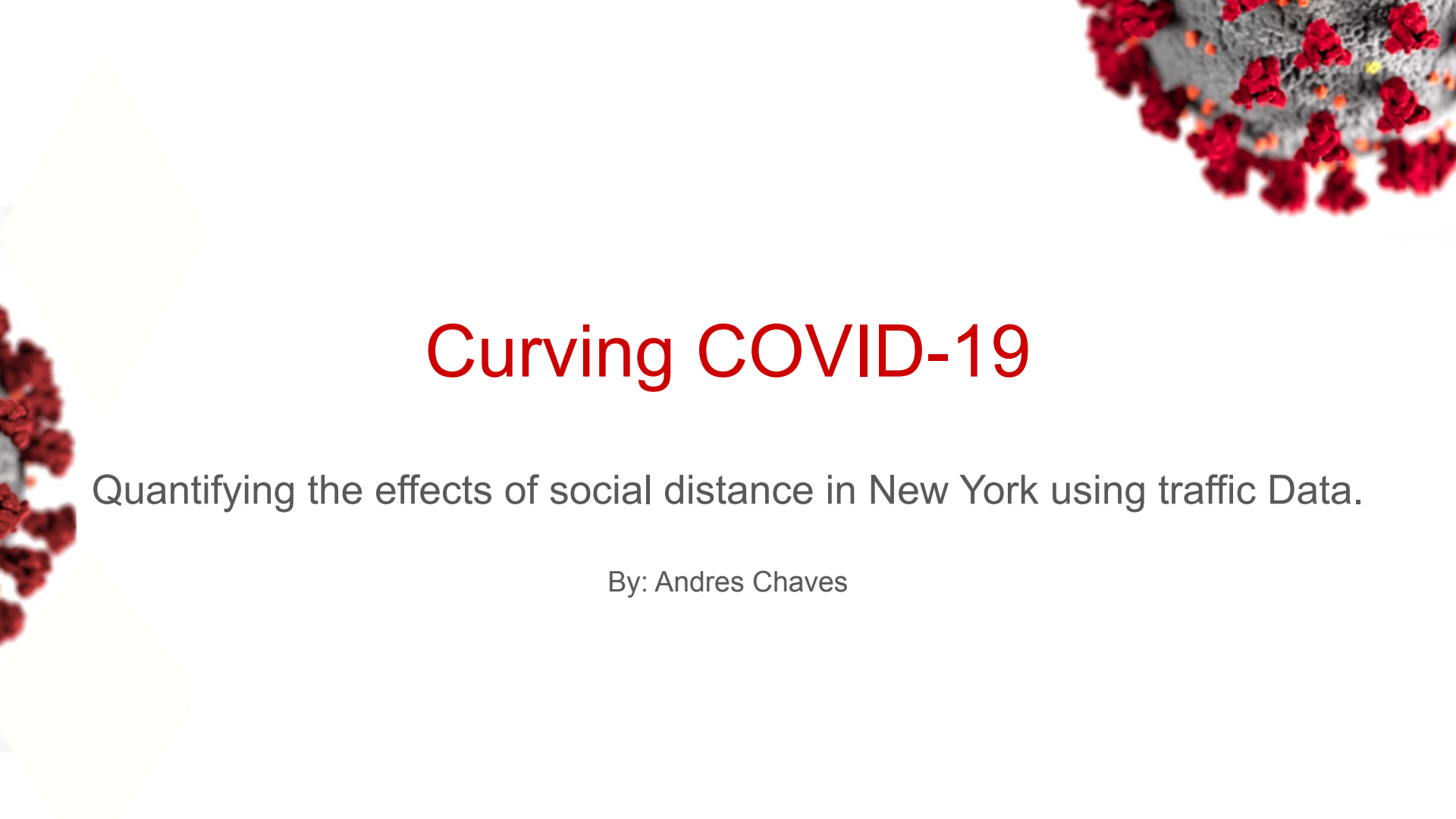


Curving COVID-19

Quantifying the effects of social distance in New York using traffic Data.

