

## **Impact on GDP and the stock market during pandemics or epidemics of 21<sup>st</sup> century**

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## Abstract

In this article, we present the effect on GDP growth rate during key major pandemics in the twenty-first century. Ebola, cholera, and the most dangerous pandemic, Covid-19, are all fatal pandemics. It was said that Coronavirus started spreading from Wuhan, China. The virus then afflicted the entire human race worldwide. The major goal of this paper is to compare the most catastrophic pandemic to another pandemic in terms of its effect on GDP. This study also examined the impact of the pandemic on the stock market. We offer a descriptive examination of economic impact over the course of 19 years for different countries.

*Subject Classification:* (2010) 68-XX, 91B84.

*Keywords:* *Coronavirus, Ebola, Cholera, GDP growth, Stock market, Tourism, Economic.*

## 1. Introduction

GDP stands for Gross Domestic Product and it indicates the total monetary worth of all final goods and services produced in a country over a given time period.

During a time period, inside a country, GDP is the total monetary or market worth of all finished products and services produced. It serves like a comprehensive scorecard of a country's economic health. Entire domestic production is measured by it. Although GDP is normally estimated on an annual basis, it is also calculated quarterly on occasions. In US, the government produces an annualized GDP estimate for each fiscal quarter and calendar year. The various data sets, in this study are presented in real terms. It means the data has been adjusted for price changes.

GDP has a few components only. Consumption, fixed investment, inventory change, government purchases, and net exports are the five major components of GDP. Historically, the average growth rate of the US economy has ranged between 2.5 and 3.0 percent. GDP calculates an economy's total production by summing total consumption, investment, government spending, and net exports. GDP is thus regarded as a good approximation of income for a whole economy in a given era. However, a country's real GDP might fall as a result of changes in demand, rising interest rates, government expenditure cuts, and other causes. Growth is negative if GDP falls from one quarter to the next. It frequently brings with it lower salaries, reduced expenditure, and job losses. When the economy has two consecutive quarters of negative growth, it is said to be in recession. As a business owner, you need to understand how this figure changes over time so you can alter your sales methods accordingly.

It raises national income and allows for an increase in living standards. When it does not increase, for example, because of a lack of customer demand, it lowers the average income of the enterprises. This entire cycle has the effect of lowering the country's per capita GDP.

Economic growth at a rapid pace. This implies an increase in economic activity, which will result in greater average earnings, higher output, and increased spending, low and steady inflation.

GDP is significant. It provides the information on the size and the performance of an economy. The rate of increase in real GDP is frequently used as an indication of the overall health of the economy. A growth in GDP is taken as proof that the economy is performing well.

The Sources of Economic Growths are:

- Natural Elements - More acreage and raw supplies should result in an outward shift of PPF, increasing potential growth.
- The Human Factor - The amount of labor available is a factor that leads to growth.
- Financial Capital.
- The Institutional Factor.

Many aspects of society rely on economics. It is the right and potential to raise living standards and a better place. Economics, like science, has the potential to both increase and degrade living conditions. It is largely determined by societal priorities and what we think most significant.

Prime indicators of Covid-19's impact on the Chinese economy are less promising than expected. China's exports declined 17.2% between January and February, vehicle sales fell by 80%, and surveys of the country's manufacturing and services sectors reached record lows in February. Official data indicate that economic activity has generally decreased. Low pollution levels and decreased shipping traffic were projected, among other informal indicators. As a result, experts' estimates of China's growth have been sharply revised lower, and many are now predicting that first-quarter GDP will decrease, marking the country's first recession since quarterly numbers started to be published in 1992. Moreover, the spread of Covid-19 will strain China's economic recovery since demand from other countries will decline while they battle the virus<sup>1</sup>.

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<sup>1</sup> <https://www.coursehero.com/file/94183630/Covid-19-effect-onenvironmentdocx/>

The estimated values of the global impact also vary. For instance, the organization for Economic Cooperation and Development anticipated that Covid-19 will reduce global GDP growth by half a percentage point in 2020 (from 2.9 to 2.4 percent), while Bloomberg Economics cautions that in the worst-case pandemic scenario, full-year GDP growth might be zero [12].

