

# Untitled

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```
## Keep this line always
knitr::opts_chunk$set(echo = TRUE,
                      collapse = TRUE,
                      warning = FALSE, message = FALSE,
                      fig.align = 'center')
```

Load Data

```
Commercial <- read.csv("C:/Users/kosti/OneDrive/Desktop/School/Econ Classes/EC 499/Data/RCI/Commercial.csv")
Residential <- read.csv("C:/Users/kosti/OneDrive/Desktop/School/Econ Classes/EC 499/Data/RCI/Residential.csv")
Industrial <- read.csv("C:/Users/kosti/OneDrive/Desktop/School/Econ Classes/EC 499/Data/RCI/Industrial.csv")
Transportation <- read.csv("C:/Users/kosti/OneDrive/Desktop/School/Econ Classes/EC 499/Data/RCI/Transportation.csv")
Total <- read.csv("C:/Users/kosti/OneDrive/Desktop/School/Econ Classes/EC 499/Data/RCI/Total.csv")
Agg <- read.csv("C:/Users/kosti/OneDrive/Desktop/School/Econ Classes/EC 499/Data/RCI/Aggregate.csv")

Stringency <- read.csv("C:/Users/kosti/OneDrive/Desktop/School/Econ Classes/EC 499/Data/Stringency/Stringency.csv")

Temp <- read.csv("C:/Users/kosti/OneDrive/Desktop/School/Econ Classes/EC 499/Data/Temp/50StateTemp.csv")
GDP <- read.csv("C:/Users/kosti/OneDrive/Desktop/School/Econ Classes/EC 499/Data/GDP/AllStateGDP.csv")

library(zoo)
library(dplyr)
library(ggplot2)
library(tidyverse)
library(lmtest)
library(psych)
library(broom)
library(stargazer)
```

Edit GDP

```
GDP$NewDate = as.Date(GDP$DATE, "%m/%d/%Y")
GDP$Month = as.numeric(strftime(GDP$NewDate, "%m"))
GDP$Year = as.numeric(strftime(GDP$NewDate, "%Y"))
GDP$State = as.factor(GDP$State)
```

Edit Temp

```
Temp$Month = as.numeric(substr(Temp$Date,5,6))
Temp$Year = as.numeric(substr(Temp$Date,1,4))
Temp$State = as.factor(Temp$State)
```

Make quarterly

```

TempQ = Temp %>% filter(Month == "1" | Month == "4" | Month == "7" | Month == "10")
ResQ = Residential %>% filter(Month == "1" | Month == "4" | Month == "7" | Month == "10")
CommQ = Commercial %>% filter(Month == "1" | Month == "4" | Month == "7" | Month == "10")
TotQ = Total %>% filter(Month == "1" | Month == "4" | Month == "7" | Month == "10")
IndQ = Industrial %>% filter(Month == "1" | Month == "4" | Month == "7" | Month == "10")
TranQ = Transportation %>% filter(Month == "1" | Month == "4" | Month == "7" | Month == "10")
StringencyQ = Stringency %>% filter(Month == "1" | Month == "4" | Month == "7" | Month == "10")
AggQ = Agg %>% filter(Month == "1" | Month == "4" | Month == "7" | Month == "10")

```

Make Numeric

```

ResQ$Customers.Count = gsub(",", "", ResQ$Customers.Count)
ResQ$Customers.Count = as.numeric(ResQ$Customers.Count)
ResQ$Price = gsub(",", "", ResQ$Price)
ResQ$Price = as.numeric(ResQ$Price)
ResQ$Sales = gsub(",", "", ResQ$Sales)
ResQ$Sales = as.numeric(ResQ$Sales)
ResQ$Revenue = gsub(",", "", ResQ$Revenue)
ResQ$Revenue = as.numeric(ResQ$Revenue)

CommQ$Customers.Count = gsub(",", "", CommQ$Customers.Count)
CommQ$Customers.Count = as.numeric(CommQ$Customers.Count)
CommQ$Price = gsub(",", "", CommQ$Price)
CommQ$Price = as.numeric(CommQ$Price)
CommQ$Sales = gsub(",", "", CommQ$Sales)
CommQ$Sales = as.numeric(CommQ$Sales)
CommQ$Revenue = gsub(",", "", CommQ$Revenue)
CommQ$Revenue = as.numeric(CommQ$Revenue)

