

# Peer Review 2 for Jennifer

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SDS 383D

April 12, 2017

## 1 Introduction

Hi Jennifer, thanks for letting me review your write-up and code. This write-up will just list the things we discussed the other day, and give links to specific resources I mentioned.

## 2 Tips for R

- In your Gibbs sampler, I noticed that you are sampling the covariance matrix  $\Sigma$  from the inverse-Wishart distribution using the MCMCpack package at each step and then inverting it to sample from the full conditional of each  $b_i$ . Instead of doing this, you can sample the precision matrix  $\Sigma^{-1}$  from the Wishart using `rWishart` command, which is also in base R so you do not have to load any special package for it.
- Also relating to your Gibbs sampler, I suggest you initialize your vectors, matrices, and arrays for storing MCMC samples from the posterior with NA values instead of each element being 0. For example, the command

```
matrix(nrow = n, ncol = p)
```

will give a  $n \times p$  matrix of all NA values. This will help save memory and also make it easier to find bugs in your code.

- Since you are looping over the  $b_i$ 's, I suggest you try using the `foreach` package), which allows you to parallelize loop tasks. Since you have a MacBook Pro, this should cut your computation time by a significant amount. The link I gave goes in depth on how to use the package.

- Printing the iteration to your console each time can slow down your Gibbs sampler a bit and also crowd out other output you may want to go back to, so instead you can add an if statement and the modulo command (e.g. `a %% n` is the same as  $a \bmod n$ ) to print, say, only each 1000th iteration. Speaking of which,...
- Use `sprintf` in R to create strings from variables. It's very handy and you can also use this in C!
- This is a fastidious bit of feedback, but I strongly suggest following certain guidelines for your code, like always having a space after commas. The [Google R Style Guide](#) is my Bible.

## 3 Tips for the write-up

### 3.1 Math notation

- Use the `\times` command in  $\text{\LaTeX}$  to make the  $\times$  symbol.
- Use the `\log` command in math environments to produce an upright log sign (in fact, you can find all such commands listed [here](#) under Table 8 [I didn't even know that `\Pr` existed but I'll be using that now]).

### 3.2 Visualization

- Be sure to have axis labels for all your graphs, and if you have them side-by-side, it is also a good idea to have them on the same scale (which is admittedly hard to do on the linear scale using this dataset).
- An informative plot for model checking in this plotting the posterior predictive of log-volume, e.g. plotting the posterior predictive median at each log-price as a line and then have a `geom_ribbon` for a 95% predictive interval.
- We've talked about this at length but if you still want help using `ggplot2` for facet plots just let me know. 😊

## 4 Conclusion

Overall, great job with this assignment. I hope this review has been helpful for you, and do not hesitate to ask me to clarify anything or give any other tips.

Spencer