**Bangladesh:** The government proclaimed a “lockdown” across the country from March 23<sup>rd</sup> to May 30<sup>th</sup>, 2020, and planned some required procedures to raise awareness in order to keep this sickness at bay. The Government of Bangladesh announced a 10-day closure from 26<sup>th</sup> March to 4<sup>th</sup> April 2020, which was eventually extended to 30<sup>th</sup> May 2020. After two days of shutdown, public transportation restarted in all urban regions of the nation, on 7<sup>th</sup> April 2020.

Markets and businesses officially resumed country-wide on April 9<sup>th</sup>, but many were informally open earlier in the week. The government stated on April 12 that commercial banks will be closed from 14<sup>th</sup> to 21<sup>st</sup> April, with the exception of foreign exchange institutions near port areas. **The lockdown period expired on April 28<sup>th</sup>, emphasizing livelihoods above what has been a minor sickness in Bangladesh. Bangladesh entered another seven-day countrywide lockdown on July 1<sup>st</sup>, 2021. The army and Border Guard Bangladesh were sent to implement the regulations, and all offices and stores were closed, with only local food markets permitted to open for a few hours every day. The shutdown was previously scheduled to begin on June 28<sup>th</sup>, prompting a mass migration of people from Dhaka [23].**

Despite the continued high number of daily illnesses and deaths, the government indicated that restrictions will be relaxed from 15<sup>th</sup> to 23<sup>rd</sup> July to facilitate Eid-ul-Azha celebrations and economic activities. However, tight controls would be reinstated from July 23 through midnight on August 5. In the run-up to Eid, there were large crowds as thousands of people traveled from cities, with trains and buses unable to meet operational capacity constraints.

**India:** On 30<sup>th</sup> January 2020, the first instances of COVID-19 in India were recorded in three locations in Kerala<sup>2</sup>, among three Indian medical students who had returned from Wuhan, the pandemic’s epicenter. Lockdowns were declared in Kerala on March 23 and throughout the country on March 25.

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2 “Kerala confirmed first novel coronavirus case in India”. India Today. 30 January 2020. Retrieved: <https://www.indiatoday.in/india/story/kerala-reports-first-confirmed-novel-coronavirus-case-in-india-1641593-2020-01-30>

*1st wave<sup>3</sup>:*

On April 16, districts were classed as “Red,” “Orange,” or “Green” zones using a color-coded tier system based on occurrence rates. All of India’s main cities were designated as Red Zones. Beginning on April 20, agricultural enterprises and stores selling farming supplies, as well as public works projects, freight transport, and banks and government facilities providing benefits, were permitted to reopen. Phases 3 and 4 of the lockdown have been prolonged till May 31, with gradual relaxations and modifications. On June 8, the nation began a gradual relaxation of restrictions [21, 22].

*2nd wave<sup>3</sup>:*

Curfew restrictions and lockdown measures were implemented in Maharashtra cities such as Amravati and Nagpur in late February and early to mid-March 2021. Maharashtra enforced a weekend lockdown and a night curfew, among other restrictions, on April 4. By early to mid-May, 35 of India’s 36 states and union territories had implemented both state-wide and regional restrictions. There has been no countrywide lockdown in India during the second wave of pandemics [13]. Moreover, the number of cases were going underreported<sup>4</sup>.

*China<sup>3</sup>:*

After a female tested positive for COVID-19 on April 2, 2020, the authorities imposed a Hubei-style lockdown in Jia County, Henan. The cities of Shijiazhuang and Xingtai, with a combined population of 19 million people, were placed under lockdown on January 9, 2021.

However, on January 15, 2021, the city of Langfang in Hebei was placed under lockdown. Due to an epidemic in Guangdong province, officials closed down Liwen district in Guangzhou and Yantian port in Shenzhen on May 30, 2021.