IndQ$Customers.Count = gsub(",", "", IndQ$Customers.Count)
IndQ$Customers.Count = as.numeric(IndQ$Customers.Count)
IndQ$Price = gsub(",", "", IndQ$Price)
IndQ$Price = as.numeric(IndQ$Price)
IndQ$Sales = gsub(",", "", IndQ$Sales)
IndQ$Sales = as.numeric(IndQ$Sales)
IndQ$Revenue = gsub(",", "", IndQ$Revenue)
IndQ$Revenue = as.numeric(IndQ$Revenue)

TranQ$Customers.Count = gsub(",", "", TranQ$Customers.Count)
TranQ$Customers.Count = as.numeric(TranQ$Customers.Count)
TranQ$Price = gsub(",", "", TranQ$Price)
TranQ$Price = as.numeric(TranQ$Price)
TranQ$Sales = gsub(",", "", TranQ$Sales)
TranQ$Sales = as.numeric(TranQ$Sales)
TranQ$Revenue = gsub(",", "", TranQ$Revenue)
TranQ$Revenue = as.numeric(TranQ$Revenue)

TotQ$Customers.Count = gsub(",", "", TotQ$Customers.Count)
TotQ$Customers.Count = as.numeric(TotQ$Customers.Count)
TotQ$Price = gsub(",", "", TotQ$Price)
TotQ$Price = as.numeric(TotQ$Price)
TotQ$Sales = gsub(",", "", TotQ$Sales)
TotQ$Sales = as.numeric(TotQ$Sales)

```

```
TotQ$Revenue = gsub(",", "", TotQ$Revenue)
TotQ$Revenue = as.numeric(TotQ$Revenue)

AggQ$Customers.Count = gsub(",", "", AggQ$Customers.Count)
AggQ$Customers.Count = as.numeric(AggQ$Customers.Count)
AggQ$Price = gsub(",", "", AggQ$Price)
AggQ$Price = as.numeric(AggQ$Price)
AggQ$Sales = gsub(",", "", AggQ$Sales)
AggQ$Sales = as.numeric(AggQ$Sales)
AggQ$Revenue = gsub(",", "", AggQ$Revenue)
AggQ$Revenue = as.numeric(AggQ$Revenue)
```

#### Stringency

```
StringencyQ$State = substring(StringencyQ$RegionCode, 4)
StringencyQ[is.na(StringencyQ)] = 0
DiDStringency = StringencyQ
PostStringency = StringencyQ %>% filter(Year >2019)
```

#### Merge Data

```
ResMerged <- merge(TempQ, ResQ, by=c("Year", "Month", "State"))
ResMerged <- merge(ResMerged, GDP, by=c("Year", "Month", "State"))
ResMerged$Temp = ResMerged$Value

CommMerged <- merge(TempQ, CommQ, by=c("Year", "Month", "State"))
CommMerged <- merge(CommMerged, GDP, by=c("Year", "Month", "State"))
CommMerged$Temp = CommMerged$Value

IndMerged <- merge(TempQ, IndQ, by=c("Year", "Month", "State"))
IndMerged <- merge(IndMerged, GDP, by=c("Year", "Month", "State"))
IndMerged$Temp = IndMerged$Value

TranMerged <- merge(TempQ, TranQ, by=c("Year", "Month", "State"))
TranMerged <- merge(TranMerged, GDP, by=c("Year", "Month", "State"))
TranMerged$Temp = TranMerged$Value

TotMerged <- merge(TempQ, TotQ, by=c("Year", "Month", "State"))
TotMerged <- merge(TotMerged, GDP, by=c("Year", "Month", "State"))
TotMerged$Temp = TotMerged$Value

AggMerged <- merge(TempQ, AggQ, by=c("Year", "Month", "State"))
AggMerged <- merge(AggMerged, GDP, by=c("Year", "Month", "State"))
AggMerged2 = merge(AggMerged, DiDStringency, by=c("Year", "Month", "State"))
AggMerged <- merge(AggMerged, PostStringency, by=c("Year", "Month", "State"))
AggMerged$Temp = AggMerged$Value
```

#### Simple Model

```
ResModel1 = lm(Sales ~ Temp + GDP, ResMerged)
ResModel2 = lm(Sales ~ abs(Temp-65) + GDP, ResMerged)

CommModel1 = lm(Sales ~ Temp + GDP, CommMerged)
```

```

CommModel2 = lm(Sales ~ abs(Temp-65) + GDP, CommMerged)

IndModel1 = lm(Sales ~ Temp + GDP, IndMerged)
IndModel2 = lm(Sales ~ abs(Temp-65) + GDP, IndMerged)