By: Andres Chaves

Introduction:

- As of today the city of New York has reported 55,280 Hospitalizations and around 18,618 deaths due to Covid-19
- Social distance (SD) has been the main tool to “flatten the curve”.
- I try to analyse Traffic trends in the city of New York and examine their relationship (as a proxy of SD) to the number of Covid_19 patients hospitalized.
  - I find that Social distancing really help curve the virus
  - The impact on hospitalization is seen after an approximate 13 day lag

Data:

I used daily traffic and official Covid hospitalization data from February 29th until June 25th

- Traffic: Tomtom traffic index measure the extra time needed to travel due to a city's congestion level

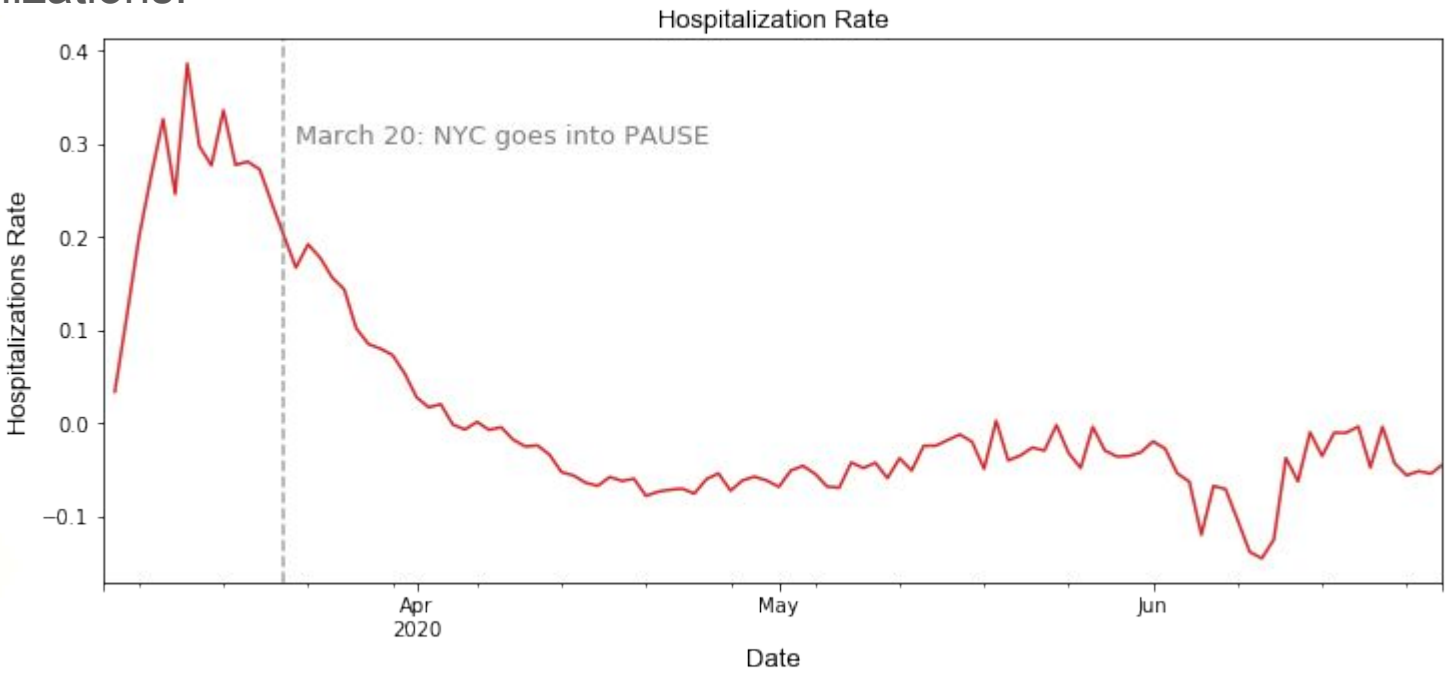
- Hospitalizations: New York's City's Health Department