**ITALY:** The government imposed a lockdown on eleven municipalities in Lombardy and Veneto on February 22, 2020. On March 7, the government

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3 <https://www.nytimes.com/2020/03/25/world/asia/india-lockdown-coronavirus.html>

4 Yeung, Jessie (28 April 2021). “As Covid sweeps India, experts say cases and deaths are going unreported”. CNN. Retrieved: <https://edition.cnn.com/2021/04/27/india/india-covid-underreporting-intl-hnk-dst/index.html>

announced plans to expand the restricted zone to all of Lombardy, as well as fourteen additional provinces in Veneto, Emilia-Romagna, Marche, and Piedmont, until April 3. Prime Minister Conte said on March 9 that the lockdown will be extended to the entire country.

An epidemic is a disease that crosses international borders, typically impacting individuals all over the world. An illness or disease is not considered a plague just because it is widespread or kills a large number of people. It must be diseased as well [15]. Cancer, for example, kills many people but is not called a pandemic since it is not communicable or infectious.

Here's a look at three different epidemics. Cholera, Ebola, and Coronavirus are the culprits. Seven cholera cases were reported 200 years ago, but in 2010, Cholera was the most lethal of them ever. Following a nine-year cholera pandemic in Haiti that claimed the lives of over 10,000 individuals.

The Ebola virus, commonly known as the Ebola Virus Disease, is a hemorrhagic virus that affects humans and other children. The illness kills between 25 and 90 percent of people affected, with an average of 50 percent. Deaths are most commonly caused by shock as a result of fluid loss and occur between six and 16 days following the beginning of the initial symptoms. The illness initially occurred in two outbreaks in 1976.

Simultaneously: one in Nzara and one in Yambuku, a community near the Ebola River, which gave rise to the disease's name. Ebola outbreaks occur on a sporadic basis in subtropical sub-Saharan Africa. According to the World Health Organization, 24 Ebola outbreaks resulting in 2,387 cases and 1,590 fatalities between 1976 and 2012. The pandemic in West Africa from December 2013 to January 2016 had the most Ebola cases and deaths, with 28,646 cases and 11,323 deaths. On March 29, 2016, it was declared that there would be no longer an emergency. In Guinea, Liberia, and Sierra Leone, 28,616 EVD cases and 11,310 fatalities were reported. The Ebola outbreak had a financial impact in Guinea, Liberia, and Sierra Leone. According to World Bank 3 predictions from 2014, an estimated \$2.2 billion was lost in the gross domestic product (GDP) of four of the three nations in 2015.

The Ebola virus has had a direct impact on the agriculture industry. 47 percent of farmers were unable to cultivate their land (UN, 2020). Restrictions and market closures disrupted the agriculture market supply networks, resulting in food shortages and price increases. Furthermore, India might learn from the Ebola outbreak in Africa, when food production plummeted by 12% in some situations, such as Liberia. [1]

The severe respiratory illness coronavirus 2 is the cause of the continuing worldwide epidemic coronavirus 2019 (COVID-19) (SARS-CoV-2) [16]. The unique virus was discovered in Wuhan, China, in December 2019; nevertheless, the shutdown of Wuhan and other towns in Hubei province did not stop the sickness from spreading to other regions of mainland China and the rest of the world. On January 30, 2020, the World Health Organization (WHO) declared a Public Health Emergency of International Concern, and on March 11, 2020, the pandemic was declared. Coronavirus is the twentieth most common illness in history. COVID-19 has been linked to over 200 million verified cases and over 4.26 million confirmed fatalities as of August 6, 2021, making it one of the deadliest illnesses in history [2, 18].

The epidemic is having a substantial influence on global economic growth. Estimates thus far show that the virus might reduce global economic growth by up to 2.0 percent every month if current conditions hold, raising the likelihood of a global economic slump on the scale of the Great Depression of the 1930s. Global commerce might potentially decline by 13% to 32%, depending on the severity and scope of the global economic crisis. The entire extent of the pandemic's impact will not be understood until the consequences of the epidemic have peaked. This paper presents an outline of the worldwide economic consequences to date, as well as the responses of governments and international agencies to these effects.