TranModel1 = lm(Sales ~ Temp + GDP, TranMerged)
TranModel2 = lm(Sales ~ abs(Temp-65) + GDP, TranMerged)

TotModel1 = lm(Sales ~ Temp + GDP, TotMerged)
TotModel2 = lm(Sales ~ abs(Temp-65) + GDP, TotMerged)

```

### Stringency Final Model

```

ResMerged2 <- merge(ResMerged,PostStringency,by=c("Year","Month","State"))
CommMerged2 <- merge(CommMerged,PostStringency,by=c("Year","Month","State"))
IndMerged2 <- merge(IndMerged,PostStringency,by=c("Year","Month","State"))
TranMerged2 <- merge(TranMerged,PostStringency,by=c("Year","Month","State"))
TotMerged2 <- merge(TotMerged,PostStringency,by=c("Year","Month","State"))

ResModel3 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) + as.factor(NewDate), ResMerged2)
CommModel3 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) + as.factor(NewDate), CommMerged2)
IndModel3 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) + as.factor(NewDate), IndMerged2)
TranModel3 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) + as.factor(NewDate), TranMerged2)
TotModel3 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) + as.factor(NewDate), TotMerged2)

ResModel4 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) + as.factor(Year), ResMerged2)
CommModel4 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) + as.factor(Year), CommMerged2)
IndModel4 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) + as.factor(Year), IndMerged2)
TranModel4 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) + as.factor(Year), TranMerged2)
TotModel4 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) + as.factor(Year), TotMerged2)

ResModel5 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) , ResMerged2)
CommModel5 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State), CommMerged2)
IndModel5 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) , IndMerged2)
TranModel5 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) , TranMerged2)
TotModel5 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(State) , TotMerged2)

```

### Exporting

```

summary(ResModel3)[c("(Intercept)", "abs(Temp - 65)", "GDP", "StringencyIndex")]
## $<NA>
## NULL
##
## $<NA>
## NULL
##
## $<NA>
## NULL
##
## $<NA>
## NULL
##
coef(ResModel3)[c("(Intercept)", "abs(Temp - 65)", "GDP", "StringencyIndex")]

```

```
##      (Intercept)  abs(Temp - 65)      GDP StringencyIndex
##      -2.074530e+06   4.345028e+04   7.154855e-01   1.699060e+03

ResTable = summary(ResModel3)$coefficients[ !grepl("State", names(coef(ResModel3))) , ,drop=FALSE]

Table2 = stargazer(ResModel3, CommModel3, IndModel3, TranModel3, type = "text", style = "all", omit = c
##
## =====
##                                     Dependent variable:
##                                     -----
##                                     Sales
##                                     (1)          (2)          (3)
## -----
## abs(Temp - 65)          43,450.290***          19,354.490***          2,315.751**
##                          (4,459.417)          (2,085.030)          (1,133.246)
##                          t = 9.743            t = 9.283            t = 2.043
##                          p = 0.000            p = 0.000            p = 0.042
## GDP                    0.715                2.062***          0.522
##                          (1.293)                (0.605)          (0.329)
##                          t = 0.553            t = 3.410            t = 1.587
##                          p = 0.581            p = 0.001            p = 0.114
## StringencyIndex        1,699.060            -1,982.565          -409.370
##                          (5,202.420)          (2,432.426)          (1,322.061)
##                          t = 0.327            t = -0.815          t = -0.310
##                          p = 0.745            p = 0.416            p = 0.757
## Constant               -2,074,530.000***      -878,644.700***      -55,409.370
##                          (314,225.800)          (146,918.300)          (79,852.390)
##                          t = -6.602            t = -5.980            t = -0.694
##                          p = 0.000            p = 0.000            p = 0.489
## -----
## Observations              480                480                480
## R2                        0.955                0.988                0.993
## Adjusted R2               0.949                0.986                0.992
## Residual Std. Error (df = 420)  596,481.700          278,889.000          151,580.500
## F Statistic (df = 59; 420)  151.305*** (p = 0.000)  590.844*** (p = 0.000)  1,002.277*** (p = 0.000)
## =====
## Note:                                                                *p<

