Problem Set 5 Yi-Wun Chen

Question 1

Ans:

$\hat{\beta}_{\text{intercept}} = 4.9133$; $\hat{\beta}_{\text{educ}} = 0.073807$; $\hat{\beta}_{\text{exper}} = 0.039313$; $\hat{\beta}_{\text{smsa}} = 0.16474$

$\hat{\beta}_{\text{black}} = -0.18822$; $\hat{\beta}_{\text{south}} = -0.12905$

And,

$SE\left(\hat{\beta}_{\text{intercept}}\right) = 0.063121$; $SE\left(\hat{\beta}_{\text{educ}}\right) = 0.0035336$; $SE\left(\hat{\beta}_{\text{exper}}\right) = 0.0021955$;

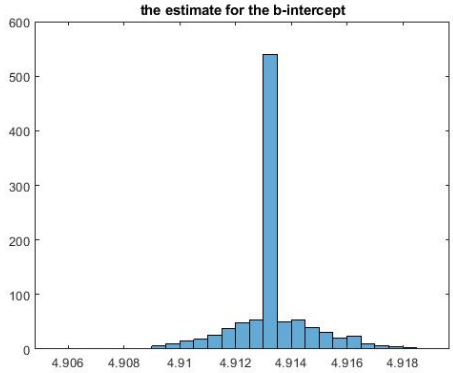
$SE\left(\hat{\beta}_{\text{smsa}}\right) = 0.015692$; $SE\left(\hat{\beta}_{\text{black}}\right) = 0.017768$; $SE\left(\hat{\beta}_{\text{south}}\right) = 0.015229$

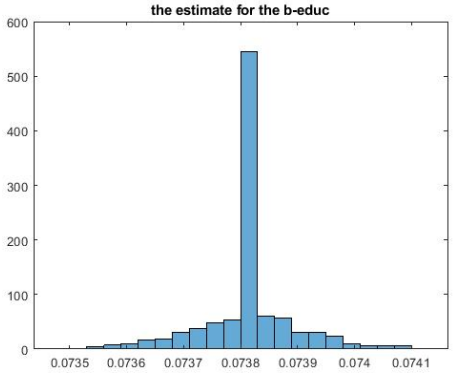
And,

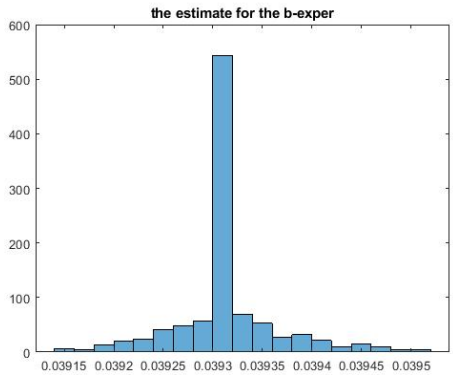
$\hat{\sigma}_{\varepsilon} = 0.3769$

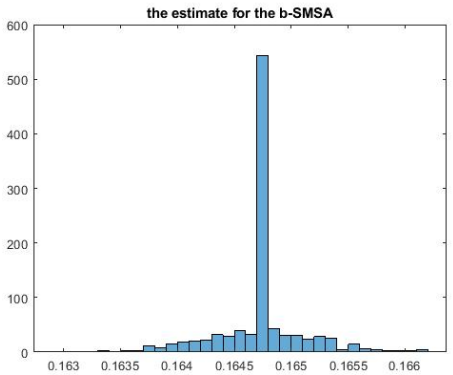
Question 2

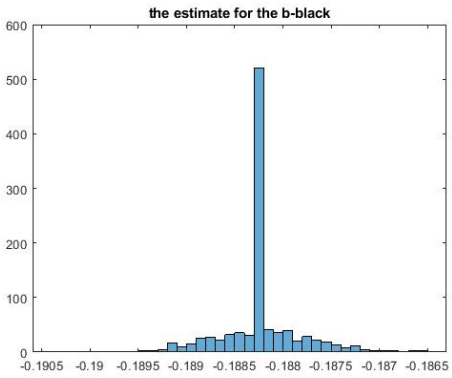
(a)

