Analysis of the Social and Political Factors for Success/Failure in Tackling the Covid-19 Pandemic

## Introduction

What factors lead to the best or worst responses early on in the Covid–19 pandemic? was it wealth, who leads the country? Maybe how the country is run? Maybe it’s something out of their control? I have been given four hypotheses to test, they are:

* Richer Countries do better than Poorer countries.
* Countries led by women are more successful than those led by men.
* The success in dealing with the pandemic is related to the proportion of older people living in the country. 2
* Democratic countries are more successful than authoritarian countries.

to test and using data on an assortment of countries from around the world, I will test them and see how these factors affect their death toll per million inhabitants. The theories are as follows:

To test these theories, I have analysed2 data from various countries around the world and used a series of measurements and characteristics to determine what effects the a country’s success at tackling the COVID-19 pandemic.

## Justification:

First, I must justify my initial hypothesis, what I believe the data will show me using prior research from sources, like the news, academic papers etc. (to prove that I didn’t pull these statements out of thin air!).

1. Richer Countries do better than Poorer countries.

A country with a higher GDP per capita and lower extreme poverty levels would be more likely to have a robust healthcare system and greater investment into pandemic preparation.

1. Countries led by women are more successful than those led by men.

In the early days of the pandemic, the media highlighted the success of New Zealand Prime Minister Jacinda Ardern and other female led nations around the world at having lower death rates compared to their male counterparts.

* <https://www.theguardian.com/world/2020/aug/18/female-led-countries-handled-coronavirus-better-study-jacinda-ardern-angela-merkel>
* <https://www.ft.com/content/6b597385-ba51-413a-96bd-cb75d3446718>
* <https://www.forbes.com/sites/avivahwittenbergcox/2020/04/13/what-do-countries-with-the-best-coronavirus-reponses-have-in-common-women-leaders/>

1. The success in dealing with the pandemic is related to the proportion of older people living in the country.

The death rate of COVID-19 infected individuals is much higher in those aged above 60. In nations with a higher older population such as Japan, the government would be prepared to take stronger measures to protect the most vulnerable as they could expect more deaths in their population.

4.Democratic countries are more successful than authoritarian countries.

## The Results:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Name of the Relevant MCT | Value of the MCT | Name of the Relevant MD | Value of the MD |
| Total Deaths Per Million | Continuous | 140.40 | variance and/or standard deviation | 209.88 |
| GDP Per Capita | Continuous | 14910.69 | variance and/or standard deviation | 16071.77 |
| Female Head of Government | Nominal | 0 (Male) = 107 1 (Female) = 9 | proportion in each category | 0 (Male) = 0.92 1 (Female) = 0.08 |
| V-Dem Polyarchy | Continuous | 0.56 | variance and/or standard deviation | 0.22 |

#### Richer Countries do better than Poorer countries.

#### Countries led by women are more successful than those led by men.

#### The success in dealing with the pandemic is related to the proportion of older people living in the country.

#### Democratic countries are more successful than authoritarian countries.

## Conclusion:

## Code:

#### INSTALL LIBRARYS: ####  
library("ggplot2")  
library(tidyverse)  
library(tidyr)  
#### INPUT DATASET: ####  
dataset <- read.csv("https://raw.githubusercontent.com/QMUL-SPIR/Public\_files/master/datasets/Covid2020.csv")  
dataset\_omit <- read.csv("https://raw.githubusercontent.com/QMUL-SPIR/Public\_files/master/datasets/Covid2020.csv")  
dataset\_omit <- drop\_na(dataset\_omit, extreme\_poverty)  
head(dataset)  
  
#### EXAMINE THE RELEVENT VARIABLES: ####  
  
# Total Deaths Per Million:  
  
# MCT:  
   
tdm\_mean <- mean(dataset\_omit$total\_deaths\_per\_million)  
tdm\_mean  
  
# MD:  
  
sd(dataset\_omit$total\_deaths\_per\_million)  
  
# GDP Per Captia:  
# MCT:  
  
gdp\_per\_cap <- mean(dataset\_omit$gdp\_per\_capita)  
gdp\_per\_cap  
  
# MD:  
  
sd(dataset\_omit$gdp\_per\_capita)  
  
# Female Head of Government:   
  
# MCT:  
  
fem\_hog <- table(dataset\_omit$female\_HoG)  
fem\_hog  
  
# MD:  
  
fem\_hog\_dev <- prop.table(table(dataset\_omit$female\_HoG))  
fem\_hog\_dev  
  
# Aged 65 of Older:  
  
# MCT:  
  
old\_age <- mean(dataset\_omit$aged\_65\_older)  
old\_age  
  
# MD:  
  
sd(dataset\_omit$aged\_65\_older)  
  
# VDEM Polyarchy:  
  
# MCT:  
  
vdem <- mean(dataset\_omit$vdem\_polyarchy)  
vdem  
  
# MD:  
  
sd(dataset\_omit$vdem\_polyarchy)  
  
#### A TABLE WITH ALL THE VARIBALE AND MEASURE OF CENTRAL TENDENCY: ####  
  
# This will be added in Rmd  
  
#### A RELEVENT PLOT FOR EVERY VARIABLE ####  
  
# Total Deaths Per Million:  
gg\_total\_deaths\_per\_mil <- ggplot(dataset\_omit, aes(x = total\_deaths\_per\_million))  
gg\_total\_deaths\_per\_mil + geom\_histogram(binwidth = 10)  
  
# GDP Per Capita:  
gg\_gdp\_per\_cap <- ggplot(dataset\_omit, aes(x = gdp\_per\_capita))  
gg\_gdp\_per\_cap + geom\_histogram()  
  