Table3 = stargazer(ResModel4, CommModel4, IndModel4, TranModel4, type = "text", style = "all", omit = c
##
## =====
##                                     Dependent variable:
##                                     -----
##                                     Sales
##                                     (1)          (2)          (3)
## -----
## abs(Temp - 65)          23,859.780***          2,554.151          -1,483.041**
##                          (3,441.296)          (1,584.520)          (722.703)
##                          t = 6.933            t = 1.612            t = -2.052
##                          p = 0.000            p = 0.108            p = 0.041
## GDP                    3.312**                3.633***          1.084***
##                          (1.652)                (0.761)          (0.347)
##                          t = 2.005            t = 4.777            t = 3.125
```

```
## p = 0.046 p = 0.00001 p = 0.002
## StringencyIndex 2,034.121 -1,735.831** -1,279.296***
## (1,898.592) (874.193) (398.721)
## t = 1.071 t = -1.986 t = -3.208
## p = 0.285 p = 0.048 p = 0.002
## as.factor(Year)2021 -52,636.000 -56,866.950 23,827.400
## (87,913.810) (40,479.280) (18,462.680)
## t = -0.599 t = -1.405 t = 1.291
## p = 0.550 p = 0.161 p = 0.198
## as.factor(Year)2022 -325,286.200*** -187,599.200*** -5,886.173
## (115,538.200) (53,198.730) (24,264.050)
## t = -2.815 t = -3.526 t = -0.243
## p = 0.006 p = 0.0005 p = 0.809
## Constant -953,502.800*** 65,130.720 164,532.000**
## (325,593.500) (149,917.100) (68,377.530)
## t = -2.929 t = 0.434 t = 2.406
## p = 0.004 p = 0.665 p = 0.017
## -----
## Observations 480 480 480
## R2 0.919 0.979 0.991
## Adjusted R2 0.909 0.977 0.990
## Residual Std. Error (df = 427) 795,005.600 366,054.600 166,958.300
## F Statistic (df = 52; 427) 92.975*** (p = 0.000) 385.605*** (p = 0.000) 935.807*** (p = 0.000) 5
## =====
## Note: *p<0.1
```

```
Table4 = stargazer(ResModel5, CommModel5, IndModel5, TranModel5, type = "text", style = "all", omit = c
```

```
##
## =====
## Dependent variable:
## -----
## Sales
## (1) (2) (3)
## -----
## abs(Temp - 65) 21,472.720*** 1,337.606 -1,675.901**
## (3,356.290) (1,552.442) (700.002)
## t = 6.398 t = 0.862 t = -2.394
## p = 0.000 p = 0.390 p = 0.018
## GDP 2.320 2.910*** 1.208***
## (1.530) (0.707) (0.319)
## t = 1.517 t = 4.113 t = 3.787
## p = 0.130 p = 0.00005 p = 0.0002
## StringencyIndex 3,527.166* -969.376 -1,163.842***
## (1,835.380) (848.950) (382.795)
## t = 1.922 t = -1.142 t = -3.040
## p = 0.056 p = 0.255 p = 0.003
## Constant -960,328.600*** 56,026.720 169,238.500**
## (327,618.300) (151,538.900) (68,329.460)
## t = -2.931 t = 0.370 t = 2.477
## p = 0.004 p = 0.712 p = 0.014
## -----
## Observations 480 480 480
## R2 0.917 0.979 0.991
```

```
## Adjusted R2                                0.908                                0.976                                0.990
## Residual Std. Error (df = 429)            800,994.400                    370,497.600                    167,058.700
## F Statistic (df = 50; 429)                95.086*** (p = 0.000) 391.225*** (p = 0.000) 972.019*** (p = 0.000) 5
## =====
## Note:                                                                                                     *p<0.1

Table5 = stargazer(TotModel3, type = "text", report = "all", omit = c( "State"), out = "Table3.csv")
##
## % Error: Argument 'report' can only consist of "v","c","s","t","p","*".
```

## Summary Stats

```
ResSumStat = describe(ResQ)
```

```
summary(ResQ)
```

```
##      Year      Month      State      Revenue
## Min.   :2010   Min.    : 1.00   Length:2550   Min.    : 13064
## 1st Qu.:2013   1st Qu.: 1.00   Class :character 1st Qu.: 71279
## Median :2016   Median : 4.00   Mode  :character Median : 205052
## Mean   :2016   Mean    : 5.38                      Mean   : 296055
## 3rd Qu.:2019   3rd Qu.: 7.00                      3rd Qu.: 374923
## Max.   :2022   Max.    :10.00                     Max.   :2433803
```

