Section 3:
Analysis:

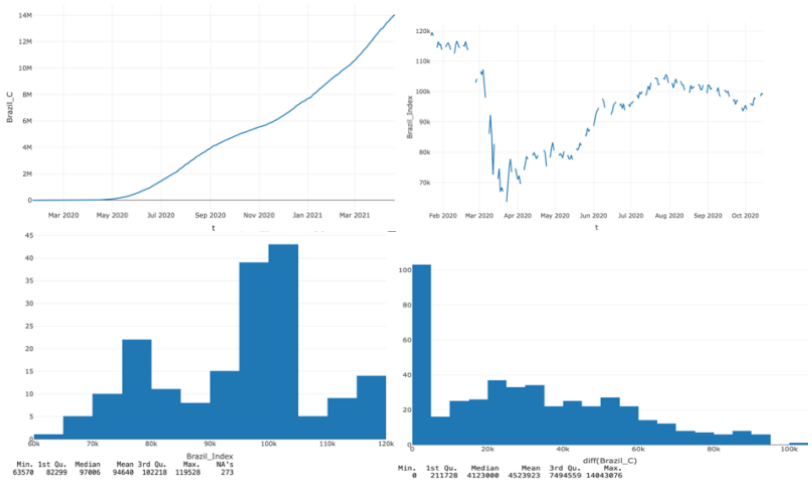
- Analysis of how the market suffered when the COVID 19 spreaded and how the Dow Jones Industrial average index dropped with the increase spread of the virus.

- Analysis of the stock market indices that were affected by COVID 19 in some countries in the south of US such as Brazil and Argentina and in the north of the US such as Mexico.

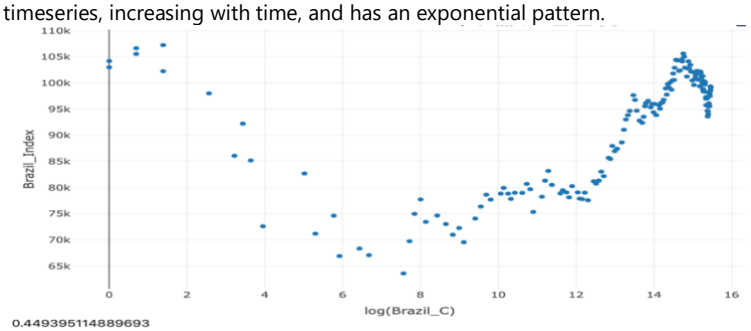
Summary:

Brazil Data:

-The first graph shows the COVID cases for the period for the period from May 2020 till April 2021 in Brazil. The second graph describes how the main stock market index in Brazil changed monthly from February 2020 till October 2020. It was decreasing then started to increase even with the increase of the COVID cases number.



The first graph describes the histogram of the Brazil stock market, and the second graph describes the daily increase rate of the COVID cases. For the stock market index, the mean value is 94640 , and it has a multi modal distribution. There are not outliers points. The COVID cases is a timeseries, increasing with time, and has an exponential pattern.



The above graph shows the correlation between stock market index in Brazil and the COVID cases number. The correlation seems to be a positive after a certain value of the cases.

Model:

Call:
lm(formula = Brazil_Index ~ log(Brazil_C), data = ALL_data[log(ALL_data$Brazil_C) >
  8,], na.action = na.omit)

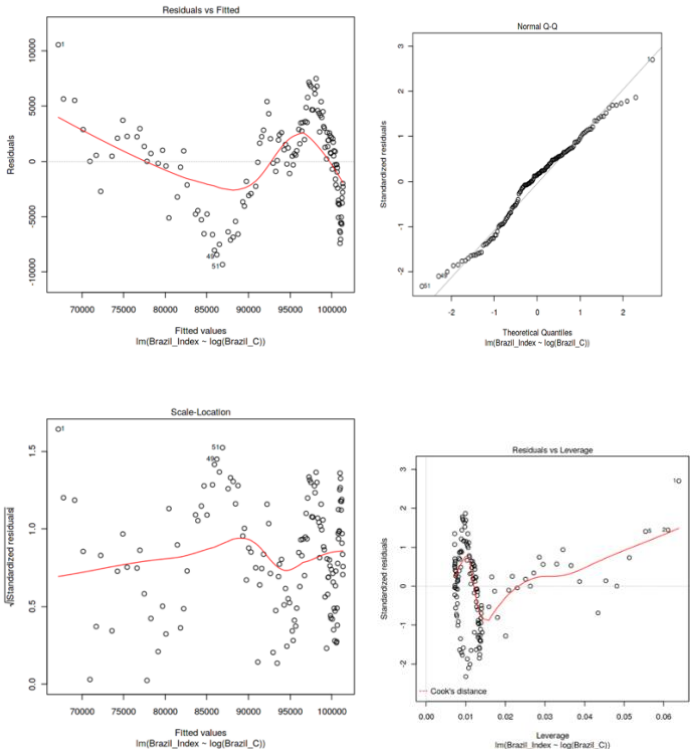
Residuals:
   Min   1Q Median   3Q   Max
-9330.4 -3002.0   561.2 2643.5 10546.0