## 2. Literature Review

The Author of [4] has studied the impact on the stock market and the economy during Ebola, Swine flu, SARS, and Coronavirus. Descriptive analysis has been conducted to see the recovery period after COVID-19 in the Indian markets. In the introduction, they give a brief discussion about Ebola, Sars, and the coronavirus. In Descriptive Analysis, they use the world's best four stocks market. SSE, Hang Seng, Dow Jones, and nifty50. During Ebola, all the stock market is losing their shares, and they are losing their claims quite similar from beginning to 2/09/2014. But on 3/09/14, hang Seng, and nifty50 falls very severely. During Sars, every share market falls down. In this case Super 50 falls down hardly [17]. During the coronavirus, Dow jones's share stocks fall very hard. From all of the scenarios, they came to a decision which is, in India, aviation & tourism will be affected almost 100% due to the lockdown, apparel & textile will be affected and drop down by 50%, oil & gas 58%. India's GDP will decline by more than 2% [4].

The Author of [5] has done a study to focus on the economic effect on the world economy by the outbreak of Coronavirus. For the paper's purpose, he allowed a comparison of Coronavirus along with SARS and Ebola. By taking 30 countries for this study, it shows the GDP impacts during these epidemics. He leads the tourism importance of some countries which is affected most by the pandemic. Where in Greece tourism has most significance along with Portugal, Mexico, Spain, Austria, Italy, and many more countries. He reveals that the world stock market lost its shares day by day during corona in 2020. The UK is the most affected country with 37%, then Spain with 35%, Germany with 33%, and many more countries [5].

There are so many countries that tried to find the proper way to recover from their economic crisis. Let's talk about China's recovery. According to the paper [9], the first country was China to suffer from the novel coronavirus pandemic, and also China was the first country to recover from the crisis. To recover from the economic crisis the development of "new infrastructure" in seven areas in early March 2020, industrial internet, 5g network, inter-city, and inner-city rail system, data centers, artificial intelligence, ultra-high voltage transmission, and charging stations for electric vehicles.

China's export also grew up, China's exports grew by more than expected in the last week of December 2020. The pandemic disrupted around the world fueled demand for China's goods even as a stronger Yuan made exports more expensive for overseas buyers [10].

By the month of April 2020, China came out of the Covid-19 crisis much faster than the other Western societies. Majority of the economists and statisticians believed that the world-wide recession would take a toll on exports of China thereby slowing the country's recovery[11]. The very contrary had happened. China has a share of world exports. It has rebounded now and its export increased more than 16.4% among those from the top 24 world economies [20].

### 3. Data

The essay will demonstrate how GDP increased and decreased amid a serious pandemic crisis in the twenty-first century. Data for cholera are from 2010. For statistics on Ebola from 2013 to 2014. For statistics on coronavirus from 2019 to 2020, we gathered all of the information from the World Bank ([data.worldbank.org](http://data.worldbank.org)). We collected data from the China Stock Exchange and the Hong Kong Stock Exchange to assess the impact

of the stock market during the Ebola and Coronavirus outbreaks [4]. We also gathered information to demonstrate the economic impact of the Coronavirus [5].

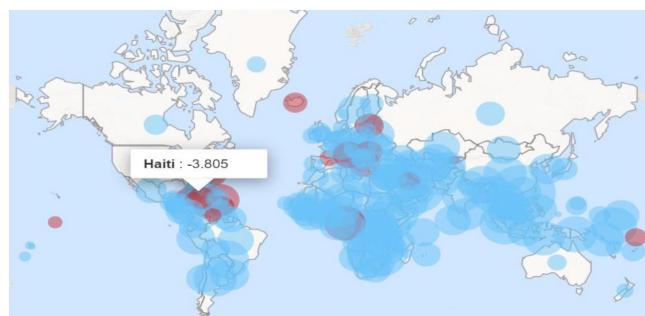
#### 4. Research methodology

To study the impact of GDP and the stock market during pandemic or epidemic of the 21st century, it is showed that the impact of GDP and stock market of 240 countries data by doing the pictorial representation. Here we collected the cholera data in the year 2010. The second data is for Ebola, and the data has been collected from 2013-2016. Finally, it comes the coronavirus and the data collection year is 2019-2020. For stock market data analysis, we take four stock market data. The bar chart shows China, Hang Seng, Dow Jones, Nifty50, and the data. Finally, the economic impact is shown as descriptive analysis by taking 30 country's data during the coronavirus.

