

Big Data: COVID-19

Effect of New Daily Cases on Recreational Mobility

Dartford Grammar School for Boys

Research Team Members: Elani, Zainab, Aniekan, Adeleke

Summary

- Covid-19 is the world's latest tragedy, to have rapidly impacted worldwide mortality, accounting for over 6 million deaths.
- Preemptive government's effort to safeguard the public health included lockdown, confinement and limited movement order and social distancing, deal a heavy impact on all sectors in economy coupled with the reduction in labour forces³.
- In this poster we will analyse the effect that new daily cases (and as a result government policies and changing attitudes to the pandemic from the public) had on visitors to retail and recreation in both the US and India.

Research aims

- We want to draw an observation of the extent that covid impacted the daily lives of people living in different areas of the world, particularly in the United States and India both being infamous for their responses to the pandemic.
- Hence to discern the difference in the populations responsiveness and engagement to the social restrictions implemented during each countries' implementations of lockdown.
- Hypothesising that a greater number of new daily cases will lead to a greater decrease in recreational mobility as people will be less likely to go out for fear of becoming infected with Covid.

Methodology

- The data used to observe and interpret the data of both the US and India's changes in visits to retail and recreational areas was gathered from Our World in Data¹, with the percentage change being measured against a "base day" which is an average of the previous 10 days' visits to retail and recreation in both countries before the time period measured in the pandemic.
- The data sets was then downloaded from the website in a CSV format so it can be later processed; in preparation to graphing the data as trends we had to first alter the data range of the data sets so that they covered the same date range in order to compare in a more coherent way.
- All statistical analysis of the data was conducted using R, where we plotted the points of data starting from the 17/2/2020 to the 29/08/2021 (in day/month/year format) for both countries and drawing a local polynomial regression line on top of the data to better visualize the overall trend of the data throughout the development of the pandemic.

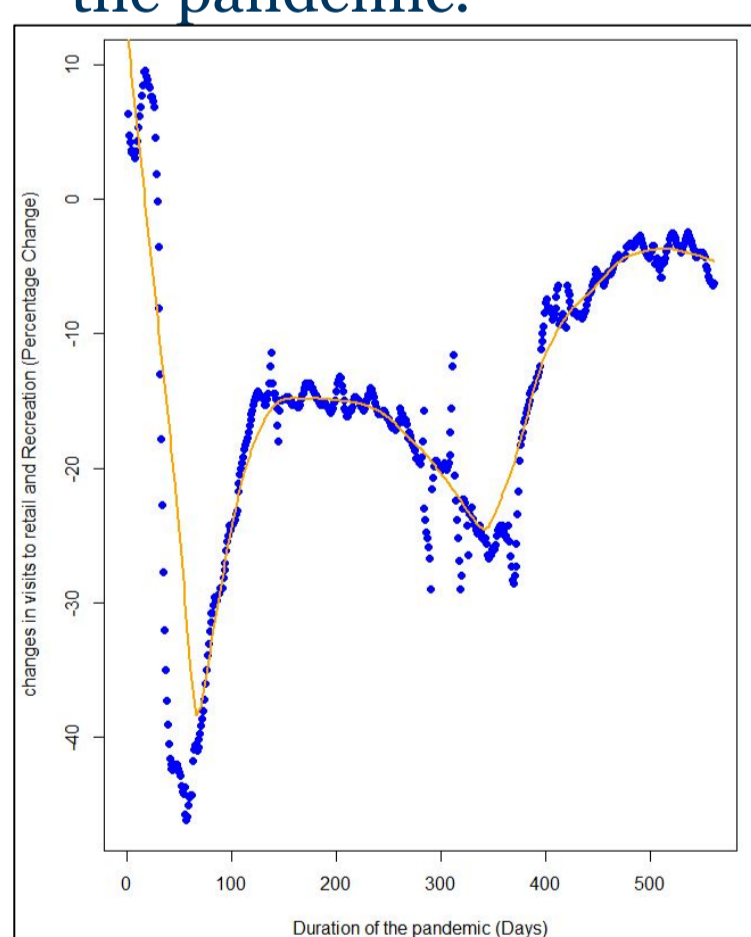


Figure 1 illustrates the changes in visits to retail and recreation within the United States during the pandemic in USA, where lockdown measures and various other viral-contingency measures were implemented. The increase observed through the graph back to the equilibrium position, can be observed after day 400, where there is a sharp increase of recreational visits, which were caused by curtailment of lockdown rules and other contingency measures.