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)   30474.7   2372.9   12.84   <2e-16 ***
log(Brazil_C) 4585.4   173.4   26.44   <2e-16 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 4036 on 137 degrees of freedom
  (252 observations deleted due to missingness)
Multiple R-squared: 0.8361,   Adjusted R-squared: 0.8349

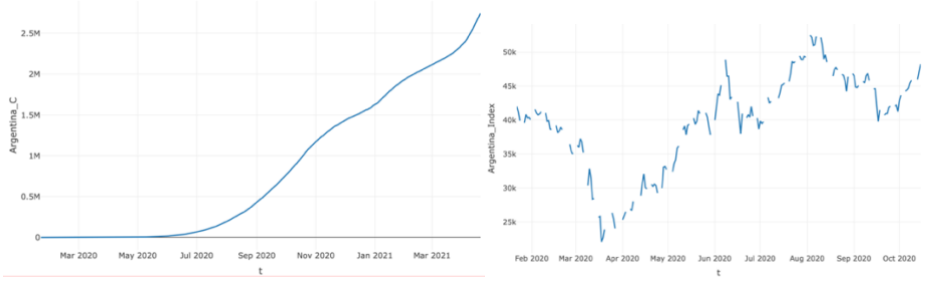
F-statistic: 699.1 on 1 and 137 DF, p-value: < 2.2e-16



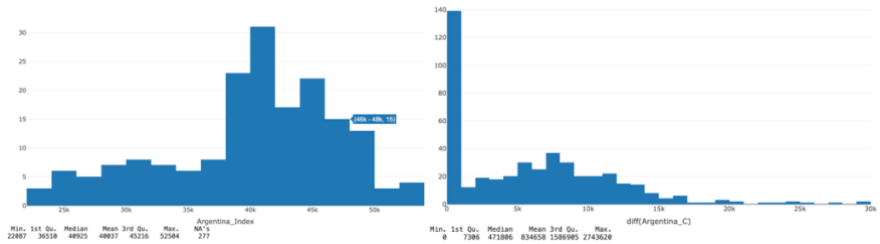
Hypothesis: there is a significant correlation between the COVID cases and the stock market index, but there are also a lot of leverage points that affect the model.

Argentina Data:

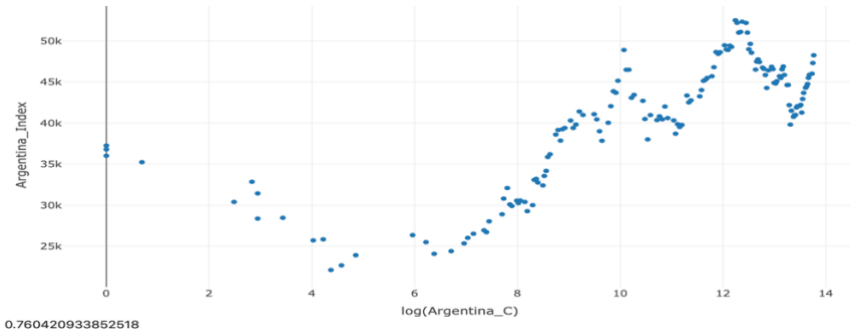
The first graph shows the COVID cases for the period from May 2020 till April 2021 in Argentina. The second graph describes how the main stock market index in Argentina changed monthly from February 2020 till October 2020. It was decreasing then started to increase even with the increase of the COVID cases number.