TOMTOM

NYC Health

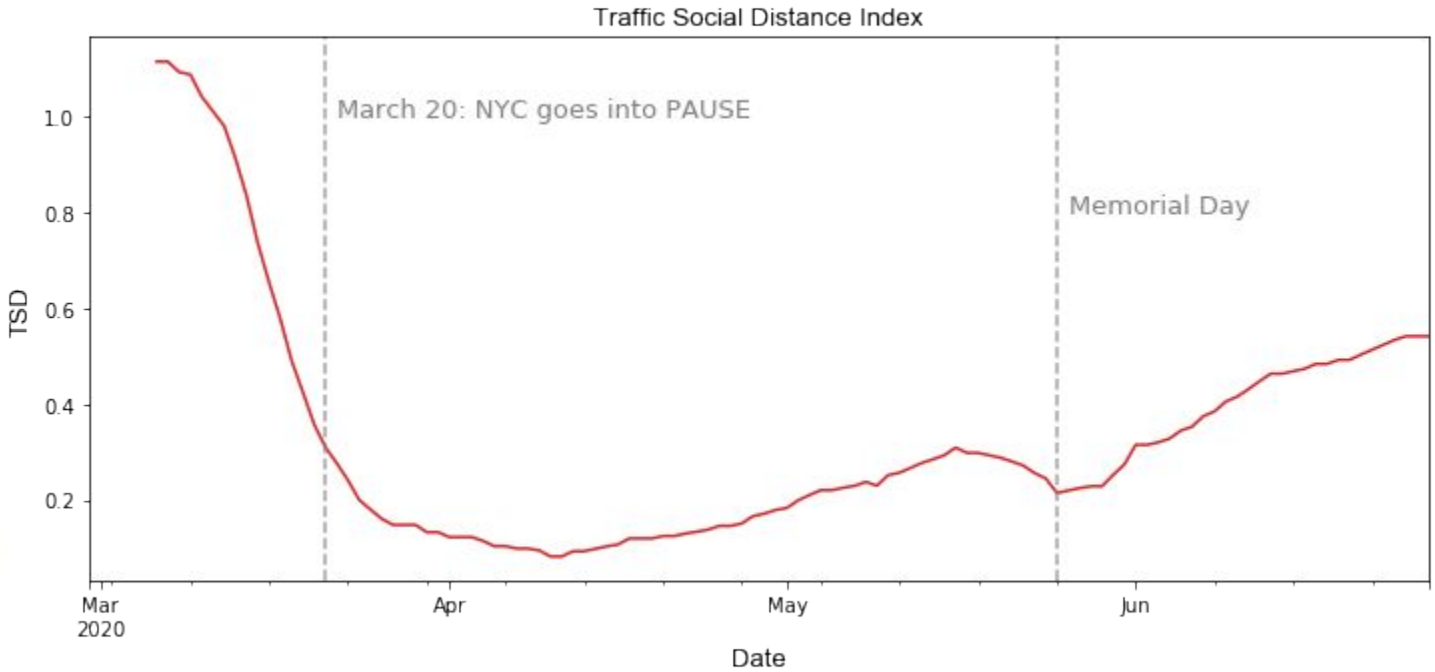
Hospitalizations

I create a hospitalization rate by first smoothing the data with a 7-day rolling mean, then I compute the daily percent change of hospitalizations.



Traffic:

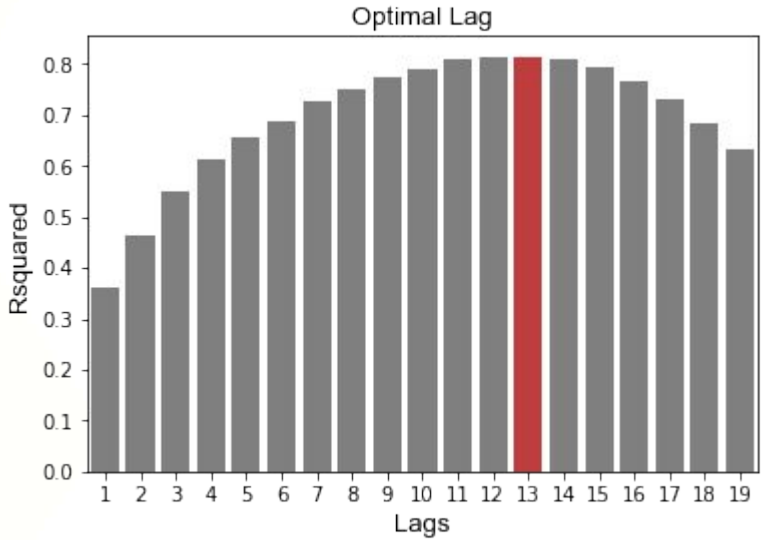
I use the first week of February as my baseline traffic congestion. I divide each day of the daily traffic index by the corresponding day in the base week. Finally the 7_day rolling mean is used to smooth the series.