```
##      Sales      Customers.Count      Price
## Min.   : 104574   Min.    : 226914   Min.    : 6.83
## 1st Qu.: 598280   1st Qu.: 760497   1st Qu.:10.68
## Median : 1674480   Median : 1949175   Median :11.98
## Mean   : 2360986   Mean    : 2573508   Mean    :13.18
## 3rd Qu.: 3176637   3rd Qu.: 2942898   3rd Qu.:14.10
## Max.   :18866998   Max.    :14269087   Max.    :41.57
```

```
summary(CommQ)
```

```
##      Year      Month      State      Revenue
## Min.   :2010   Min.    : 1.00   Length:2550   Min.    : 20778
## 1st Qu.:2013   1st Qu.: 1.00   Class :character 1st Qu.: 62442
## Median :2016   Median : 4.00   Mode  :character Median : 156798
## Mean   :2016   Mean    : 5.38                      Mean   : 232664
## 3rd Qu.:2019   3rd Qu.: 7.00                      3rd Qu.: 298792
## Max.   :2022   Max.    :10.00                     Max.   :2230115
```

```
##      Sales      Customers.Count      Price
## Min.   : 126344   Min.    : 23408   Min.    : 6.160
## 1st Qu.: 638876   1st Qu.: 113253   1st Qu.: 8.690
## Median : 1589892   Median : 275462   Median : 9.805
## Mean   : 2206458   Mean    : 357378   Mean    :10.857
## 3rd Qu.: 2814255   3rd Qu.: 422943   3rd Qu.:11.450
## Max.   :14474282   Max.    :1894673   Max.    :38.750
```

```
summary(IndQ)
```

```
##      Year      Month      State      Revenue
## Min.   :2010   Min.    : 1.00   Length:2550   Min.    : 243
## 1st Qu.:2013   1st Qu.: 1.00   Class :character 1st Qu.: 40886
## Median :2016   Median : 4.00   Mode  :character Median : 81309
## Mean   :2016   Mean    : 5.38                      Mean   :111210
## 3rd Qu.:2019   3rd Qu.: 7.00                      3rd Qu.:141000
## Max.   :2022   Max.    :10.00                     Max.   :783161
```

```
##      Sales      Customers.Count      Price
```

```

## Min. : 2919 Min. : 1 Min. : 3.900
## 1st Qu.: 535104 1st Qu.: 4174 1st Qu.: 5.870
## Median : 1260252 Median : 9079 Median : 6.810
## Mean : 1616884 Mean : 16803 Mean : 7.940
## 3rd Qu.: 2230890 3rd Qu.: 18663 3rd Qu.: 8.127
## Max. :12045650 Max. :316829 Max. :34.490
summary(TranQ)
## Year Month State Revenue
## Min. :2010 Min. : 1.00 Length:2550 Min. : 0.0
## 1st Qu.:2013 1st Qu.: 1.00 Class :character 1st Qu.: 0.0
## Median :2016 Median : 4.00 Mode :character Median : 41.0
## Mean :2016 Mean : 5.38 Mean : 1226.2
## 3rd Qu.:2019 3rd Qu.: 7.00 3rd Qu.: 623.8
## Max. :2022 Max. :10.00 Max. :37024.0
## Sales Customers.Count Price
## Min. : 0.0 Min. : 0.000 Min. : 0.000
## 1st Qu.: 0.0 1st Qu.: 0.000 1st Qu.: 0.000
## Median : 452.5 Median : 1.000 Median : 6.870
## Mean : 12117.8 Mean : 1.858 Mean : 5.351
## 3rd Qu.: 7247.0 3rd Qu.: 2.000 3rd Qu.: 9.310
## Max. :341166.0 Max. :58.000 Max. :27.960

summary(GDP)
## DATE GDP State NewDate
## Length:3430 Min. : 26610 AK : 70 Min. :2005-01-01
## Class :character 1st Qu.: 86847 AL : 70 1st Qu.:2009-04-01
## Mode :character Median : 209236 AR : 70 Median :2013-08-16
## Mean : 340396 AZ : 70 Mean :2013-08-16
## 3rd Qu.: 432723 CA : 70 3rd Qu.:2018-01-01
## Max. :2942969 CO : 70 Max. :2022-04-01
## (Other):3010
## Month Year
## Min. : 1.000 Min. :2005
## 1st Qu.: 1.000 1st Qu.:2009
## Median : 4.000 Median :2013
## Mean : 5.414 Mean :2013
## 3rd Qu.: 7.000 3rd Qu.:2018
## Max. :10.000 Max. :2022
##
summary(TempQ)
## Date Value State Month
## Min. :201001 Min. : -12.80 AK : 52 Min. : 1.00
## 1st Qu.:201303 1st Qu.: 41.60 AL : 52 1st Qu.: 3.25
## Median :201606 Median : 53.40 AR : 52 Median : 5.50
## Mean :201606 Mean : 53.06 AZ : 52 Mean : 5.50
## 3rd Qu.:201908 3rd Qu.: 67.40 CA : 52 3rd Qu.: 7.75
## Max. :202210 Max. : 89.20 CO : 52 Max. :10.00
## (Other):2184
## Year
## Min. :2010
## 1st Qu.:2013
## Median :2016
## Mean :2016

```



