Assignment 3: Almond Profit

Steven Cognac, Marie Rivers, Bri Baker

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Read in Climate Data

```
# import climate data hosted on Namoi Tague's github
clim <- read.csv(
  "https://raw.githubusercontent.com/naomitague/ESM232_Examples/main/Data/clim.txt",
  sep = " ", header=TRUE)
```

Run Almond Profit Model.

```
# import function
source(here("R", "almond_profit.R"))

# run function using climate data
almond_profits <- almond_profit(climate_data = clim)
```

Sensitivity Analysis

```
# generate samples for both parameters

deviation  <-  0.20
price <- 4000
acres <- 1600000

avg_cost <- runif(min = price - deviation * price,
                  max = price + deviation * price, n=100)

acres_used <- runif(min = acres - deviation * price,
                    max = acres + deviation * price, n=100)

parms <- cbind.data.frame(avg_cost, acres_used)

# use pmap
results <- parms %>% pmap(almond_profit,
                          climate_data = clim)
```

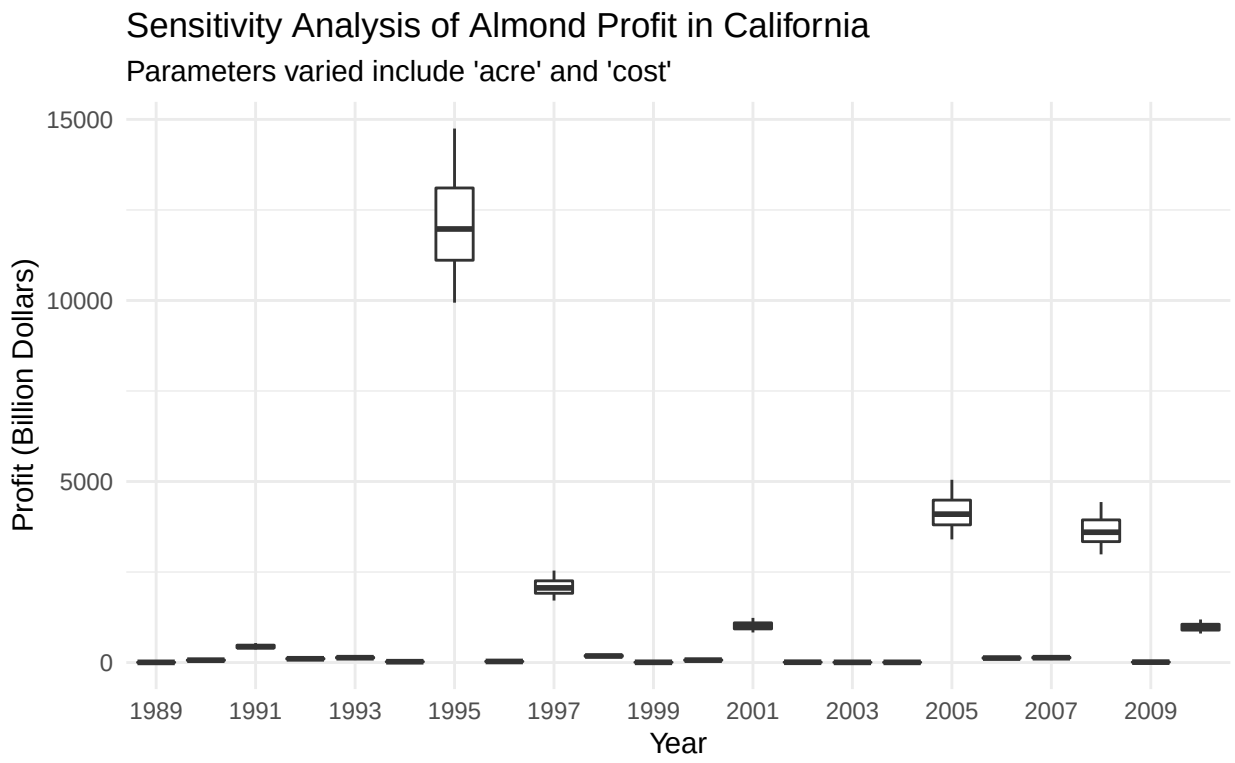
Put into dataframe and clean

```
annual_profit <- map_df(results,`[`, c("almond_profit",
                                       "almond_profit_anom",
                                       "year")) %>%
  mutate(almond_profit_billion_dollar = (almond_profit/1000000000),
         almond_profit_anom_billion_dollar = (almond_profit_anom/1000000000))

annual_profit <- cbind.data.frame(annual_profit, parms)
```

```
profit_plot <- ggplot(annual_profit, aes(x = as.factor(year),
                                       y = almond_profit_billion_dollar,
                                       group = year))+
  geom_boxplot() +
  labs(y = "Profit (Billion Dollars)",
       x = "Year",
       title = "Sensitivity Analysis of Almond Profit in California",
       subtitle = "Parameters varied include 'acre' and 'cost'",
       caption = "Average almond yield, price and acreage source:\n https://fruitgrowers.com/californi
  theme(plot.caption = element_text(hjust = -0.2), plot.caption.position = "plot") +
  scale_x_discrete(breaks = seq(1989,2010, by = 2)) +
  theme_minimal()

profit_plot
```



Summary of results

```
# ggsave(here("figs/profit_plot.jpg"), plot = profit_plot)
```