ECON 634 Homework 6

Ruohao Zhang

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Question 1

After run the OLS, I get the estimation of $\hat{\beta} = [4.9133,\ 0.0738,\ 0.0393,\ 0.1647,\ -0.1882,\ -0.1291]$, and the estimated variance-covariance matrix is

$$
\begin{bmatrix}
0.003984 & -0.000209 & -0.000109 & -0.000108 & -0.000209 & -0.000163 \\
-0.000209 & 0.000012 & 0.000005 & -0.000006 & 0.000013 & 0.000004 \\
-0.000109 & 0.000005 & 0.000005 & 0.000001 & 0.000002 & 0.000001 \\
-0.000108 & -0.000006 & 0.000001 & 0.000246 & -0.000018 & 0.000039 \\
-0.000209 & 0.000013 & 0.000002 & -0.000018 & 0.000316 & -0.000084 \\
-0.000163 & 0.000004 & 0.000001 & 0.000039 & -0.000084 & 0.000232
\end{bmatrix}
$$

The estimated variance is $\hat{\sigma^2} = 0.1423$, and the estimated variance of $\hat{\sigma^2}$ is 1.3479×10^5 according to $(n-p)\frac{\hat{\sigma}^2}{\sigma^2} \overset{d}{\sim} \chi^2_{n-p}$.

Question 2

(a) Flat Prior

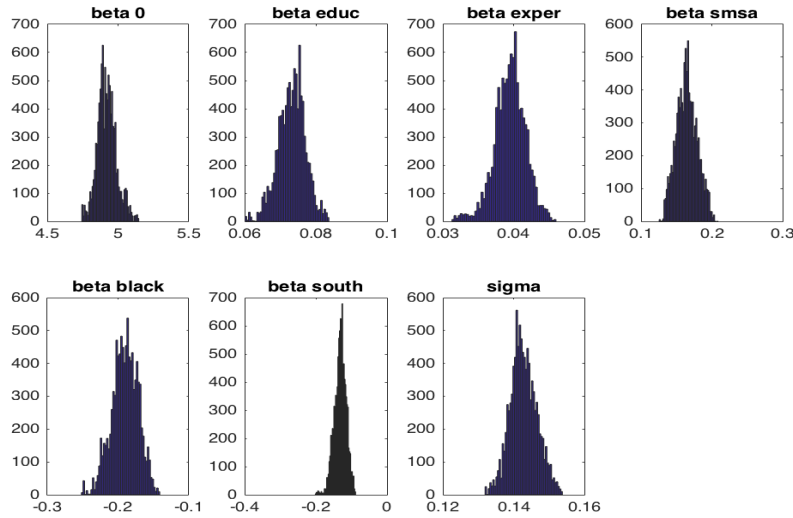Using flat prior, I get the following result for all parameters.

Figure 1: Posterior with Flat Prior

(b) Alternative Prior

Using the alternative prior specified in the question, I get the following result for all parameters.
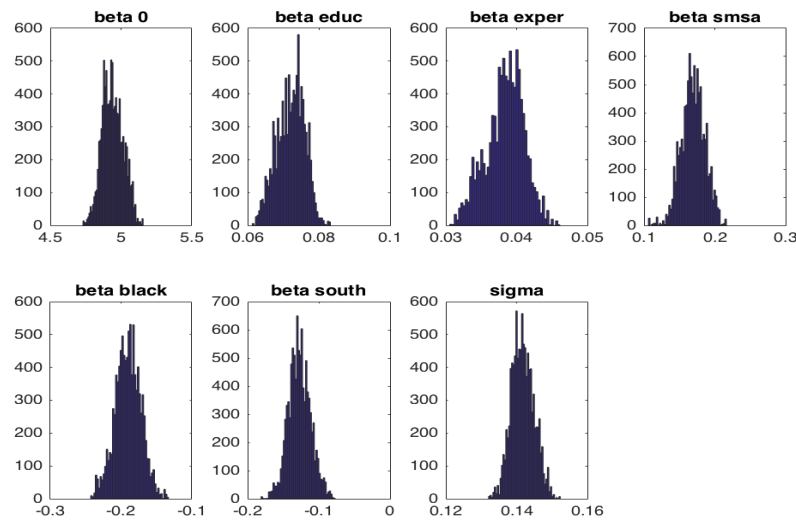

Figure 2: Posterior with Alternative Prior

Question 3

By comparing the Baysian approach result with the OLS result, I see that the Baysian approach gives the estimated distribution of parameters instead of a point estimation from OLS regression. The similar thing is that the posterior distribution is around the OLS estimation. Comparing with the result from two parts of question 2, I notice that the different priors do not have significant effect on the posterior.