- The first graph describes the histogram of the Argentina stock market, and the second graph describes the daily increase rate of the COVID cases. For the stock market index, the mean value is 40037 , and it has a multi modal distribution. There are not outliers points. The COVID cases is a timeseries, increasing with time, and has an exponential pattern



The below graph shows the correlation between stock market index in Argentina and the COVID cases number. The correlation seems to be a positive after a certain value of the cases.



Model:

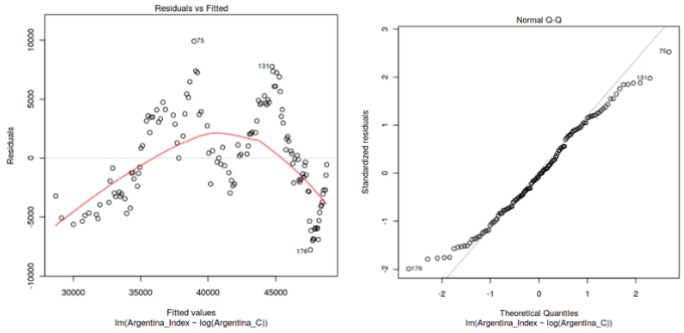
Call:
lm(formula = Argentina_Index ~ log(Argentina_C), data = ALL_data[log(ALL_data$Argentina_C) >
6,], na.action = na.omit)

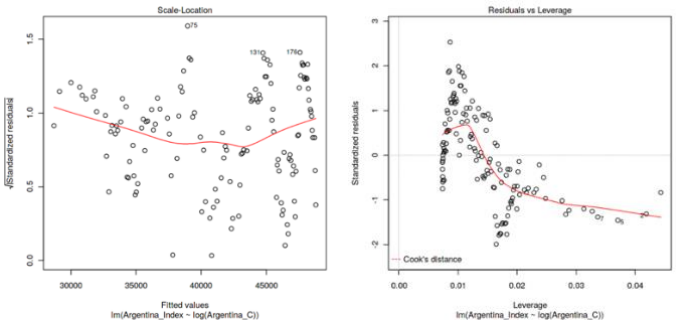
Residuals:
Min 1Q Median 3Q Max
-7778.2 -2951.7 -225.2 3206.3 9925.8

Coefficients:
Estimate Std. Error t value Pr(>|t|)
(Intercept) 12137 1786 6.798 3.19e-10 ***
log(Argentina_C) 2663 160 16.644 < 2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3944 on 134 degrees of freedom
(255 observations deleted due to missingness)
Multiple R-squared: 0.674, Adjusted R-squared: 0.6716
F-statistic: 277 on 1 and 134 DF, p-value: < 2.2e-16



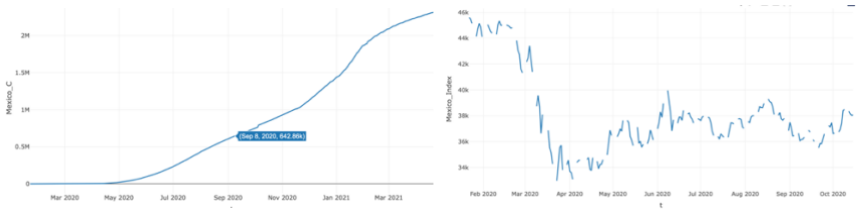


Hypothesis: there is a significant correlation between the COVID cases and the stock market index in Argentina, but there are also a lot of leverage points that affect the model.

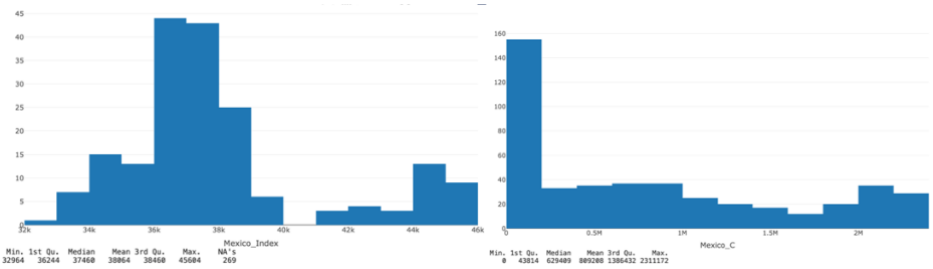
Mexico Data:

The first graph shows the COVID cases for the period from May 2020 till April 2021 in Mexico. The second graph describes how the main stock market

