

**TASK**

**Exploratory Data Analysis on the COVID-19 Financial Policy Response Data Set**

[](http://www.hyperiondev.com/portal/)

**Introduction**

The aim was to create an overview of the various responses to the COVID-19 epidemic as well as a brief look at the overall economic outlook through the lens of GDP. The project utilized 2 sperate datasets as they provided insights and could be correlated in the report. The first dataset dealt with the financial policy responses to the COVID-19 virus. The data set tracks measure that governments have taken to support their financial sector following the spread of the COVID-19 respiratory virus. Policies are classified according four main categories: liquidity/funding, financial institutions, financial markets and payments systems (Level 1 policy). Each category has different sub-categories (Level 2 policy measures. There were 9 separate columns each containing relevant data for the analysis. The second dataset was regarding GDP growth % around the world. The Dataset included growth from 2017-2019 as well as predictions based on the current economic conditions for 2020 and 2021.

**DATA CLEANING**

**Financial Policy Dataset**

**Missing Data**

The main issue was with the level 2 policy measures. On further inspection of these values it seems the data all falls within the level 1 policy measure involving the Banking sector. The summary of data in the excel sheet provided did not provide further explanation of these missing values. On inspection of the description, the various policy measure seemed case specific and could not be correctly identified. Therefore, the null values were changed to 'other' so as not to lose the data and the presence of a detail column allowed further exploration of these instances. The remaining null values regard dates of entry. Missing dates are down to entry error and missing information at the time of entry. Therefore, it would be hard to locate the missing information, so the specific rows were dropped instead as they make up a small % of the data fame.

**Data Cleaning**

After dealing with missing data in the dataset, the consistency of entries was checked specifically looking at the data in 'Country’, ‘Level 1 policy measure' and 'Level 2 policy measure' was checked for any mistakes. There were inconsistencies with capital letters that split some of the same measures, and these were corrected for. The dataset was now complete for analysis

**GDP Dataset**

**Missing Data**

The dataset contained many columns relating to years that were completely empty that could be dropped initially. The rest of the columns contained complete information and therefore the set did not require any statistical input.

**Data Cleaning**

The columns 'Indicator Name' and 'Indicator Code' were constant for each entry and would not be relevant to the analysis so the columns were dropped. In terms of consistency as well with the Financial policy response dataset, the countries had to be consistent with each other. The GDP set had indexes within the country columns and they would not be relevant to the country specific first dataset. Therefore, these were dropped as well. The format allowed for the first set of visualizations which utilized a world map overview of the data. After these were completed, the set was manipulated from a long format to a wide format to better suited the next set of visualizations. The year column was also converted to an integer as this allowed the column to be plotted sequentially.

DATA STORIES AND VISUALIZATIONS

Incorporating a world map visualization indicates an overall view of GDP growth. The visualizations are specific to the measured growth in 2019 and the estimated growth in 2020 and 2021

**World Map**

2019 - The overall outlook of growth amongst respective countries was scattered. China continued to see growth at 6% but patterns in Africa and South America show small growth or negative rates in some instances

2020 - As a result of the global effects of COVID-19, the estimate for 2020 is overwhelmingly negative as countries are forced to adapt to forced slowdowns of their economies. As opposed to 2019, all countries fall to rates around and well below a positive growth %

2021 - As a result of the previous year, economies are expected to recover and return to similar growth rate as 2019. However, due to the loss in 2019, some countries would be hoping to double growth in attempts to return to previous rates

**GDP Line Graph**

The plot reveals the trend holds true as every country is set to fall considerably in 2020. While a recovery is estimated, a large majority of the countries seem to be struggling to return to levels experienced in 2019

**Pie Charts of Financial Responses**

With the effect of COVID-19 globally, it is interesting to look into the response financially by different countries. The data set tracks measure that governments have taken to support their financial sector following the spread of the COVID-19 respiratory virus. Policies are classified according four main categories: liquidity/funding, financial institutions, financial markets and payments systems.

Initially we wanted to see what the general reaction has been policy wise to the virus, which countries have been most active and what policy has been implemented. The initial outlook has been a response in the banking sector which makes up 52.8% of the policy implementation. Banking Sector: Within this sector, almost 2/3 of the decisions regard prudential banking decisions. Liquidity/funding: The majority focuses on liquidity, while a third of the decisions have effect policy rate. Financial markets: The focus is on Market functioning. Payments systems: The cases seem more specific to each individual instance but 40% of these decisions regard, 'Promoting and ensuring availability of digital payment mechanisms.'

**Frequency of Policy Implementation**

The dataset allows us to also see which countries have been the most active in terms of policy implementation. The results show India as the most active in terms of policy comparative to the origin country of the virus China, which has half the number of instances.

**BRICS Analysis**

In order to look at specific responses in the data frame, the countries can be narrowed further for an easier comparison. As it incorporates a good range of countries who have all been affected by the virus, the BRICS model will be used. (Brazil, Russia, India, China, South Africa) The United States will also be included as it is seen as the financial world leader.

Plotting GDP once again reveals the prediction for each economy.

* Brazil: Brazil falls the largest % but recovers to a higher level in 2021
* China: Does not experience negative growth and recovers considerably
* India: Continues on a negative trend and does not fully recover in 2021
* Russia: Experiences negative growth but recovers to similar level in 2021
* South Africa: Experiences significant negative growth but recovers past 2019 levels
* United States: Considerable negative growth but has greatest recovery

With each individual GDP growth figure in mind, the specific responses are now considered. This is also measure alongside a timeline of when the countries are implementing these issues to show when each individual country reacted.

Brazils response has focused on prudential policy making and liquidity. After an initial surge in policy in March as a response to the first look at the virus, recurring policy surrounding liquidity seems to be a common theme.

Russia reaction also shows a similar theme with prudential policy in the banking sector dominating the response. However, there has also been a notable effort to support borrowers as well. Russia seemed to react more measurably in the initial phase and concurrent with the viruses lingering effect, saw a surge in decisions over April and May. As of June, the focus seems to have turned to NBFI.

India was revealed earlier as the most active issuer of new policy. The timeline shows this them as there is a constant stream of different policies issued. India seems to have taken a different approach as there is a split between the banking sector, liquidity and financial markets. In comparison to other countries it will be interesting to see whether India’s active role has a greater effect on the economy.

China, in contrast to India has a far more focused approach. Initially, much like the other nations there is a large amount of policy issued in mid-March but unlike the other nations, less reaction over the course of the next few months. This may be due to the fact that the virus was present far earlier and China was able to deal with it effectively. This may be model for other countries to follow and shows if the virus is managed effectively how need for policy is less frequent. Looking at Chinas GDP growth levels this may explain the high rise expected in 2021

South Africa's response shows a large amount of activity in March and April. Again, the trend seems to be consistent as the presence of the virus in some countries was enough to trigger the global response. South Africa follows the general trend with a focus on prudential policy throughout this time.

The United States has had three separate batches of bulk policy implementation, seemingly Mid-March, beginning and end of April. The emphasis however has been on liquidity followed by prudential policy.

**THIS REPORT WAS WRITTEN BY: Andrew Earle**

