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ECONOMIC ANALYSIS OF 9 MAJOR ECONOMIES (1997-2020)

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1. Abstract

This is a critical analysis of the economic data of 9 major economies of the world, namely: The United States of America, The United Kingdom, India, Japan, Hong Kong, China, Germany, France and Spain. My aim is to compare the economic trends that persist, how various parameters effect each other and the effect of the 2008 and 2020 crisis on these economies.

2. Introduction

The most common/comprehensive tool used to measure an economies size/success is GDP. GDP encompasses all the economic output data of a country and shows us how a country has performed economically .But, there are also other factors, such as Inflation Rate and Unemployment that do effect a country's economic output and are a good indicator of a countries current financial and economic position. We will analyse these factors in this paper.

3. Data Set

This data is reflective of 10 parameters over 40 years (1980-2020), which are explained below. Chinese economic data is for the most part not available pre 1997, so we have filtered all the data post 1997.

https: //www.kaggle.com/code/algoholiccreations/preliminary-eda-on-economic-dataset-1980-2020/notebook

4. Descriptive Statistics

- Index Price - this is the stock market price (at the end of each year) of every country's most traded stock index.
- Inflation Rate - this shows us the effective change in prices in a country relative to the previous year.
- Gdp Growth - this shows us the effective change in a countrys GDP relative to the previous year.
- Per Capita - the average income per person by country, filtered by year.
- Unemployment - the rate of unemployment in a country in a particular year.
- Manufacturing - the net output of goods produced by a country in a year.
- Trade Balance - the difference between exports and imports, positive values of this are usually regarded a good sign of economic prosperity.

5.1 - How is the growth/decline in manufacturing correlated to the growth/decline of the stock market idex by country?

Manufacturing output of a country tells us how industrialised and self-sufficient a country is. Here, we will try to assess if manufacturing output has any correlation with the stock market and which countries show the most correlation.

Figure 1.1 − Stock Market Index by Country (1997−2004)

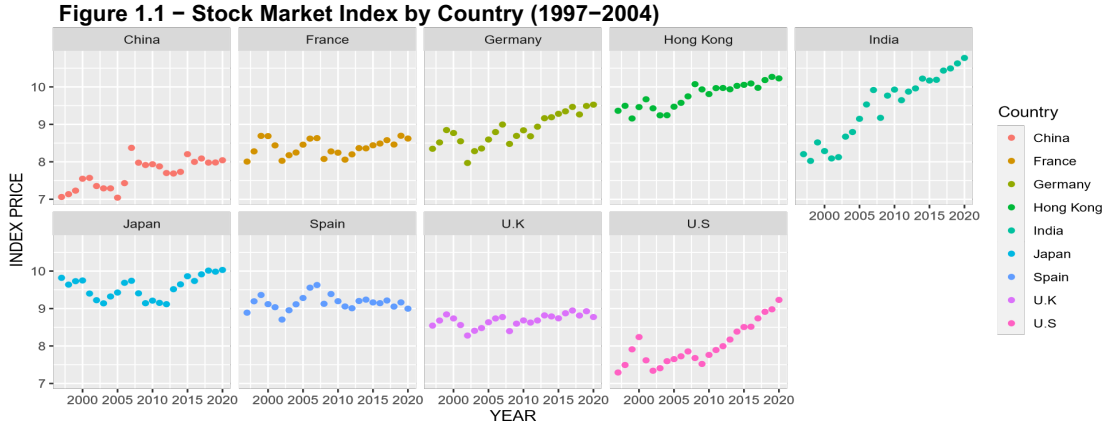


Figure 1.1 - shows us a visual representation of stock market performance from 1997-2020.