### 5. Results

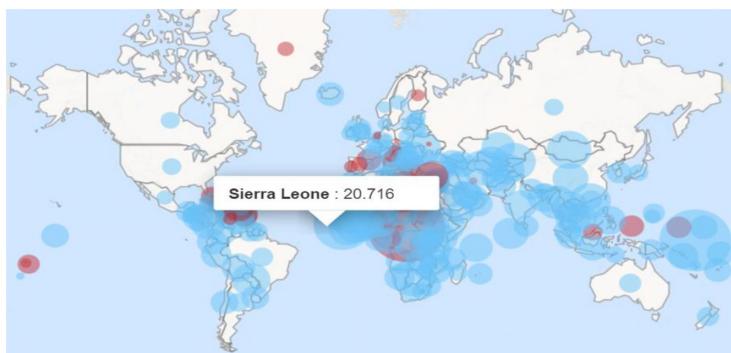
#### 5.1 GDP Growth

Pandemic always affects our economic growth and the stock market. It is a visual analysis based on Table 1. The pandemic Cholera has detected in the year 2010 in Haiti. The GDP growth has fallen. Here the data shows that it was -3.805. Figure 1 represents GDP impact during Cholera disease. For a better understanding, the effect of ebola virus on GDP across the world has been plotted in geospatial maps. The year wise transformation from 2013 to 2016 has been depicted sequentially in Figure 2, 3, 4, 5.



**Figure 1**  
**GDP impact during Cholera**

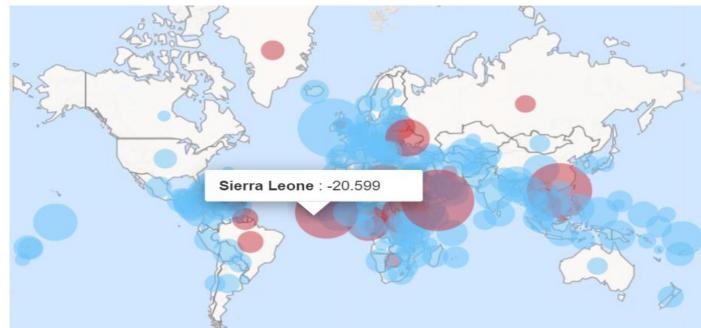
Ebola was one of the deadliest pandemics in the world. The virus spread in a few countries like Sierra Leone, Liberia, and Guinea in 2013-2016. The GDP growth of Sierra Leone was 20.716 in the year of 2013. The GDP kept falling, and it became 4.557 in 2014. The hardest part for Sierra Leone was facing the GDP growth rate of -20.599 in 2015. However, it comes 6.055 in 2016 but still, they were struggling to compare the year 2013. Liberia was the other county with a GDP of 8.704 in the year 2013. In 2014 the GDP was 0.701. In 2015 their GDP was 0.000, and in 2016, it was 2016 -1.6. The pandemic still suffers GDP in Liberia. Finally comes the other most affected county Guinea. In the year 2013, the GDP was 3.946. In 2014, it became 3.697, which was horrific for Guinea. The year 2015 showed a GDP rate of 3.826, and finally, it was a slight bit recovery for Guinea in 2016, and the GDP was 10.821.