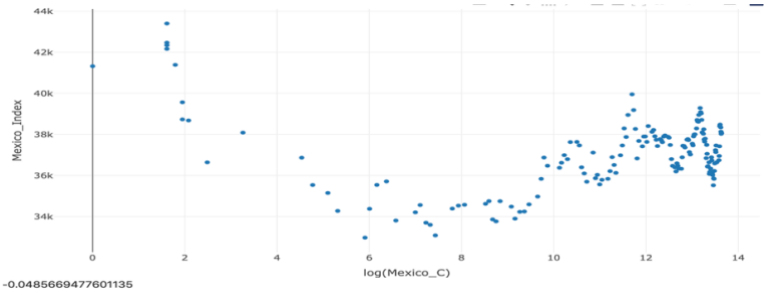
index in Mexico changed monthly from February 2020 till October 2020. It was decreasing then started to increase even with the increase of the COVID cases number.



- The first graph describes the histogram of the Mexico stock market, and the second graph describes the daily increase rate of the COVID cases. For the stock market index, the mean value is 38064 , and it has a multi modal distribution. There are not outliers points. The COVID cases is a timeseries, increasing with time, and has an exponential pattern.



- The below graph shows the correlation between stock market index in Mexico and the COVID cases number. The correlation seems to be a positive after a certain value of the cases.



Model:

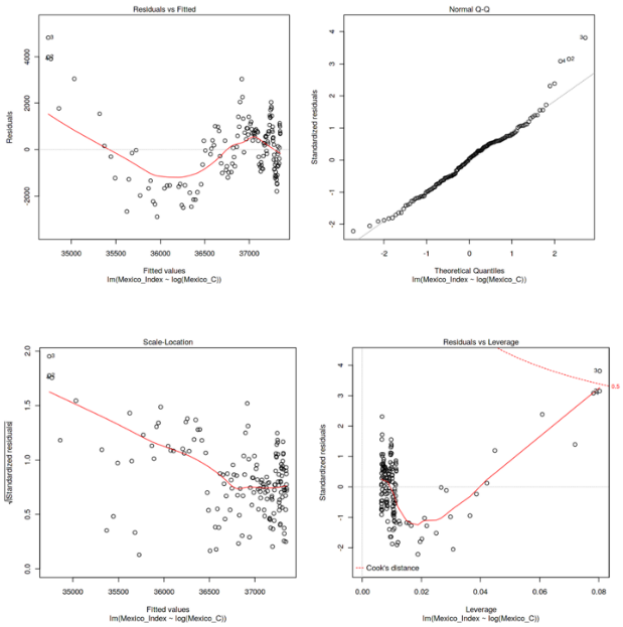
Call:
lm(formula = Mexico_Index ~ log(Mexico_C), data = ALL_data[(ALL_data$Mexico_C) >
  6,], na.action = na.omit)

Residuals:
   Min   1Q Median   3Q   Max
-2889.0 -869.4   56.7 787.3 4823.4

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 34308.46   446.33 76.867 < 2e-16 ***
log(Mexico_C) 222.83   38.64   5.767 4.37e-08 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

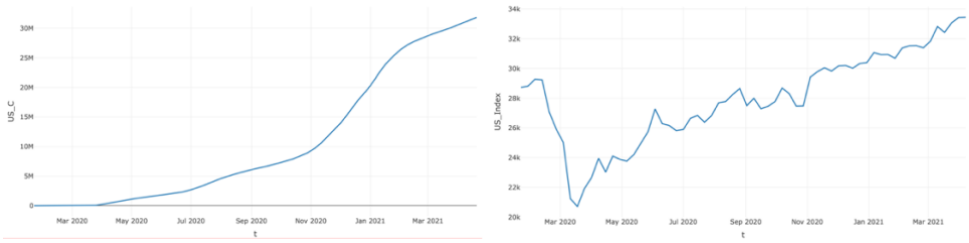
Residual standard error: 1319 on 152 degrees of freedom
  (255 observations deleted due to missingness)
Multiple R-squared: 0.1795,   Adjusted R-squared: 0.1741
F-statistic: 33.26 on 1 and 152 DF, p-value: 4.368e-08



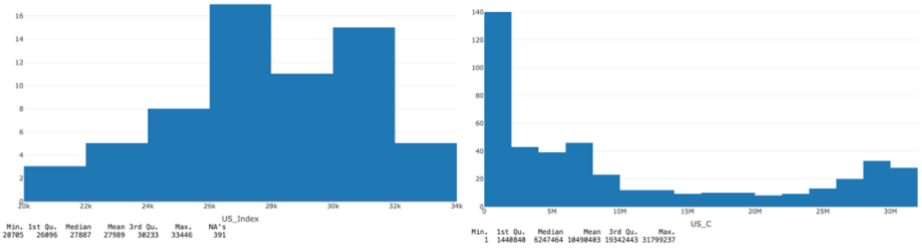
Hypothesis: there is a significant correlation between the COVID cases and the stock market index in Mexico, but there are also a lot of leverage points that affect the model.