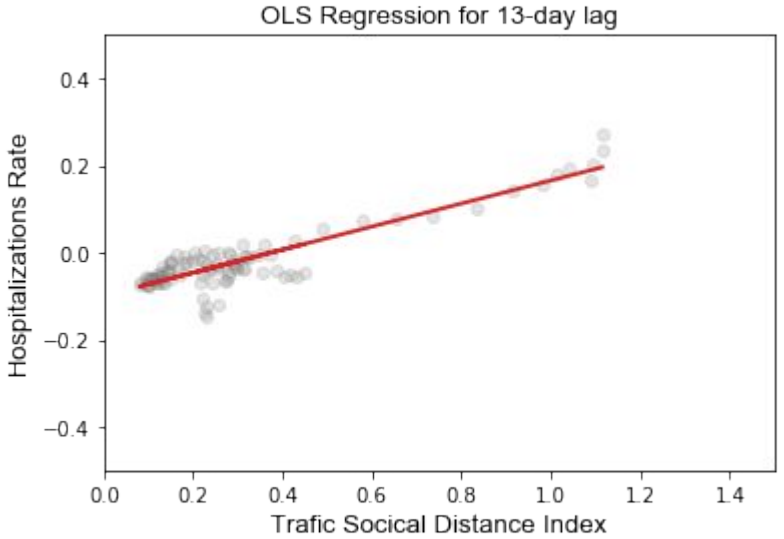


Linear Regression

I fit a simple linear model using the traffic social distance as a predictor of Hospitalization's growth and test the R^2 at different lags.

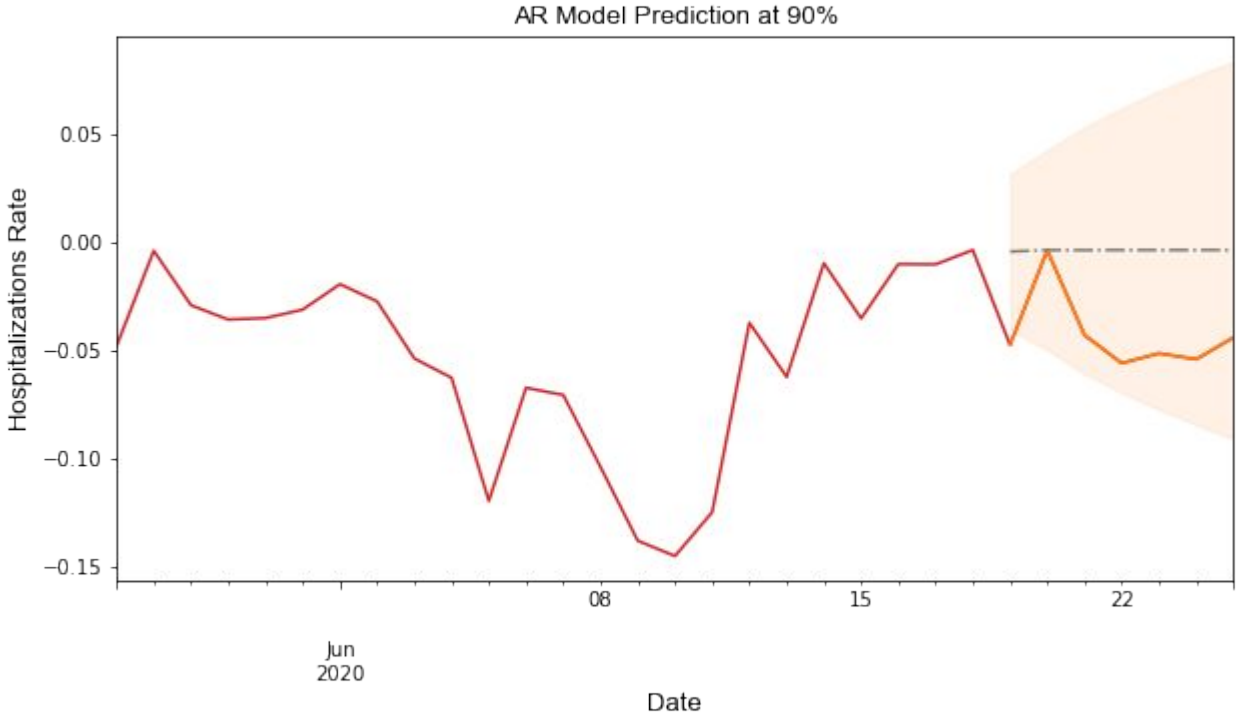
The analysis shows an optimal lag of 13 days





