IAF603: Preparing Data For Analytics

Impact of various government responses and policies on confirmed cases/confirmed deaths/fatality ratio of Covid-19

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Abstract

This research will examine the implementation of public health policy of three first world countries in response to the COVID-19 pandemic and how each approach affected the confirmed cases/death cases/fatality ratio. The three countries that are targeted are South Korea, the United States, and Sweden. These three countries are known in the public health sector for their varying response to the pandemic with South Korea having a strict approach, United States having a moderate approach, and Sweden having a relaxed approach. (Soistmann & Trigonoplos, 2020) Through various time series models and linear regression models, this project aimed to see how effective the implementation of stringency index, government response index, health containment index, and economic support index are in curbing the virus among the three countries.

Introduction

The novel coronavirus COVID-19 is one of the most prominent infectious diseases during the 21st century; its transmission rate is incomparable to other viruses (Gates, 2020). After the World Health Organization declared the disease a pandemic on March 11, 2020, several countries had diverging ideas of how to curb and prevent the spread of the disease (Hale et al.,2020; Soistmann & Trigonoplos, 2020). COVID-19 created a unique environment where governments had to react quickly and implement various plans to stop the spread of the virus.Because government response varies across different countries, it is important to examine how impactful these variances are in preventing the spread of the virus. This information is likely to be useful for decision makers in the event of a future disease similar to the coronavirus. Many people believe that the likelihood of future pandemics is a matter of when, not if they will happen.

According to Ed Yong of the Atlantic,

> "Wild mammals harbor an estimated 40,000 unknown viruses, a quarter of which could conceivably jump into humans. Changing climate and shrinking habitats have brought those viruses into closer contact with people and livestock, while crowded cities and air travel hasten their spread."

In order to examine the variance in disease spread, this project will look at the quantitative measurement of public health policy regarding COVID-19 from around the world, and explore that effect on the recorded confirmed cases/death cases/fatality ratio. The method of more this analysis will be done through a regression test and model. Thus, this research will aim to examine to see if there's a relationship between public health policy on Covid-19 confirmed cases/death cases/fatality ratio.

Research Problem

What were the impacts of various public health policies on the spread and fatality rate of COVID-19?

Description of dataset

Government Response dataset: This dataset was obtained from the University of Oxford's github repository and quantitatively measures each country's responses to the pandemic (Hale et al., 2020). It contains 17 variables related to government responses, which further include: containment and closure, economic, and health. The University of Oxford combined these 17 variables to create indices of strength; these indexes are: overall government response, containment and health, economic support, and original stringency (which the University of Oxford classifies as the "strictness" of the government response). However, only StringencyIndex, GovernmentResponseIndex, ContaimentHealthIndex, and EconomicsupportIndex are variables targeted.

Confirmed/Confirmed death dataset: This dataset was obtained from John Hopkins github repository, which contained total confirmed cases and death cases on a day to day basis. The fatality ratio will be calculated based on the WHO formula of total death/total confirmed.

Data Processing

Because the data that were collected from each respective repository contain different formatting and data types there were some cleaning processes involved:

- Convert data type in each column into appropriate types
- Convert dates into appropriate format between the two data source so joining by dates can be done later through a database in sqlite

- In the government response dataset, the united states was the only country that has data for each states, thus we must aggregate all values by dates and take the average to fit the formatting with other countries
- Dropping of unneeded columns will be needed for both datasets
- Creation of new column that contains fatality ratio will be needed for the covid cases dataset
- Queries from sqlite will be used to retrieve a uniformed dataset and may target specific countries
- Data visualization techniques with simple regression and time series models will be explored through sci-kit learn, matplotlib, and seaborn packages

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