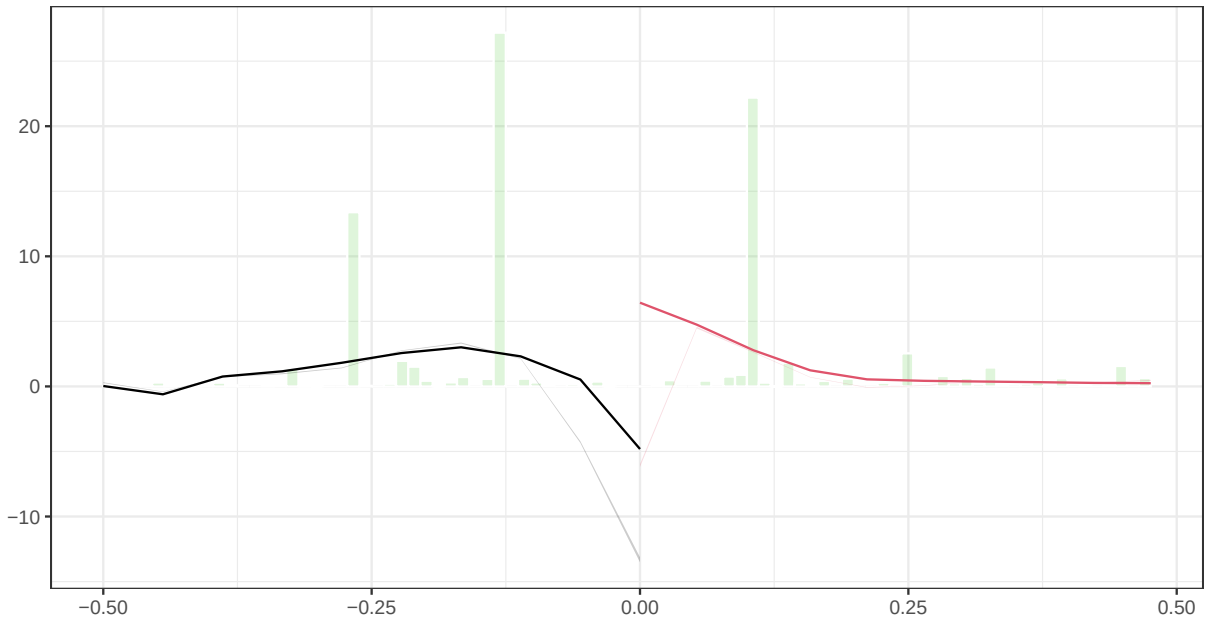
```
##         Method     Coef. Std. Err.         z     P>|z|      [ 95% C.I. ]
## ================================================================================
##   Conventional     0.017     0.004     4.277     0.000     [0.009 , 0.025]
##         Robust         -         -     2.554     0.011     [0.007 , 0.052]
## ================================================================================

## Sharp RD estimates using local polynomial regression.
##
## Number of Obs.                18986
## BW type                      Manual
## Kernel                      Uniform
## VCE method                      HC0
##
## Number of Obs.                11208         7778
## Eff. Number of Obs.            3966         1916
## Order est. (p)                    1            1
## Order bias  (q)                   2            2
## BW est. (h)                   0.140        0.140
## BW bias (b)                   0.140        0.140
## rho (h/b)                     1.000        1.000
##
## ================================================================================
##         Method     Coef. Std. Err.         z     P>|z|      [ 95% C.I. ]
## ================================================================================
##   Conventional     0.008     0.003     2.882     0.004     [0.003 , 0.013]
##         Robust         -         -     3.907     0.000     [0.019 , 0.056]
## ================================================================================
```