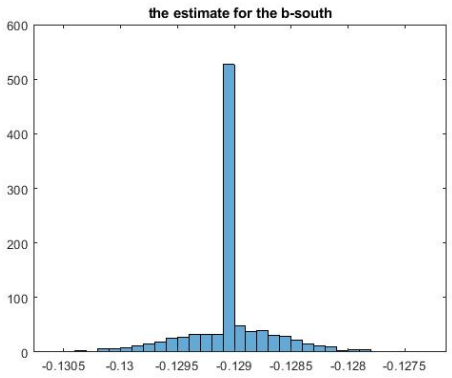


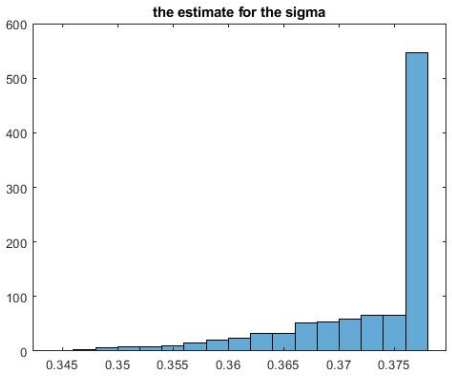




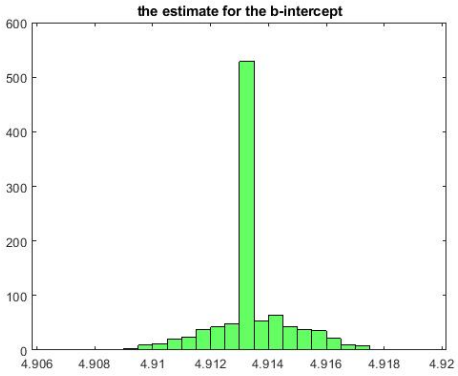


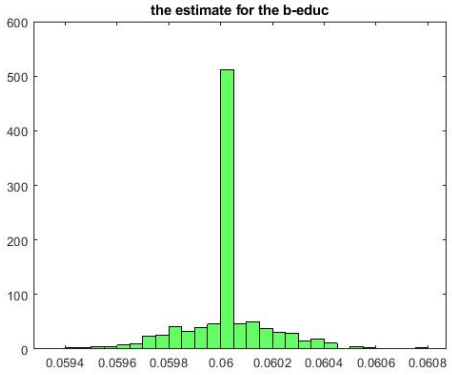

the estimate for the b-black
600
500
400
300
200
100
0
-0.1905 -0.19 -0.1895 -0.189 -0.1885 -0.188 -0.1875 -0.187 -0.1865

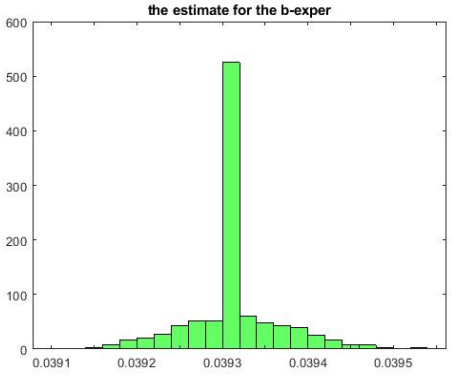

the estimate for the b-south
600
500
400
300
200
100
0
-0.1305 -0.13 -0.1295 -0.129 -0.1285 -0.128 -0.1275

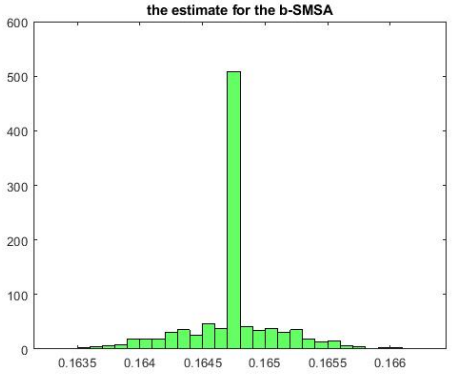

the estimate for the sigma
600
500
400
300
200
100
0
0.345 0.35 0.355 0.36 0.365 0.37 0.375

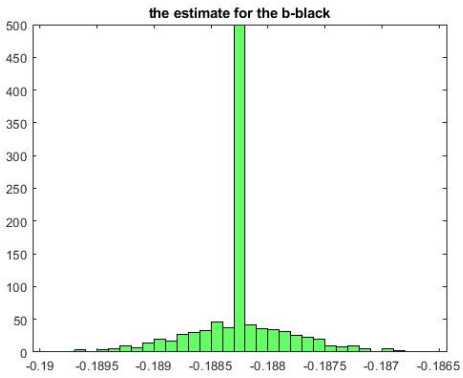
(b)

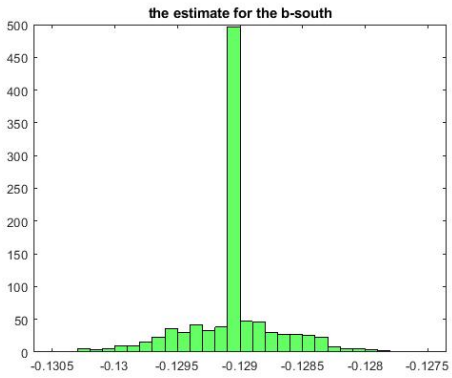

the estimate for the b-intercept
600
500
400
300
200
100
0
4.906 4.908 4.91 4.912 4.914 4.916 4.918 4.92

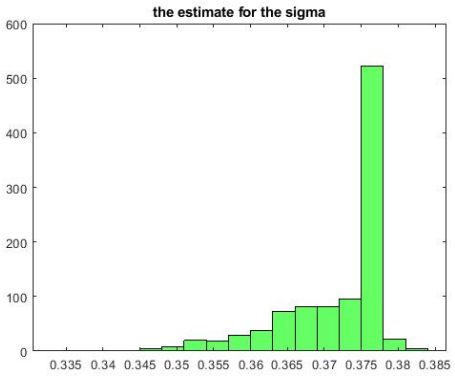

the estimate for the b-educ
600
500
400
300
200
100
0
0.0594 0.0596 0.0598 0.06 0.0602 0.0604 0.0606 0.0608


the estimate for the b-exper
600
500
400
300
200
100
0
0.0391 0.0392 0.0393 0.0394 0.0395


the estimate for the b-SMSA
600
500
400
300
200
100
0
0.1635 0.164 0.1645 0.165 0.1655 0.166







Question 3

Ans: Based on the distribution of the estimates from Q1 to calculate the posterior distribution of the estimates for Q2. Thus, the posterior distribution is also normal distribution (since the posterior distribution proportional to the distribution of the estimates from Q1).