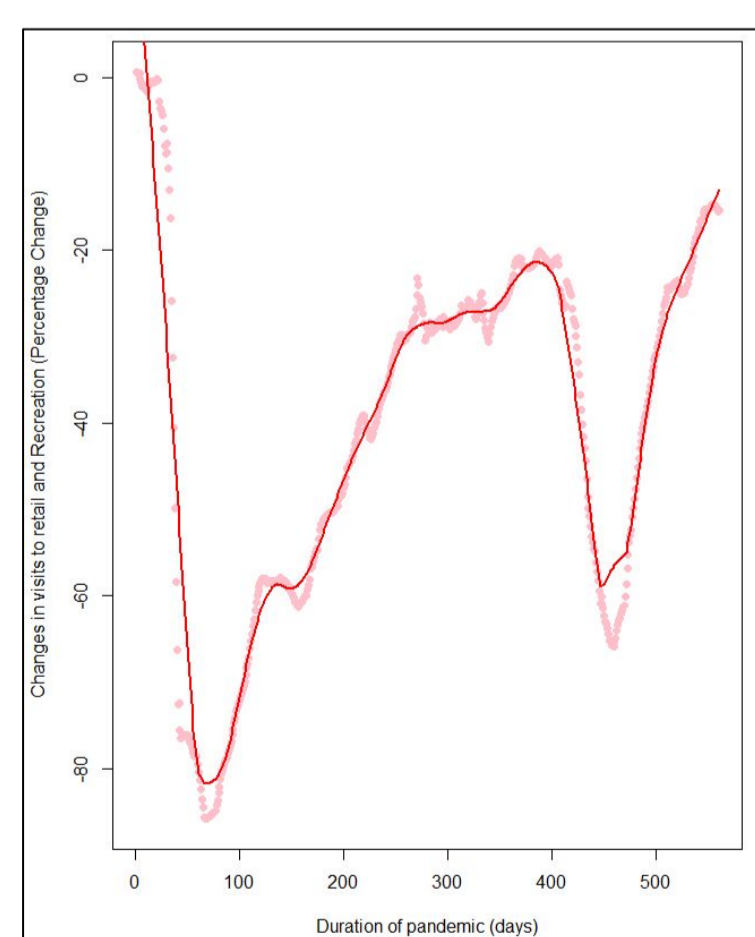


Figure 2 illustrates the changes in visits to retail and recreation during the onslaught of the pandemic in India, where lockdown measures and various other viral-containing methods were used. By looking at the graph, we can deduce that through the duration of the pandemic, there was a decrease in the initial drastic steep decline in recreational visits, which can be observed just before 100 days.

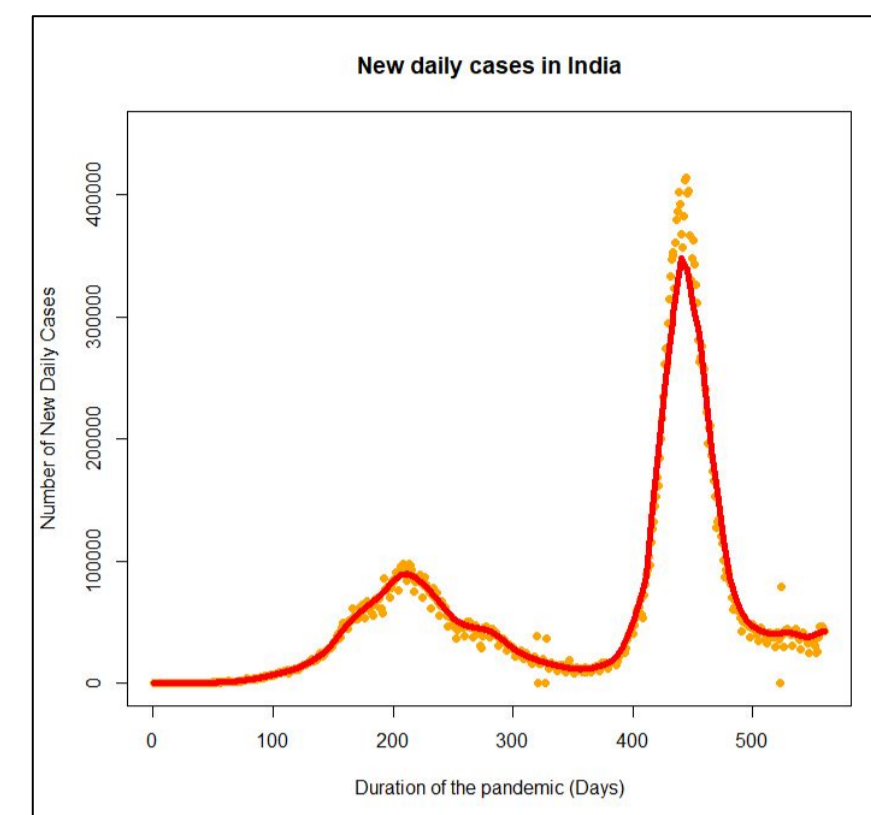


Figure 3 displays the number of new daily cases in India over the same period of 550 days.