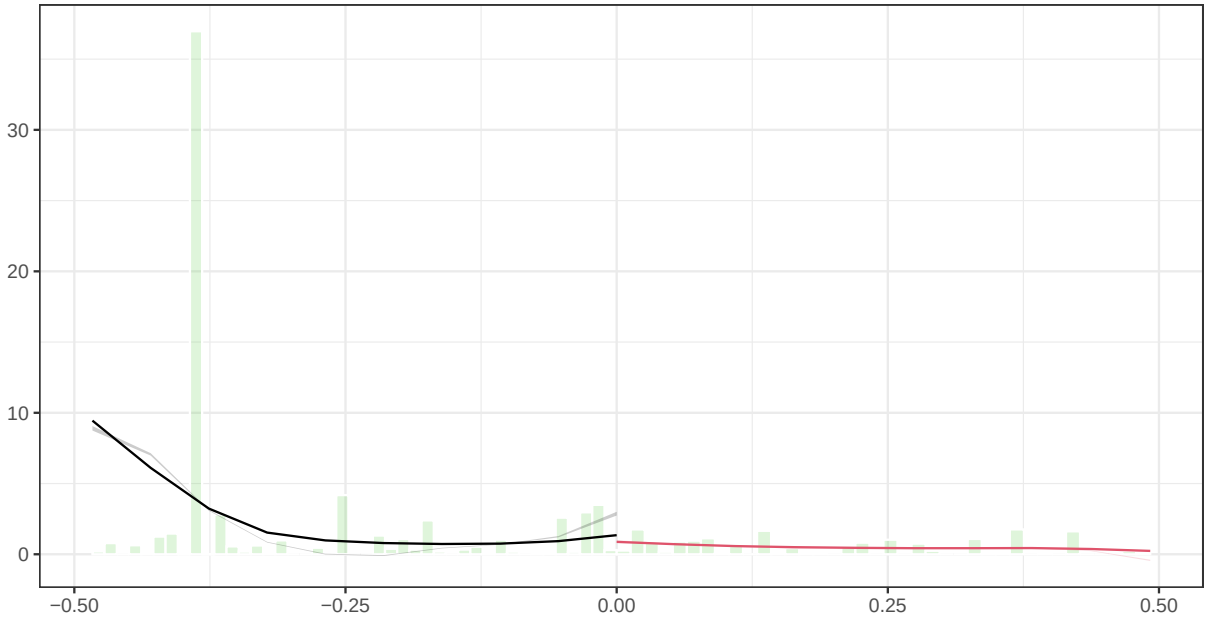
It seems as if the bandwidth does influence the results. However, all of them remain statistically significant.

Question 4



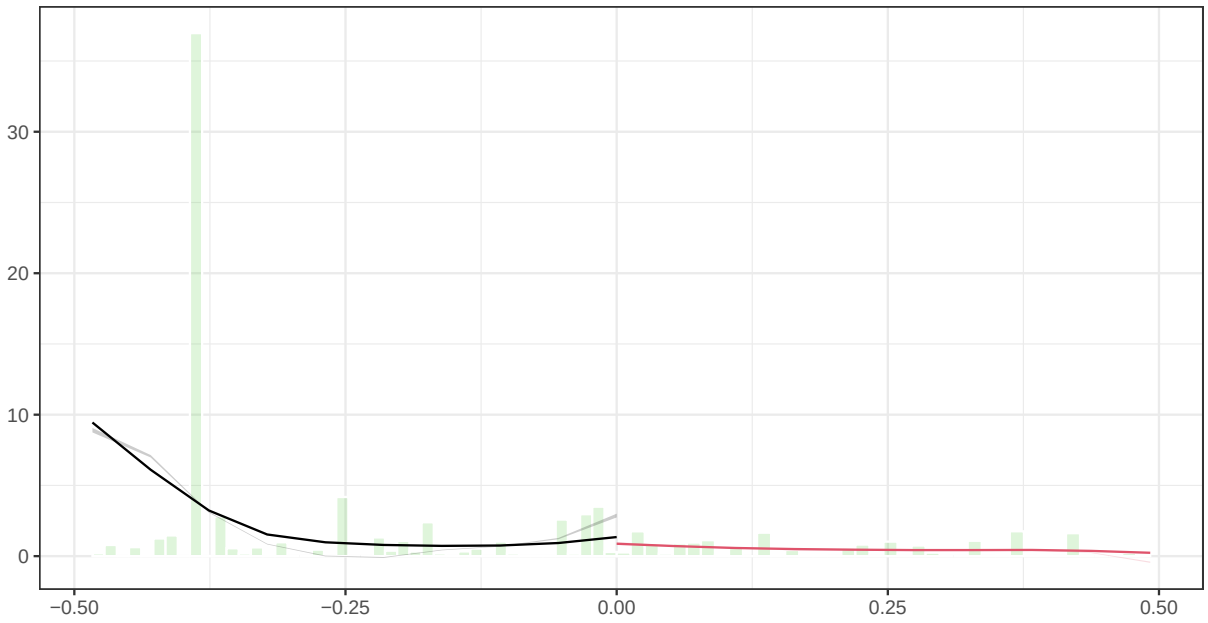

```
## $Estl
## Call: lpdensity
##
## Sample size                                      21850
## Polynomial order for point estimation    (p=)    2
## Order of derivative estimated            (v=)    1
## Polynomial order for confidence interval (q=)    3
## Kernel function                                  triangular
## Scaling factor                                   0.577252311756935
## Bandwidth method                                 user provided
##
## Use summary(...) to show estimates.
##
## $Estr
## Call: lpdensity
##
## Sample size                                      16001
## 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                                   0.422721268163805
## Bandwidth method                                 user provided
##
## Use summary(...) to show estimates.
##
## $Estplot
```

