The Stay-at-home Order: Antidote or Poison to the Unemployment Problem?

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Research Background & Question

Since the outbreak of Covid-19, the economic downturn and rising unemployment rate have been a sore point in American society. After repeated trade-offs, many State Governments introduced the Stay-at-home Order in the great controversy. From the unemployment data, it seems that the Order has severely restricted people's mobility, work, and life, thus inhibiting consumption and causing a steep increase in the unemployment rate. However, in the long run, the Order is conducive to curbing the rapid growth of the new cases of Covid-19 and thus conducive to more rapid economic recovery and alleviating the unemployment problem in the long run.

Therefore, we would like to explore which one of these two seemingly contradictory views is right. Specifically, we want to evaluate the effect of the Stay-at-home Order and new cases on the unemployment rate in the US. Besides, we hope to see the trend of new cases and see which state executed the most effective Stay-at-home Order and the unemployment rate of which state was affected most by data visualization.

Research Method

1. Data Source and Acquisition

1) *Information of the Stay-at-home Order:* Only tables from the web can be found, so they need to be scraped manually and cleaned up and formatted uniformly.
2) *Unemployment Data:* Due to the limitations of Bureau of Labor Statistics, we could only parse the tables of the unemployment data by State and by Industry manually, then append more than 600 sub-tables from more than 600 links into the final 1-2 organized tables.
3) *Region Mobility Data:* Data come from Google Report
4) *New Covid-19 Cases:* Data come from CDC
5) *US GDP Data:* Data come from BEA

2. Regression Analysis

We used multiple regression methods to evaluate the effect of descending new cases on unemployment rate in 2020. We chose GDP, order time, and seasons as control variables.

1) *Process:* we built this model through 3 steps:

First, organize data of the variables. Based on the data scraping from the internet, we dropped the columns and values that we don't need and uniform the column

names. Here, in order not to make the coefficient of new cases too small, we multiply it by 10000. Thus, the result of the coefficient reflects the change in unemployment rate when there is a change of 10000 new cases

Second, filter the US data and merge the data into one regression data. We set states names and dates as the keys to joining each data.

Finally, regress the model and return the result. Find a statistic package and import it, using our data to create a regression model. Then show the result.

2) *Result:*

We can see a positive correlation between the 10,000 new cases and unemployment rate through the coefficient(0.044) of the 10,000 new cases. The effect of descending new cases is statistically significant at 0.05 level. The statistic interpretation is that we believe a decrease of 10000 new cases will cause a decrease of 0.044 in unemployment rate. That is, we do believe the decrease of new cases has a significant effect on alleviating the unemployment problem.

Besides, we can get from the results that the Stay-at-Home Order has a positive correlation with unemployment rate, which indicates that the Stay-at-Home may have negative effect on unemployment. However, the estimation is not statistically significant. That means there is no significant evidence that the policy exacerbates the economic downturn.

3) *Conclusion:*

Although intuitively or from the trend of the unemployment rate, one would think that there is a direct causal relationship between the Stay-at-home order and the spike in unemployment, their correlation is not significant, let alone causal. On the contrary, the decrease in new cases can be a good deterrent to the rise in unemployment.

Therefore, we believe the Stay-at-home policy does not have a significantly negative effect on unemployment problem and the decrease of new cases has a significant effect on alleviating the unemployment problem.

3. Data Visualization

We visualize our conclusions from different perspectives through three interactive plots.

1) *Trend of Region Mobility / New Cases / Unemployment in 2020*

2) *Spatial Difference of Region Mobility / New Cases by Day in 2020*

3) *Spatial Difference of Employees Change by Industry by Day in 2020*

Deficiency and Potential Improvements:

Due to time constraints, we do not judge the effectiveness of Stay-at-home Order in our regression analysis, which can be reflected by the change rate of Region mobility, but only use their execution dates as a variable. If we had more time, we should be drilling down to every state in the U.S., exploring the differences of the effectiveness of the Order and its effect on new cases and thus on the unemployment rate. Meanwhile, we should exclude the interference of correlation among the variables and include more possible omitted variables to get a more convincing policy analysis.