```
## 3rd Qu.:2019
## Max. :2022
##
summary(PostStringency)
## CountryName CountryCode RegionName RegionCode
## Length:612 Length:612 Length:612 Length:612
## Class :character Class :character Class :character Class :character
## Mode :character Mode :character Mode :character Mode :character
##
##
## Jurisdiction Date Year Month
## Length:612 Min. :20200101 Min. :2020 Min. : 1.00
## Class :character 1st Qu.:20200926 1st Qu.:2020 1st Qu.: 3.25
## Mode :character Median :20210551 Median :2021 Median : 5.50
## Mean :20210551 Mean :2021 Mean : 5.50
## 3rd Qu.:20220176 3rd Qu.:2022 3rd Qu.: 7.75
## Max. :20221001 Max. :2022 Max. :10.00
## Day StringencyIndex GovIndex State
## Min. :1 Min. : 0.00 Min. : 0.00 Length:612
## 1st Qu.:1 1st Qu.:22.41 1st Qu.:37.40 Class :character
## Median :1 Median :34.26 Median :46.61 Mode :character
## Mean :1 Mean :38.48 Mean :45.28
## 3rd Qu.:1 3rd Qu.:55.67 3rd Qu.:57.99
## Max. :1 Max. :87.96 Max. :77.34

AggMergedSum = AggMerged
AggMergedSum$Year = as.character(AggMergedSum$Year)
AggMergedSum$Month = as.character(AggMergedSum$Month)
AggMergedSum$Date.x = as.character(AggMergedSum$Date.x)
AggMergedSum$Date.y = as.character(AggMergedSum$Date.y)
AggMergedSum$Day = as.character(AggMergedSum$Day)
AggMergedSum$Value = as.character(AggMergedSum$Value)

stargazer(AggMergedSum, type = "text", title = "Summary Statistics", out = "Sumtable.txt", flip = TRUE)
##
## Summary Statistics
## =====
## Statistic Revenue Sales Customers.Count Price GDP StringencyIndex GovIndex T
## -----
## N 1,920 1,920 1,920 1,920 1,920 1,920 1,920 1,
## Mean 171,546.700 1,569,573.000 784,839.300 9.611 376,490.200 41.613 47.019 50
## St. Dev. 276,646.300 2,186,046.000 1,822,529.000 5.107 494,550.300 22.617 18.673 17
## Min 0 0 0 0.000 26,863.400 0.000 0.000 -6
## Max 2,433,803 18,866,998 14,269,087 27.100 2,942,969.000 87.960 77.340 85
## -----

##Visuals for Paper
UsAve = ResMerged2 %>%
  group_by(NewDate) %>%
  summarize(StringencyIndex = mean(StringencyIndex))