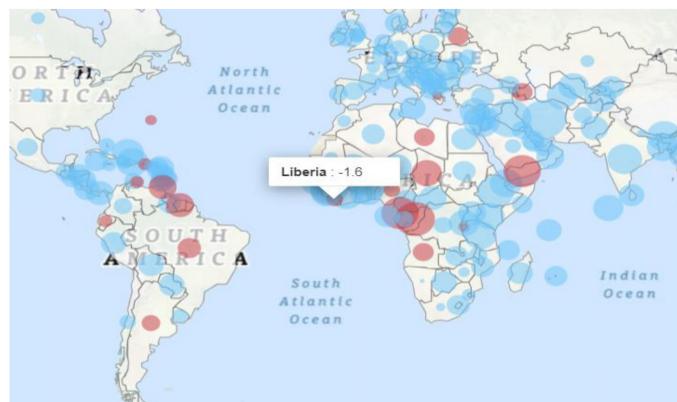
**Figure 2**  
GDP growth during Ebola (2013)



**Figure 3**  
GDP growth during Ebola (2014)



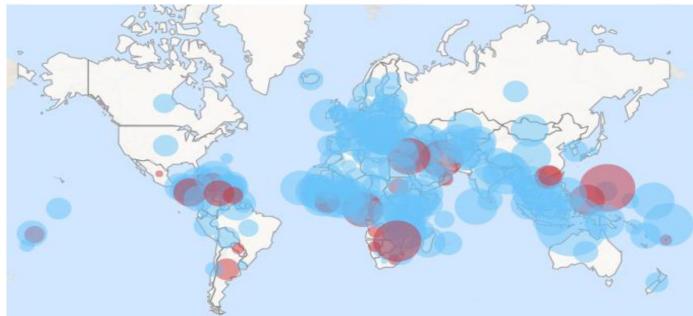
**Figure 4**  
GDP growth during Ebola (2015)



**Figure 5**  
GDP growth during Ebola (2016)

Coronavirus, the deadliest and the most significant pandemics in the modern era, has done a Sevier damage to GDP. After the 2010's world recession, global faces most unemployment problems because of coronavirus. In China, the GDP growth became 5.950 where GDP was 6.94 in 2018. China alone covers 60% of supply and demand in the world. The coronavirus had ruined their GDP, and it became 2.3 in 2020. The pandemic spread across the globe. As a result, the GDP growth fell. In 2019 USA had a GDP of 2.161, and it became -3.486 in 2020. In 2019 UK had a GDP of 1.371, and it became -9.790 in 2020. In the year 2019, Russia had a GDP of 2.033, and it became -2.951 in 2020. In 2019 France had a GDP of 1.509, and it became -8.115 in the year 2020. At the beginning of 2019, Italy had a GDP of 0.287, and it became -8.871 in 2020. In 2019 India, one

of the largest populated countries had a GDP of 4.042, and it became -7.965 in 2020. Figure 6 and Figure 7 depict GDP growth during Coronavirus in 2019 and 2020 respectively.



**Figure 6**  
GDP growth during Coronavirus (2019)



**Figure 7**  
GDP growth during Coronavirus (2020)

**Table 1**  
GDP Growth

Country Name	2010	2013	2014	2015	2016	2019	2020
Aruba	-3.685	4.198	0.300	5.700	2.100		
Afghanistan	14.362	5.601	2.725	1.451	2.260	3.912	-1.935
United Arab Emi- rates	1.603	5.053	4.284	5.106	3.061	1.678	
Argentina	10.125	2.405	-2.513	2.731	-2.080	-2.088	-9.905
Armenia	2.200	3.300	3.600	3.200	0.200	7.600	-7.600