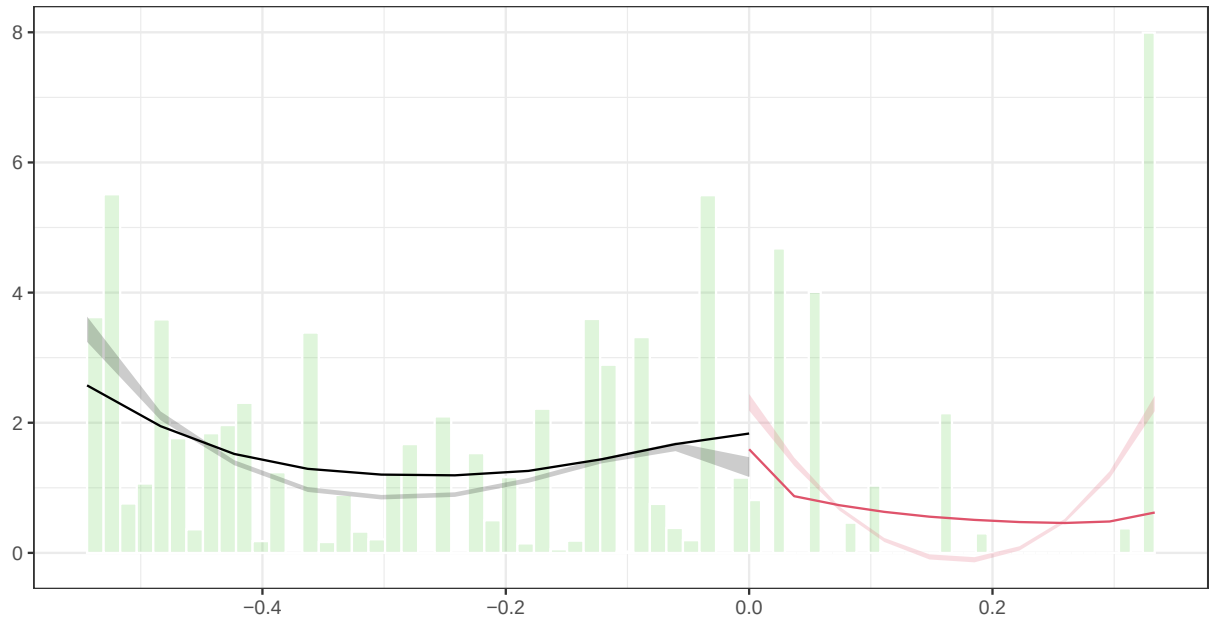




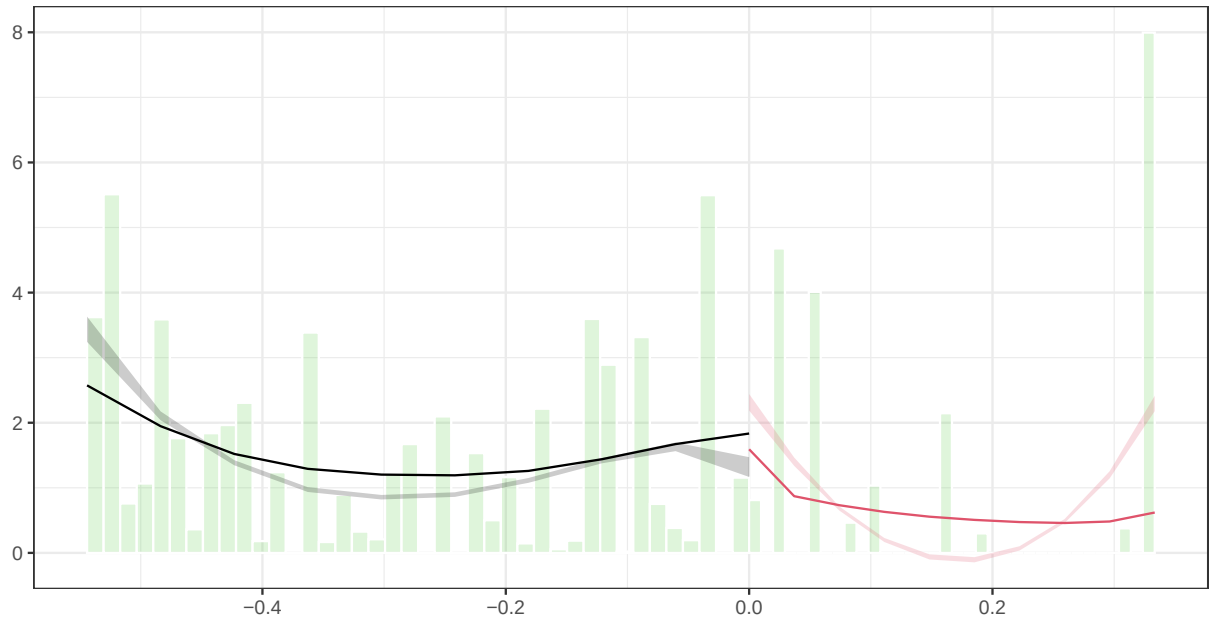

```
## $Estl
## Call: lpdensity
##
## Sample size                                    17497
## Polynomial order for point estimation    (p=)  2
## Order of derivative estimated            (v=)  1
## Polynomial order for confidence interval (q=)  3
## Kernel function                                triangular
```

```
## Scaling factor                                     0.772041302621128
## Bandwidth method                                   user provided
##
## Use summary(...) to show estimates.
##
## $Estr
## Call: lpdensity
##
## Sample size                                        5242
## 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                                     0.231268202276939
## Bandwidth method                                   user provided
##
## Use summary(...) to show estimates.
##
## $Estplot
```






```
## $Estl
## Call: lpdensity
##
## Sample size                                    8294
## 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                                 0.7860663507109
## Bandwidth method                               user provided
##
## Use summary(...) to show estimates.
##
## $Estr
## Call: lpdensity
##
## Sample size                                    2410
## 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                                 0.228341232227488
## Bandwidth method                               user provided
##
## Use summary(...) to show estimates.
##
## $Estplot
```



Question 5

```
## # A tibble: 5 x 2
##   negative avg_hmo
##      <dbl>   <dbl>
## 1        0  1
## 2        1  0.145
## 3        1  0.230
## 4        0  0.622
## 5        1  0.0915
```

```
## # A tibble: 5 x 2
##   negative avg_partd
##      <dbl>     <dbl>
## 1        0     1
## 2        1     0.871
## 3        1     0.641
## 4        0     0.728
## 5        1     0.612
```

Question 6

From my previous anaysis, it seems like the effect of the star rating on market share is big when the star rating is low, but the importance of the rating decreases as the rating increases. Unfortunately, we couldn't work with the 4.5 rating, since there are no observations that were rounded down and that is a key assumption for RDD.