US Data:

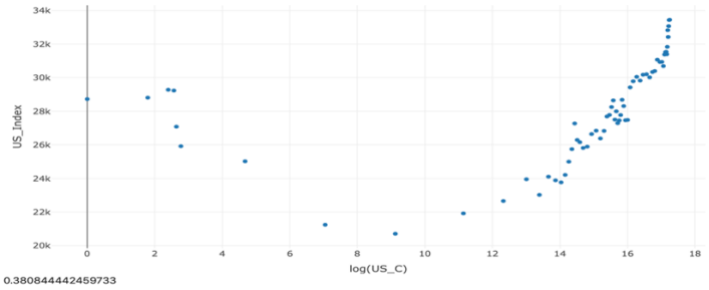
- The first graph shows the COVID cases for the period from May 2020 till April 2021 in US. The second graph describes how Dow Jones Industrial average index in US changed weekly from February 2020 till October 2020. It was decreasing with the increase spread of the virus.



- The first graph describes the histogram of the US Dow Jones Industrial average index, and the second graph describes the daily increase rate of the COVID cases. For the Dow Jones Industrial average index, the mean value is 27989 , and it has a multi modal distribution. There are not outliers points. The COVID cases is a timeseries, increasing with time, and has an exponential pattern.



- The below graph shows the correlation between the Dow Jones Industrial average index in US and the COVID cases number. The correlation seems to be a positive after a certain value of the cases.



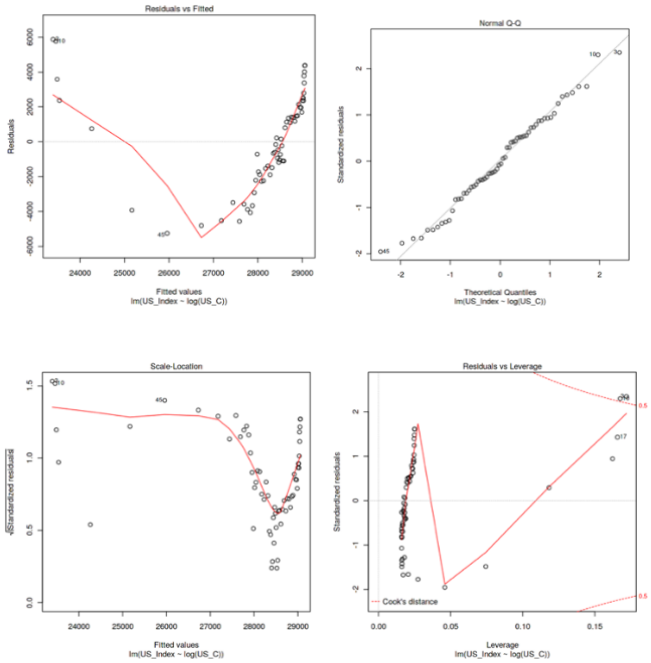
Model:
Call:
lm(formula = US_Index ~ log(US_C), data = ALL_data[(ALL_data$US_C) >
  8,], na.action = na.omit)

Residuals:
   Min   1Q Median   3Q   Max
-5258.5 -1850.3 -195.3 1975.2 5878.2

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 22483.54   1350.61 16.647 < 2e-16 ***
log(US_C)   381.42   90.79   4.201 8.95e-05 ***

Signif. codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 2755 on 60 degrees of freedom
  (381 observations deleted due to missingness)
Multiple R-squared: 0.2273,   Adjusted R-squared: 0.2144
F-statistic: 17.65 on 1 and 60 DF, p-value: 8.946e-05



Hypothesis: there is a significant correlation between the COVID cases and the `Dow Jones Industrial average index in US`, but there are also a lot of leverage points that affect the model