Figure 1.2 − Manufacturing Output by Country (1997−2004)

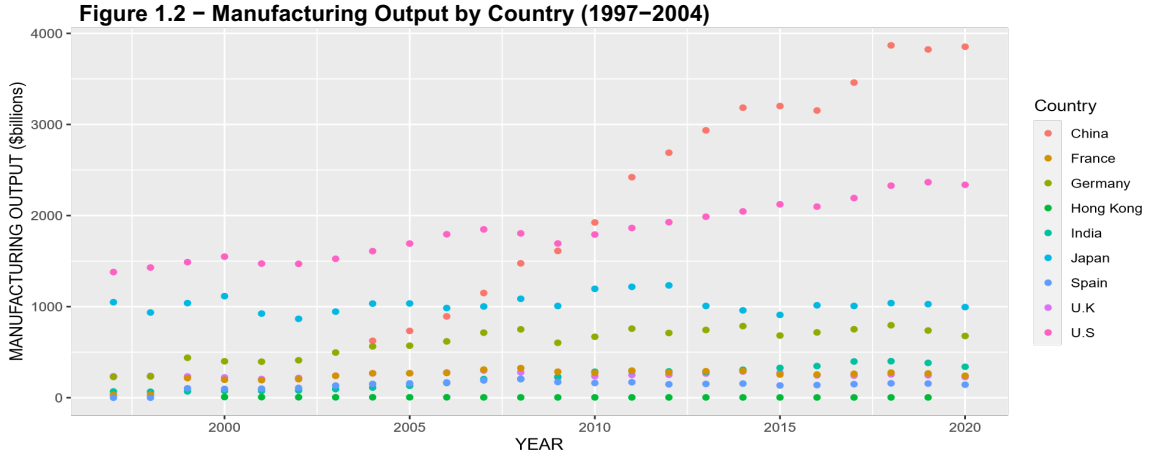


Figure 1.2 - It is key to note the exponential rise of China's manufacturing. During the 2008 crisis, China decided to be economically independent. 2009 was the year China's manufacturing overtook the U.S as largest manufacturer in the world. Only 3 countries have ever had a manufacturing output greater than $1Trillion and they are - U.S.A, Japan and China. America and China are large countries in terms of population, Japan impresses us with its output as it has a small and ageing population.

Table 1: Correlation - Index Price and Manufacturing Output.

Country	Correlation
U.S	0.8647777
U.K	0.173107
India	0.9179667
Japan	-0.2462266
Hong Kong	-0.7290299
China	0.4199009
Germany	0.6284191
France	0.1589861
Spain	0.3710352

Table 1 – Manufacturing is associated with China, but it is fascinating to see India and the U.S having the largest correlations. The Indian economy exponentially grew after the LPG reforms in 1992, this is reflected in their high GDP growth and gradual increase in manufacturing output. The U.S lost the title of the largest manufacturing country to China mainly because of high labour costs. Nevertheless, the U.S market and its manufacturing have grown equally, at a steady pace.

5.2 - Is a countries GDP growth affected by Inflation Rate and Trade Balance ?

Inflation Rate of a country tells us about the rising prices of various commodities and sectors in a country, a minimal inflation rate is considered healthy. Trade Balance shows us if a country is a net exporter or a net importer. Here, we are going to asses these 2 variables and see if they have any or no effect on a country's GDP growth.

Figure 2.1 – GDP by Country (1997–2004)