# Female Head of Government:  
gg\_female\_HoG\_deaths <- ggplot(data = dataset\_omit, aes(x = female\_HoG)) +  
 geom\_histogram(binwidth = 20)  
  
geom\_text(size = 2,   
 colour = "red",   
 aes(label = location))  
  
gg\_female\_HoG\_deaths + facet\_wrap(~ female\_HoG)  
  
# Aged 65 or Older:  
gg\_aged\_65\_plus <- ggplot(data = dataset\_omit, aes(x = aged\_65\_older))  
gg\_aged\_65\_plus + geom\_histogram()  
  
# VDEM Polyarchy:  
gg\_vdem <- ggplot(data = dataset\_omit, aes(x = vdem\_polyarchy))  
gg\_vdem + geom\_histogram()  
  
#### RECODES FOR VARIBELS OF INTREST (BINARY)####  
  
# calculate median GDP Per Capita  
med\_gdp <- median(dataset\_omit$gdp\_per\_capita)  
  
# create new variable using case\_when()  
dataset\_omit <- dataset\_omit %>% # pipe the dataset  
 mutate( # create new variable  
 gdp\_var = # name the new variable  
 factor(case\_when(  
 gdp\_per\_capita > med\_gdp ~ 1,  
 gdp\_per\_capita <= med\_gdp ~ 0)))  
  
# calculate median 65 or Older  
med\_65\_plus <- median(dataset\_omit$aged\_65\_older)  
  
# create new variable using case\_when()  
dataset\_omit <- dataset\_omit %>% # pipe the dataset  
 mutate( # create new variable  
 sixty\_five\_var = # name the new variable  
 factor(case\_when(  
 aged\_65\_older > med\_65\_plus ~ 1,  
 aged\_65\_older <= med\_65\_plus ~ 0)))  
  
# calculate median vdem Polyarchy  
med\_vdem <- median(dataset\_omit$vdem\_polyarchy)  
  
# create new variable using case\_when()  
dataset\_omit <- dataset\_omit %>% # pipe the dataset  
 mutate( # create new variable  
 vdem\_var = # name the new variable  
 factor(case\_when(  
 vdem\_polyarchy > med\_vdem ~ 1,  
 vdem\_polyarchy <= med\_vdem ~ 0)))  
  
  
  
#### RELATIONSHP BETWEEN TOTAL COVID 19 DEATHS AND THE RELEVENT VARIABLES ####  
  
 #### CONDITIONAL DISTRIBUTION PLOTS ####  
  
# Distribution of Deaths per Million Conditional on GDP per Capita  
  
gdp\_dist <- ggplot(data = dataset\_omit, aes(total\_deaths\_per\_million, group = gdp\_var)) +   
 geom\_density(aes(colour = gdp\_var)) +  
 labs(x = "Total Deaths Per Million", # clearer x axis label  
 y = "Density", # clearer y axis label  
 title = "Distribution of Deaths per Million Conditional on GDP per Capita") + # title   
 scale\_color\_discrete(name = "GDP Per Capita", # change legend title  
 labels = c("Below or equal median", # change legend labels  
 "Above median")) +   
 theme\_minimal()  
  
gdp\_dist  
  
# Distribution of Deaths per Million Conditional on median 65 or Older  
  
sixtyfive\_dist <- ggplot(data = dataset\_omit, aes(aged\_65\_older, group = sixty\_five\_var)) +   
 geom\_density(aes(colour = sixty\_five\_var)) +  
 labs(x = "Total Deaths Per Million", # clearer x axis label  
 y = "Density", # clearer y axis label  
 title = "Distribution of Deaths per Million Conditional on the Estimate Share of the Population aged 65 or Older") + # title   
 scale\_color\_discrete(name = "Over aged 65", # change legend title  
 labels = c("Below or equal median", # change legend labels  
 "Above median")) +   
 theme\_minimal()  
  
sixtyfive\_dist  
  
# Distribution of Deaths per Million Conditional on median vdem Polyarchy  
  
vdem\_dist <- ggplot(data = dataset\_omit, aes(vdem\_polyarchy, group = vdem\_var)) +   
 geom\_density(aes(colour = vdem\_var)) +  
 labs(x = "Total Deaths Per Million", # clearer x axis label  
 y = "Density", # clearer y axis label  
 title = "Distribution of Deaths per Million Conditional on the Level of Liberal Democracy") + # title   
 scale\_color\_discrete(name = "Level of Liberal Democracy", # change legend title  
 labels = c("Below or equal median", # change legend labels  
 "Above median")) +   
 theme\_minimal()  
  
vdem\_dist  
  
 #### TWO SAMPLE T-TESTS ####  
  
# T-Test: GDP  
  
t.test(vdem\_polyarchy ~ vdem\_var, # formula y ~ x  
 data = dataset\_omit, # dataset where the variables are found  
 mu = 0, # difference under the null hypothesis  
 alt = "two.sided", # two sided test (difference in means could be smaller or larger than 0)  
 conf = 0.95) # confidence interval  
  
# T-Test: Aged 65 Plus  
  
t.test(aged\_65\_older ~ sixty\_five\_var, # formula y ~ x  
 data = dataset\_omit, # dataset where the variables are found  
 mu = 0, # difference under the null hypothesis  
 alt = "two.sided", # two sided test (difference in means could be smaller or larger than 0)  
 conf = 0.95) # confidence interval  
  
# T-Test: VDEM Polyarchy  
  
t.test(vdem\_polyarchy ~ vdem\_var, # formula y ~ x  
 data = dataset\_omit, # dataset where the variables are found  
 mu = 0, # difference under the null hypothesis  
 alt = "two.sided", # two sided test (difference in means could be smaller or larger than 0)  
 conf = 0.95) # confidence interval