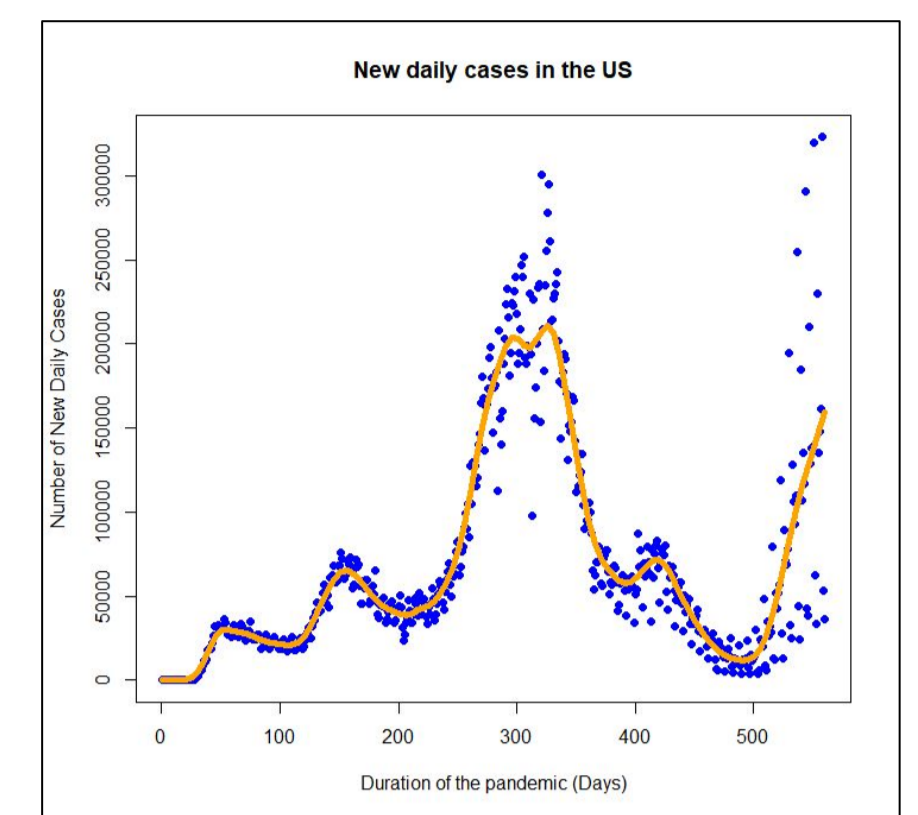


Figure 4 displays the number of new daily cases in the US over the same time period of 550 days.

Results

- Both countries experience high peaks at different times and in the case of the US, fluctuations in the number of new daily cases seem much more prevalent.
- They also maintained a higher mean and median new daily cases than india suggestion that over the time period performed worse than India at managing the spread of Covid.
- This could be attributed to many factors such as Inadequate tracing, poor response to isolating and quarantines, Slow and flawed testing and Confusing mask guidance⁴.
- This paled in comparison to the second peak at around day 430 in which 414188 cases were recorded in India on the 6/5/2021 which again far exceeds America's peak on the 27/08/2021 which reached 322934 new cases, implicating that India did not necessarily out perform the United States at monitoring covid transmission even when considering the differences in population size in the two countries.

Figure 5 The correlation between the percentage change of visitors to retail and recreation and the number of new daily cases is negative (-0.1577). This indicates a weak negative linear relationship between the variables. The p-value (0.0001789) suggests that the observed correlation is statistically significant, indicating that the relationship between them is unlikely to be due to chance, as we assumed.

```
> US OWID summary (New Daily cases)
  Min. 1st Qu. Median Mean 3rd Qu. Max.
    0  25203  47212  69280  79160 322934
*India OWID summary (New Daily cases)
  Min. 1st Qu. Median Mean 3rd Qu. Max.
    0  12122  36760  58464  62314 414188
Pearson's product-moment correlation
Data: indRetandRec and indOWID
t = -3.7725, df = 558, p-value = 0.0001789
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 -0.23745584 -0.07583762
sample estimates:
 cor
```

Analysis & conclusions

- With the implementations of Lockdown originally being pre-emptive to the surge of new daily cases, originally the sudden decrease in visits to retail and recreational areas were associated in both countries with a time period of low new daily cases, additionally in both countries the first few peaks of covid were associated with an increase in recreational mobility which in both cases but more particularly in India led to a rapid surge in cases once it increased to high followed by a decrease in cases that followed the the re-implementation of lockdown rules and a sudden drop in retail and recreational visits.
- Whilst the two data sets aren't necessarily linearly correlated and many other contextual factors do need to be considered, we could state that (whilst not the original way round we thought) recreational mobility does to a moderate extent have an effect on the new daily cases of covid.

References

1. "COVID-19: Google Mobility Trends." *Our World in Data*, ourworldindata.org/covid-google-mobility-trends.
2. "Difference between US and India Lockdown." *Business Insider*, www.businessinsider.in/india/news/difference-between-us-and-india-lockdown/articleshow/74846274.cms. Accessed 6 June 2023.
3. Wellcome. "The Many Ways Covid-19 Is Affecting Societies and Economies | News | Wellcome." *Wellcome.org*, 29 June 2021, wellcome.org/news/equality-global-poverty-how-covid-19-affecting-societies-and-economies.
4. Lewis, Tanya. "How the U.S. Pandemic Response Went Wrong—and What Went Right—during a Year of COVID." *Scientific American*, Scientific American, 11 Mar. 2021, www.scientificamerican.com/article/how-the-u-s-pandemic-response-went-wrong-and-what-went-right-during-a-year-of-covid/.