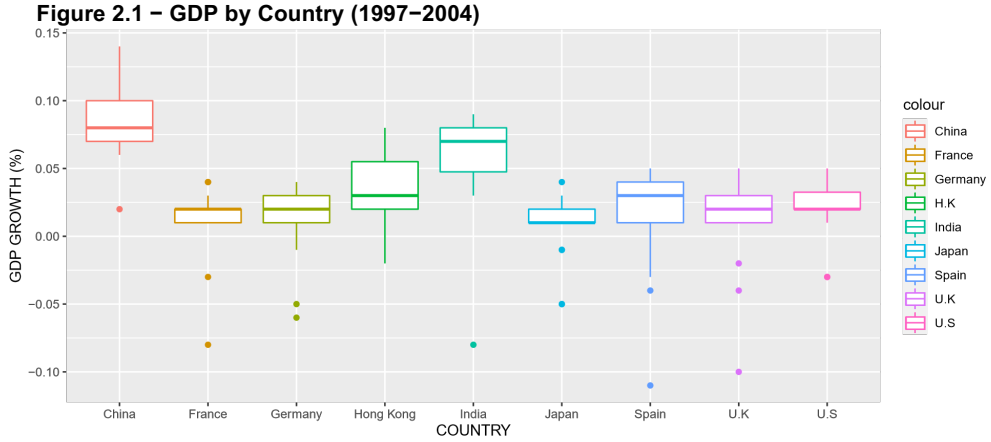
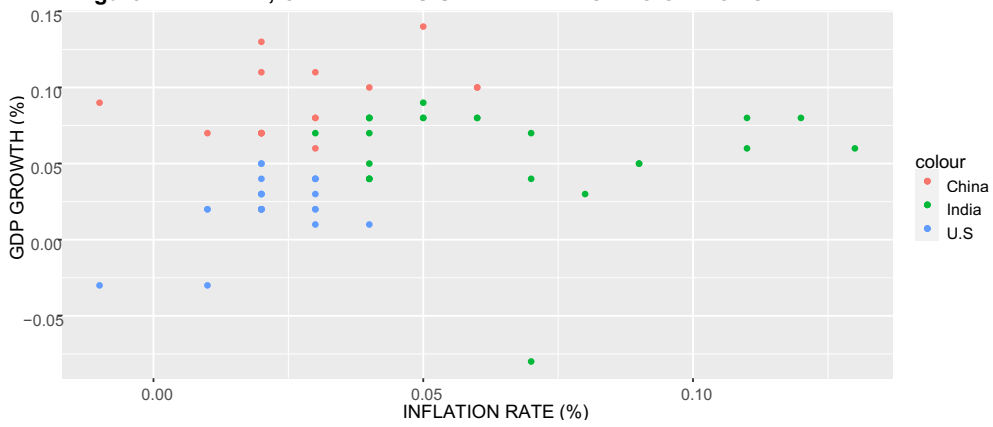


Figure 2.1 - Most of the Asian Economies have a higher growth rate compared to the Western countries, due to an economic boom in the last 30 years.

We are going to concentrate on 3 economies in particular for this relation, namely, China, India and the U.S.A. The reason for this will be explained below.

Figure 2.2 – INDIA, CHINA AND U.S.A – INFLATION vs GDP GROWTH



In Figure 2.2 we can observe from this graph that **China has High Economic Growth and Low Inflation**, which are both great factors for an economy. **India has moderately High Economic growth and a High Inflation rate** while the **U.S has minimal Economic Growth but moderately Low Inflation**.

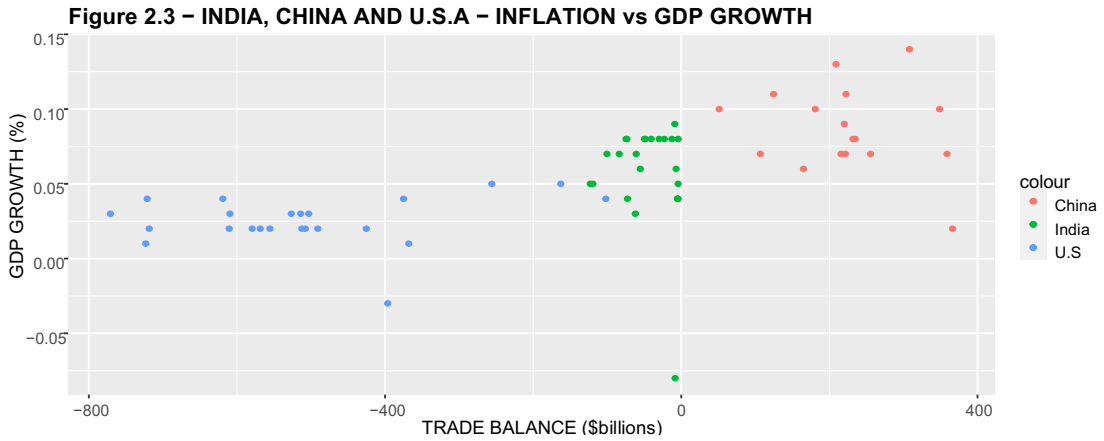


Figure 2.3 - shows us the graph of Trade balance over GDP growth. It is clear here that China is a massive net exporter India is a relatively low net importer and the U.S is a large net importer.