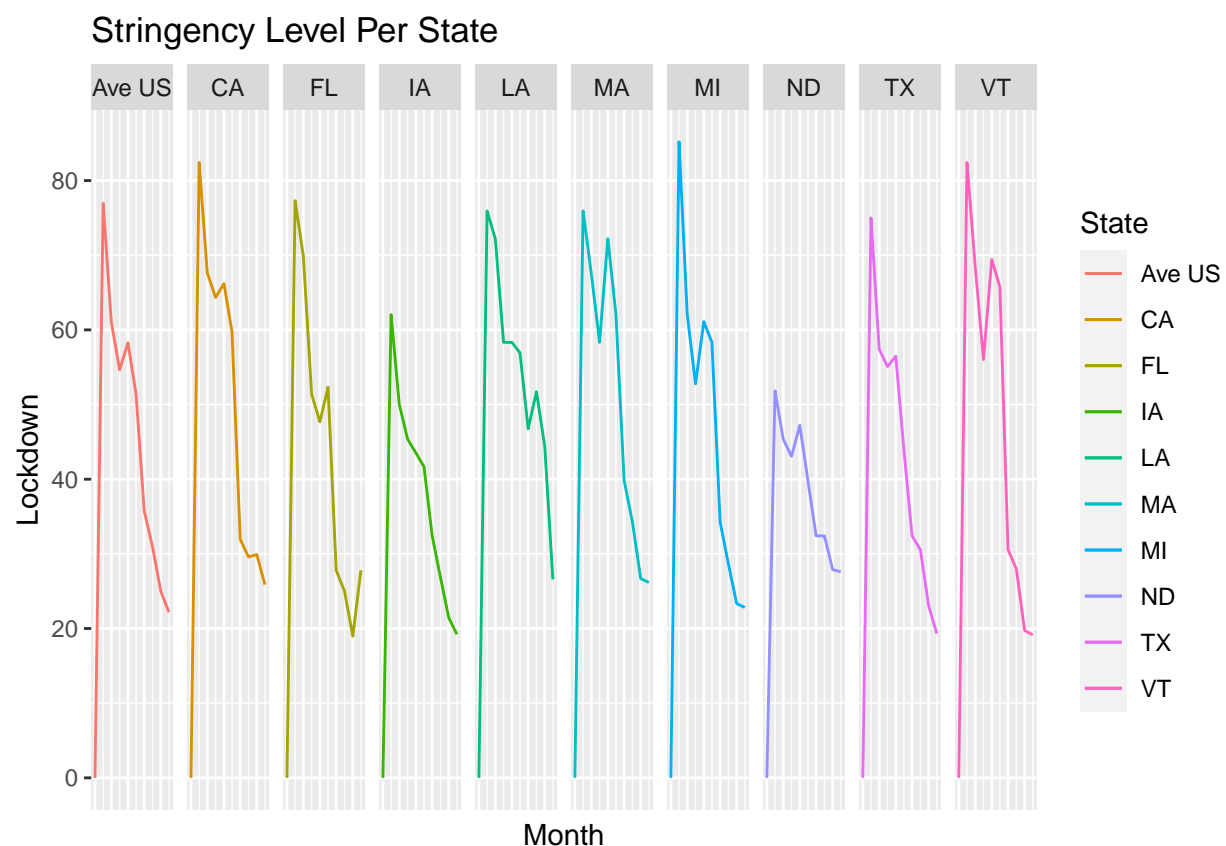
UsAve$State = "Ave US"
```

```

Ave = ResMerged2 %>%
  filter(State == "TX" | State == "IA" | State == "ND" | State == "FL" | State == "MI" | State == "VT")
  select(NewDate, State, StringencyIndex)

plot1 <- ggplot(data = Ave, mapping = aes(x = NewDate, y=StringencyIndex, color = State)) +
  geom_line() +
  facet_wrap(vars(State), ncol = 11) + labs(x = "Month", y = "Lockdown", title = "Stringency Level Per S
  labs(colour = "State")+theme(axis.text.x=element_blank(),axis.ticks.x=element_blank()) +
  geom_line(mapping = aes(x= NewDate, y= StringencyIndex), data = UsAve)
plot1

```



