

STATS 451 Final Report Code

Yingxi Chen, Jiayu Feng, Qiyun Teng, Sirui Chen

2024-04-15

Settings

```
library(bayesplot)
library(coda)
library(ggplot2)
library(invgamma)
library(readr)
library(rstan)
library(rstanarm)
library(tidyverse)
```

```
knitr::opts_chunk$set(echo = FALSE)
```

Data Cleaning & Encoding

```
##   Year      Sector  Fuel.Type Methane.emissions Industry.Type
## 1 2022 Power Plants Natural Gas           1.25           C,D
## 2 2022 Power Plants Natural Gas           3.00           C,D
## 3 2022 Power Plants Natural Gas          21.25           C,D
## 4 2021 Power Plants Natural Gas           1.00           C,D
## 5 2021 Power Plants Natural Gas           1.00           C,D
## 6 2021 Power Plants Natural Gas          15.75           C,D
```

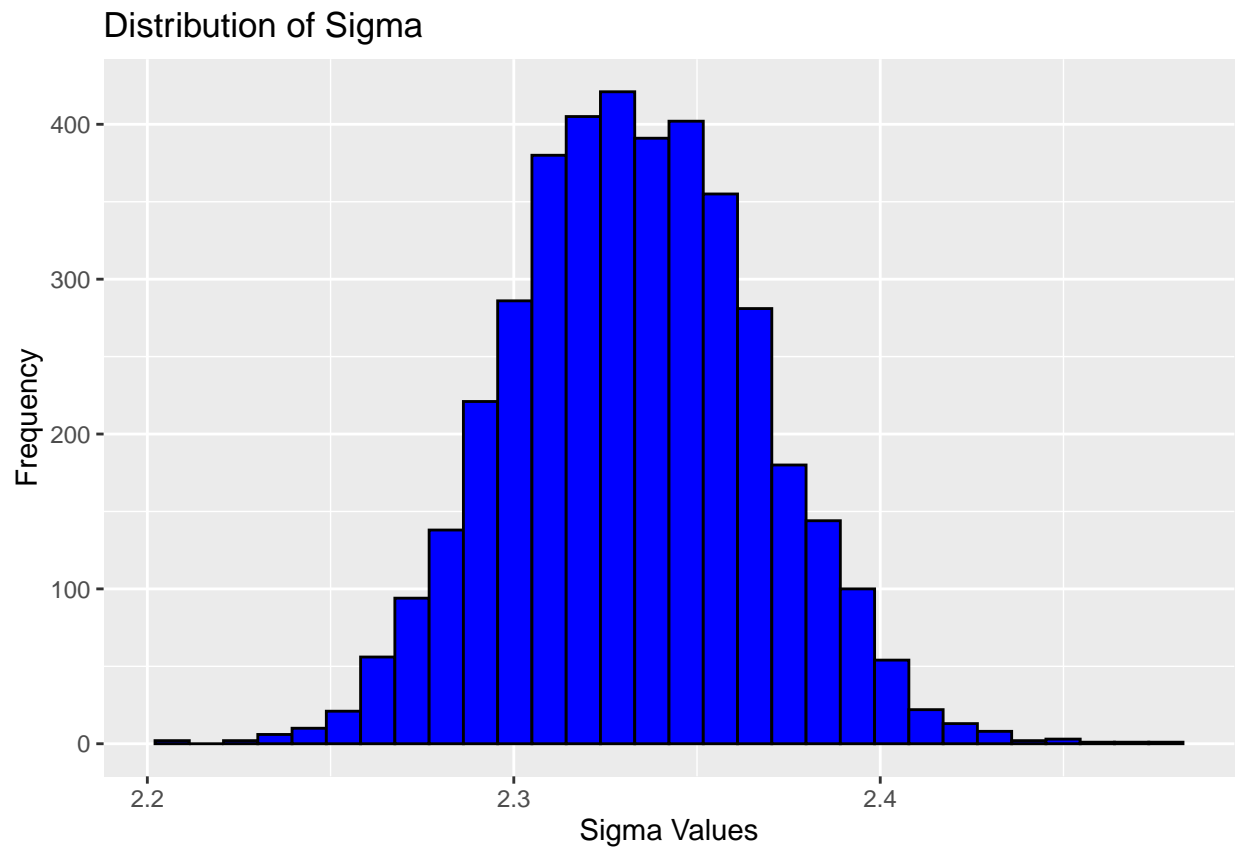
```
##      Year      Sector  Fuel.Type Methane.emissions Industry.Type FuelType
## 1 1.684138 Power Plants Natural Gas           1.25           C,D         3
## 2 1.684138 Power Plants Natural Gas           3.00           C,D         3
## 3 1.684138 Power Plants Natural Gas          21.25           C,D         3
## 4 1.393842 Power Plants Natural Gas           1.00           C,D         3
## 5 1.393842 Power Plants Natural Gas           1.00           C,D         3
## 6 1.393842 Power Plants Natural Gas          15.75           C,D         3
##   IndustryType
## 1             2
## 2             2
## 3             2
## 4             2
## 5             2
## 6             2
```