Using Linear Regression to see Trade Balance and Inflation are linearly linked to GDP growth -

$$Y_t = \beta_0 + \beta_i X_i + u_i$$

US Data:

(Intercept)	Inflation_Rate
0.000730769	1.026923077
(Intercept)	**Trade_Balance**
3.54E-02	2.02E-05

The U.S is the only country which constantly has a negative trade balance. But, it is not a factor in economic growth for the U.S. Inflation Rate of the U.S does have an impact on GDP growth, both the variables linearly influence each other.

India Data:

(Intercept)	Inflation_Rate
0.06260101	-0.06565657
(Intercept)	**Trade_Balance**
0.052404944	-0.000132186

India has a relatively small but positive trade balance. Both Trade Balance and inflation are not linearly related to GDP growth. India is growing at a healthy GDP growth despite high inflation.

China Data:

(Intercept)	Inflation_Rate
0.07035971	0.58273381
(Intercept)	**Trade_Balance**
1.02E-01	-6.94E-05

China has the biggest Trade Balance surplus for an country.But, both Inflation and Trade Balance are not linearly related to GDP growth .

5.3 - Does high PerCapita mean low unemployment?

Figure 3.1 – PER CAPITA vs UNEMPLOYMENT

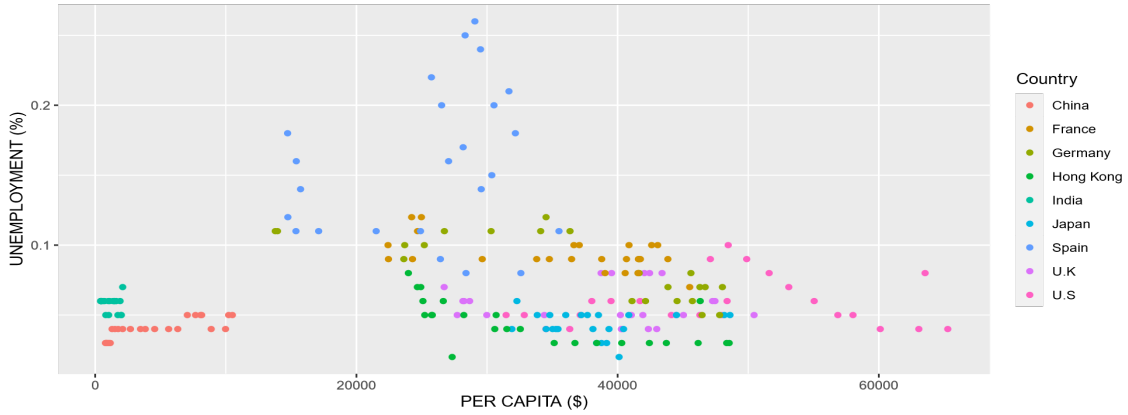
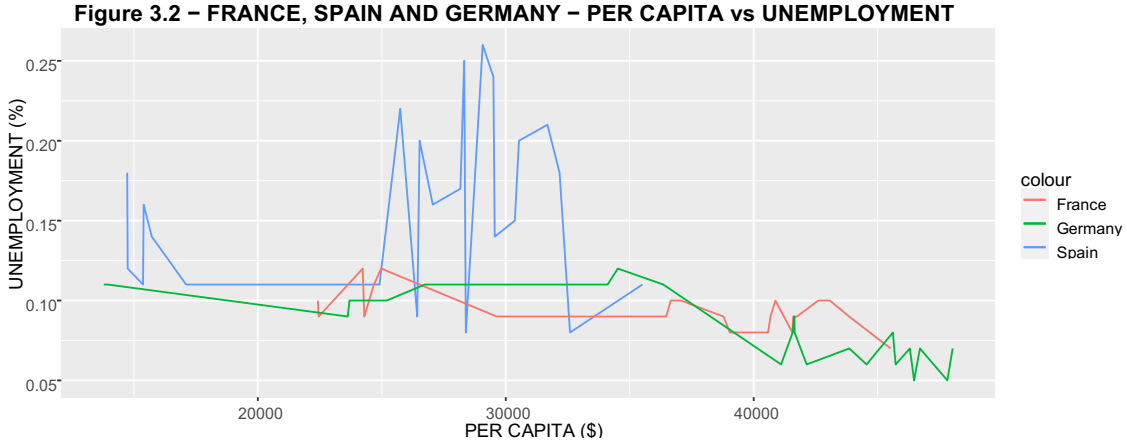