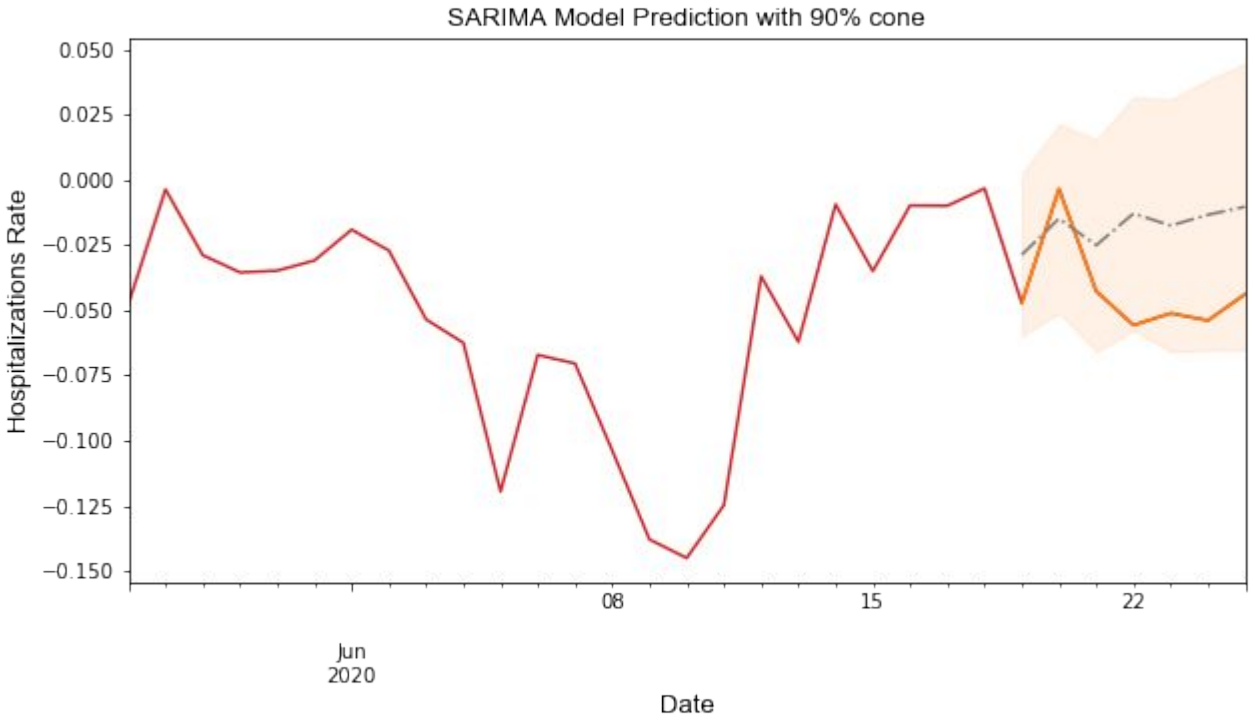
ARIMA model:

