# Tentative Analysis

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## 1. Data:

```
dat <- readRDS(file = "By_Year_State_updated.rds")
dat$States <- factor(dat$States)

test_row <- seq(14,700,14)
train <- dat[test_row,]
test  <- dat[-test_row,]


kable(head(dat[, 1:7]), "latex", caption = "", booktabs = T) %>%
        kable_styling(latex_options = c("striped", "hold_position"))
```

Table 1:

| States | Year | Y_st | t | X_t | Senate_Demo | Senate_Repu |
|---|---|---|---|---|---|---|
| Alabama | 1992 | 0.2834922 | -14 | 0.1239377 | 1022698 | 522015 |
| Alabama | 1994 | -0.0076992 | -13 | -0.1378433 | NA | NA |
| Alabama | 1996 | -0.1575772 | -12 | 0.0913879 | 681651 | 786436 |
| Alabama | 1998 | -0.3717561 | -11 | 0.1570374 | 474568 | 817973 |
| Alabama | 2000 | -0.4323009 | -10 | -0.0155585 | NA | NA |
| Alabama | 2002 | -0.3501917 | -9 | -0.1205374 | 538878 | 792561 |

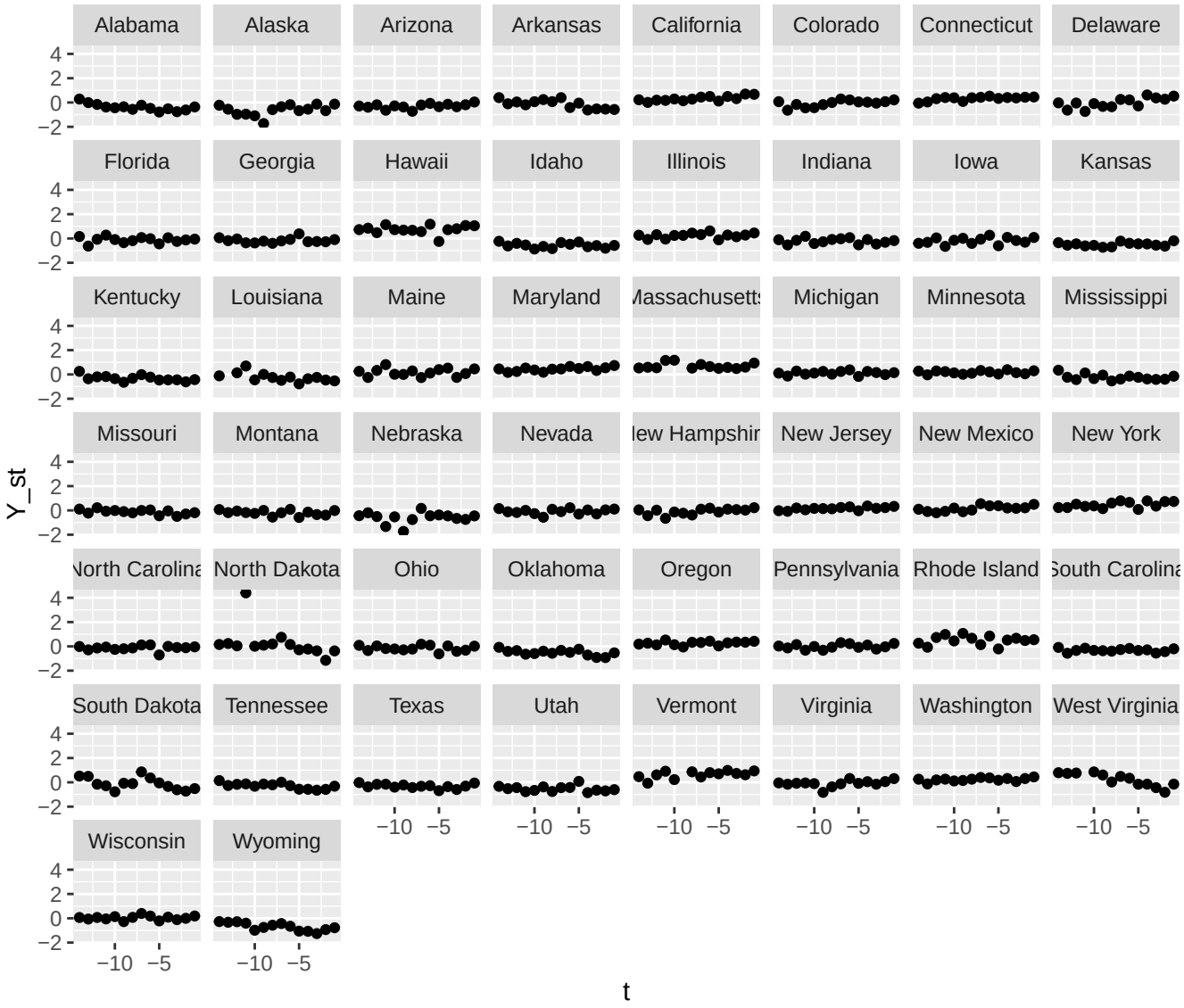
```
kable(head(dat[, c(1,8:13)]), "latex", caption = "", booktabs = T) %>%
        kable_styling(latex_options = c("striped", "hold_position"))
```

Table 2:

| States | House_Demo | House_Repu | President_Demo | President_Rep | Grand_Total_Demo | Grand_Total_Repu |
|---|---|---|---|---|---|---|
| Alabama | 895601 | 643150 | 690080 | 804283 | 2608379 | 1969448 |
| Alabama | 554154 | 558437 | NA | NA | 554154 | 558437 |
| Alabama | 656047 | 785513 | 662165 | 769044 | 1999863 | 2340993 |
| Alabama | 545465 | 665625 | NA | NA | 1020033 | 1483598 |
| Alabama | 485660 | 849229 | 695602 | 944409 | 1181262 | 1793638 |
| Alabama | 507117 | 694606 | NA | NA | 1045995 | 1487167 |

## 2. Eploratory Data Analysis (EDA):

```
par(mfrow = c(6,9))
ggplot(dat, aes(x = t, y = Y_st)) + geom_point() + facet_wrap(. ~ States)
```




```
par(mfrow = c(1,1))
```

## 3. Model formulation:

## 4. Preliminary Analysis:

```
CORES <- parallel::detectCores() - 1
SEED <- 2000

## Classical Model
Model1 <- lmer(formula = Y_st ~  X_t + t + (X_t + t | States),
           data = test,
```

```
           REML = TRUE)
S <- summary(M3)
#ranef(Model1)
#fixef(Model1)
#tidy(M3, conf.int = TRUE)

## Bayesian Model
Model2<- stan_lmer(formula = Y_st ~  X_t + t + (X_t + t | States),
          data = test, cores = CORES, iter = 1e4, control = list(adapt_delta = 0.99),
          prior = normal(location = 0,
                         scale = 5,
                         autoscale = FALSE),
                         prior_intercept = normal(location = 0,
                         scale = 5,
                         autoscale = FALSE),
                         seed = SEED)
```