Figure 3.1 depicts a graph of Per Capita over Unemployment. Iis clear that Spain's Unemployment is relatively high having a median Per Capita income comparable to France and Germany. Hence, we will compare these 3 countries to get a better understanding of the data.

The below Graph compares Spain, France and Germany's Per Capita to its Unemployment :

Figure 3.2 – FRANCE, SPAIN AND GERMANY – PER CAPITA vs UNEMPLOYMENT



In Figure 3.2 we can clearly see that Unemployment and Per Capita are not always related, most of the western economies have a high per capita but a low unemployment. And the Asian economies of India and China have a low Per Capita and a low unemployment rate. Spain is the only exception where it has a moderately high per capita but a high unemployment rate.

So, High Per Capita does not always mean Low Unemployment.

5.4 - The 2008 Global recession and the 2020 Covid scare had an adverse effect on economies, which economies were the worst affected :

A - Data by country and Inflation rate difference (2008-09 & 2019-2020)

Table 2: Impact of 2008 Recession & 2019 Pandemic on Inflation.

Country	2008-2009 Inflation Difference	2019-2020 Inflation Difference
U.S	0.05	0.01
U.K	0.02	0.01
India	**-0.03**	**-0.03**
Japan	0.02	0.00
Hong Kong	0.03	**0.03**
China	**0.07**	0.01
Germany	0.03	0.00
France	0.03	0.01
Spain	0.04	0.01

From Table 2 we can conclude that during both 2008 and 2020, India's Inflation peaked more than any other country in the list. And the East Asian economies of China and Honk Kong were the least effected in 2008 and 2020 respectively.

B - Data by country and Index Price difference (2008-09 & 2019-2020)

Table 3: Impact of 2008 Recession & 2019 Pandemic on Inflation.

Country	08-09(Index Change)	08-09(% Change)	19-20(Change)	19-20(%Change)
U.S	-316.27	-14.630953	2261.15	**28.476669**
U.K	978.71	22.072000	-1081.92	-14.344430
India	7817.50	**81.032951**	6497.59	15.750305
Japan	-2819.24	**-23.174343**	1007.79	4.644787
Hong Kong	-3093.73	-13.053465	-1153.51	-4.004667
China	-175.89	-6.038312	180.84	6.174247
Germany	1147.23	23.849944	469.77	3.545699
France	718.36	22.323390	-426.65	-7.136931
Spain	2744.20	29.841884	-1475.50	**-15.451556**

From Table 3 we can conclude that Japanese and Spanish markets were the most effected in 2008 and 2020 respectively . While India experienced the most growth post the 2008 financial crisis and the U.S post the initial pandemic crash.

6 - Discussion

The goal of this analysis was to ascertain economic trends and the effect 2 crisis has on the 9 economies. We ascertained that:

A) India and the U.S' GDP was the most correlated to its Manufacturing output.
B) The U.S is the only country is linearly tied to its Inflation Rate. Trade Balance is not linearly related to any countrys GDP Growth.
C) High PerCapita does not always mean Low Unemployment
D) Country Affected the most – (**Inflation wise**) : **2008 & 2020** – **India**. Country Affected the most (**Stock Market wise**) : **2008 - Japan, 2020 – Spain**