```

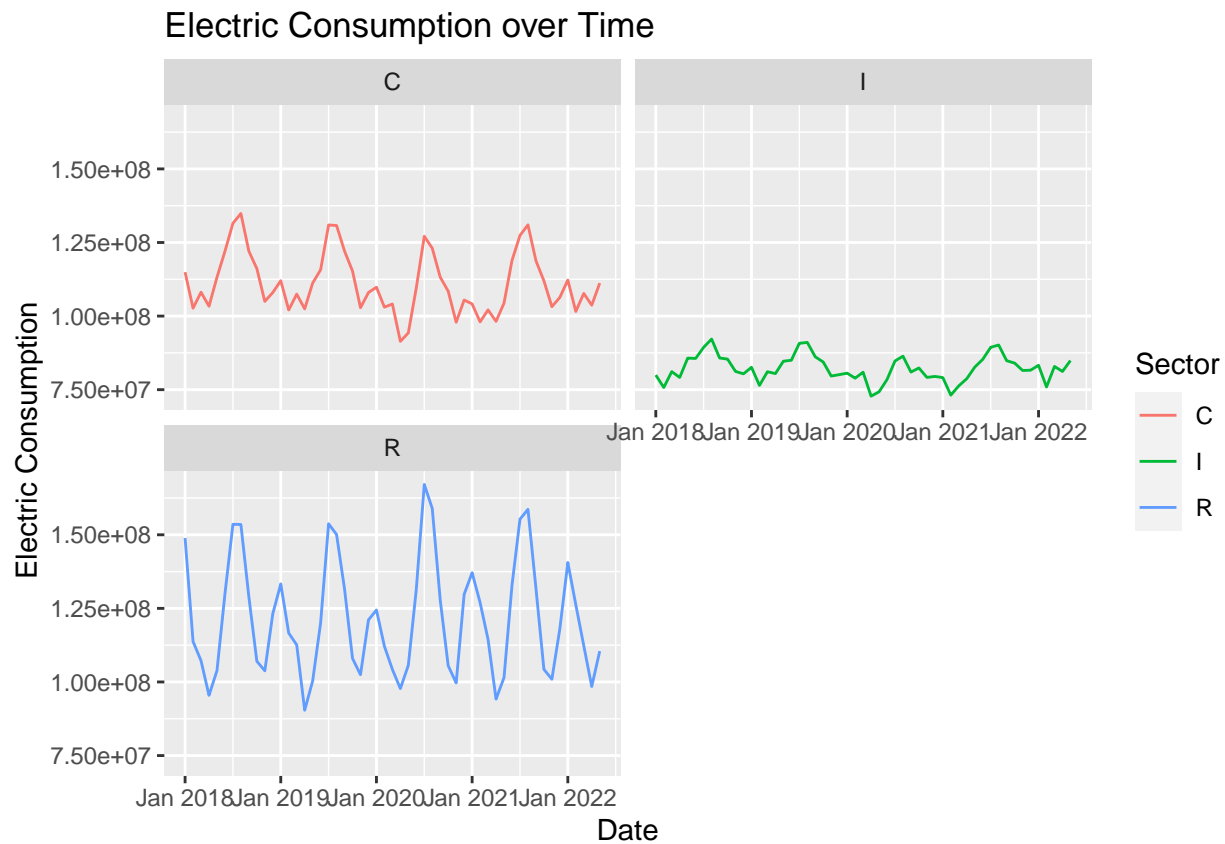
Agg$Sales = gsub(",", "", Agg$Sales)
Agg$Sales = as.numeric(Agg$Sales)
SumDB = Agg %>%
  group_by(Year, Month, Sector) %>%
  filter(Sector != "T" & Year > 2017) %>%
  summarise(value = sum(Sales))

SumDB$Date <- as.yearmon(paste(SumDB$Year, SumDB$Month), "%Y %m")

plot2 <- ggplot(data = SumDB, mapping = aes(x = Date, y=value, color = Sector)) +

```

```
geom_line() +
  facet_wrap(vars(Sector), ncol = 2) +
  theme() +
  labs(x = "Date", y = "Electric Consumption", title = "Electric Consumption over Time")
plot2
```



Aggregate Model

```
AggMerged$Sector = as.factor(AggMerged$Sector)
AggMerged$Sector = relevel(AggMerged$Sector, ref = "T")

AggModel = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(Sector) + StringencyIndex:as.f

AggModel2 = lm(Sales ~ abs(Temp-65) + GDP + StringencyIndex + as.factor(Sector) + StringencyIndex:as.f

Temp1 <- transform(Temp, yq = as.yearqtr(Month, "%m/%y"))
GDP1 <- transform(GDP, yq = as.yearqtr(Month, "q%Vq/%y"))

ResMergedFinal <- merge(Temp, Residential, by=c("Year", "Month", "State"))
ResMergedFinal <- merge(ResMergedFinal, GDP, by=c("Year", "Month", "State"))
ResMergedFinal <- merge(ResMergedFinal, PostStringency, by=c("Year", "Month", "State"))
ResMergedFinal$Temp = ResMergedFinal$Value

tot18 = sum(AggMerged2$Sales[AggMerged2$Year == "2018"])
spread18 = AggMerged2 %>% group_by(Sector) %>% filter(Year == 2018) %>% summarise(Percentage=sum(Sales),
```

```

tot20 = sum(AggMerged2$Sales[AggMerged2$Year == "2020"])
spread20 = AggMerged2 %>% group_by(Sector) %>% filter(Year == 2020) %>% summarise(Percentage=sum(Sales).

res19 = sum(AggMerged2$Sales[AggMerged2$Year == "2019" & AggMerged2$Sector == "R"])
res20 = sum(AggMerged2$Sales[AggMerged2$Year == "2020" & AggMerged2$Sector == "R"])

ratio = sum(AggMerged2$Sales[AggMerged2$Sector == "R"])/sum(AggMerged2$Customers.Count[AggMerged2$Sector

```