ARIMA(3,1,0)
RMSE = 0.0424

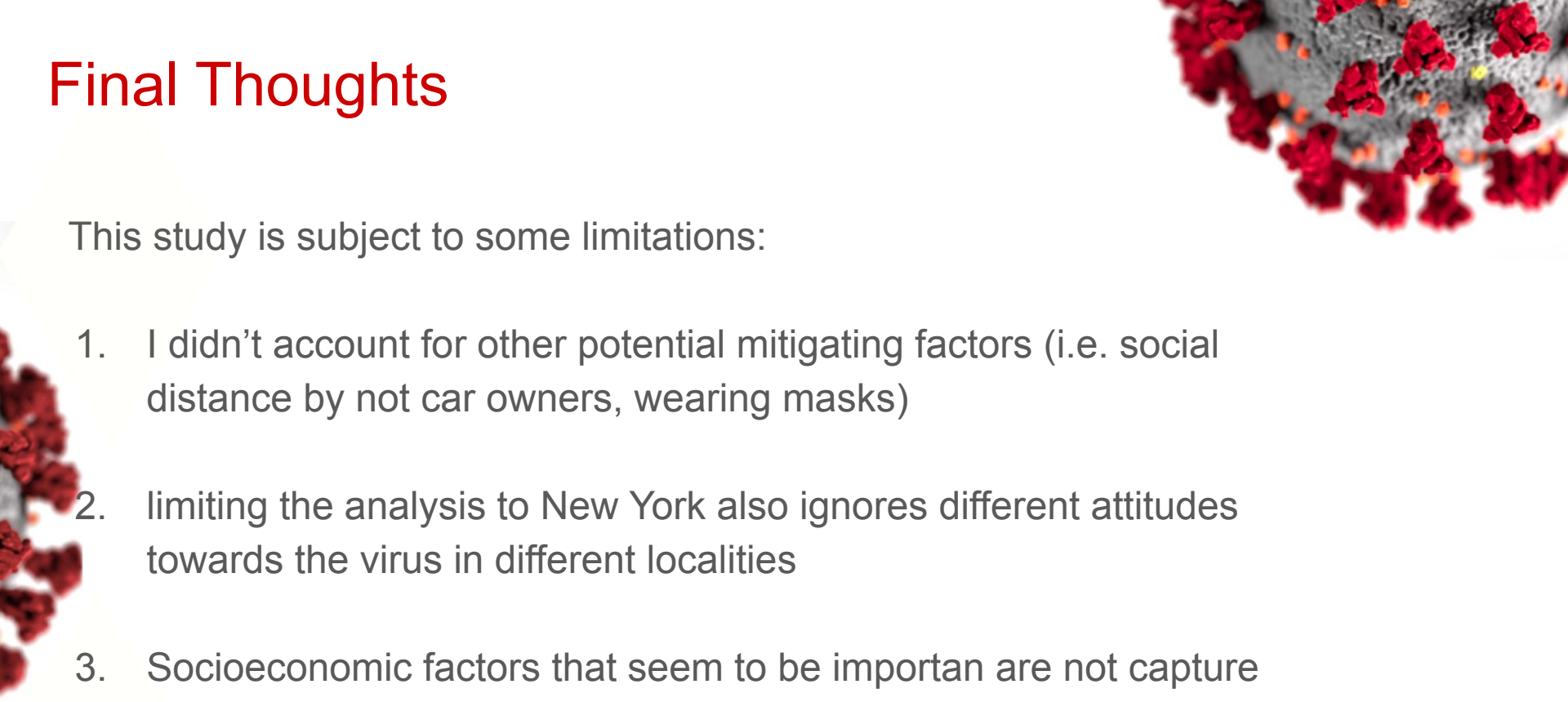


SARIMAX model with 13-day lag

SARIMAX(1,1,1)x(1,0,0,7)
RMSE: 0.024



Final Thoughts



This study is subject to some limitations:

1. I didn’t account for other potential mitigating factors (i.e. social distance by not car owners, wearing masks)

2. limiting the analysis to New York also ignores different attitudes towards the virus in different localities

3. Socioeconomic factors that seem to be importan are not capture by this project

Conclusion

- The result strongly suggest that less travel (social distanced) is indeed a factor in reducing the number of hospitalizations
- Safe travel behavior manifest weeks later and might make it difficult to recognize its value to curve the spread.
- I hope that this results encourage you to take action in the difficult months ahead.

Thank You