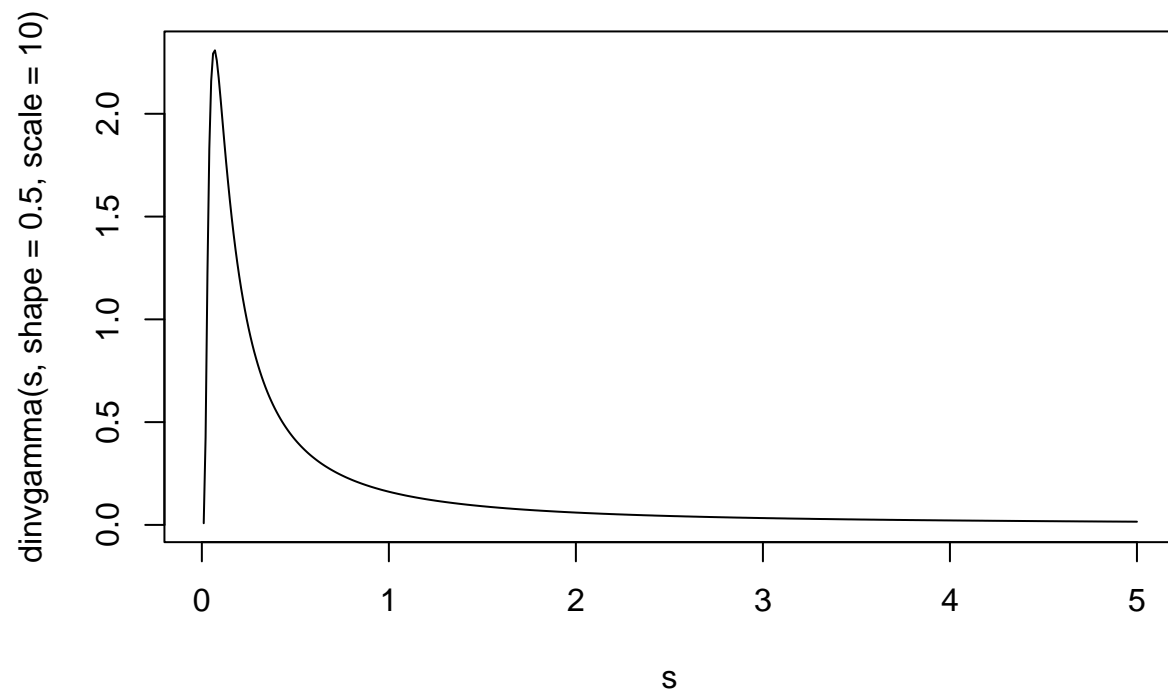
Model Building

```
stan_model <- stan_model(model_code = stan_code)
```

```
## Trying to compile a simple C file
```

```
fit <- sampling(stan_model, data = stan_data, iter = 2000, chains = 4)  
print(fit)
```





Sensitivity Test

##	sd	parameter	mean	lower	upper
## 1	0.5	beta1	0.03574926	-0.05973073	0.1306606
## 2	0.5	beta2	1.73641431	1.62944409	1.8416303
## 3	0.5	beta3	0.93010417	0.73000725	1.1246476
## 4	1.0	beta1.1	0.03590249	-0.05935157	0.1335380
## 5	1.0	beta2.1	1.75075456	1.64481966	1.8542811
## 6	1.0	beta3.1	0.95403037	0.75210733	1.1528076
## 7	2.0	beta1.2	0.03657837	-0.05736638	0.1333934
## 8	2.0	beta2.2	1.75527631	1.65354958	1.8556585
## 9	2.0	beta3.2	0.96433876	0.76009357	1.1635471

Inference