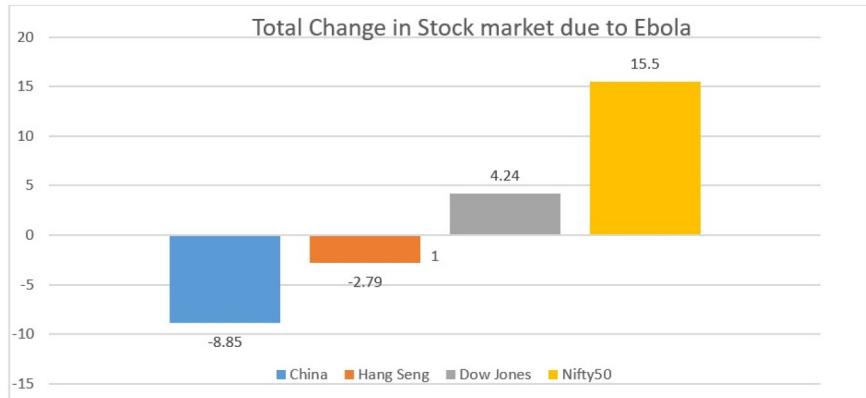
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Australia	2.067	2.585	2.533	2.193	2.771	2.161	-0.285
Austria	1.837	0.026	0.661	1.015	1.989	1.419	-6.590
Belgium	2.864	0.459	1.579	2.041	1.267	1.785	-6.284
Bangladesh	5.572	6.014	6.061	6.553	7.113	8.153	2.376
Bolivia	4.127	6.796	5.461	4.857	4.264	2.217	-7.823
Brazil	7.528	3.005	0.504	-3.546	-3.276	1.411	-4.059
Canada	3.089	2.329	2.870	0.659	1.001	1.861	-5.403
China	10.636	7.766	7.426	7.041	6.849	5.950	2.300
Colombia	4.495	5.134	4.499	2.956	2.087	3.281	-6.847
Germany	4.180	0.438	2.210	1.492	2.230	0.555	-4.897
Denmark	1.871	0.933	1.619	2.343	3.246	2.850	-2.733
Algeria	3.600	2.800	3.800	3.700	3.200	0.800	-5.481
Ecuador	3.525	4.947	3.789	0.099	-1.226	0.012	-7.750
Spain	0.163	-1.435	1.384	3.835	3.031	1.950	-10.839
Finland	3.186	-0.902	-0.365	0.544	2.811	1.273	-2.774
United Kingdom	2.074	2.186	2.863	2.363	1.722	1.371	-9.790
Ghana	7.900	7.313	2.856	2.121	3.373	6.508	0.414
Guinea	4.813	3.946	3.697	3.826	10.821	5.646	6.989
Greece	-5.479	-2.742	0.698	-0.412	-0.490	1.857	-8.248
Haiti	-3.805	3.085	3.402	1.617	1.723	-1.682	-3.374
Hungary	1.122	1.861	4.229	3.819	2.140	4.641	-4.957
Indonesia	6.224	5.557	5.007	4.876	5.033	5.018	-2.070
India	8.498	6.386	7.410	7.996	8.256	4.042	-7.965
Ireland	1.773	1.227	8.640	25.176	1.994	5.565	3.418
Iraq	6.403	7.629	0.197	4.723	13.787	4.445	-10.365
Iceland	-2.833	4.552	1.687	4.437	6.304	2.569	-6.649
Israel	5.580	4.200	3.921	2.218	3.827	3.450	-2.440
Italy	1.713	-1.841	-0.005	0.778	1.293	0.287	-8.871
Jamaica	-1.457	0.518	0.690	0.921	1.375	0.892	-10.200
Jordan	2.315	2.610	3.384	2.497	1.994	1.955	-1.551
Japan	4.192	2.000	0.375	1.223	0.522	0.270	
"Korea, Rep."	6.805	3.165	3.202	2.809	2.947	2.039	-0.958
Kuwait	-2.370	1.149	0.501	0.593	2.926	0.427	

Contd...

Lebanon	7.975	3.811	2.461	0.212	1.530	-6.700	-20.300
Liberia	6.100	8.704	0.701	0.000	-1.600	-2.278	-2.871
Libya	5.021	-13.600	-24.000	-8.862	-2.795	2.536	-31.300
Sri Lanka	8.016	3.396	4.961	5.008	4.487	2.255	-3.569
Monaco	2.100	9.600	7.200	4.900	3.500	7.500	
Mexico	5.118	1.354	2.850	3.293	2.631	-0.055	-8.239
Myanmar	9.634	8.426	7.991	6.993	5.750	1.694	-9.992
Malaysia	7.425	4.694	6.007	5.092	4.450	4.303	-5.588
Namibia	6.039	5.615	6.093	4.264	0.034	-0.606	-7.984
Nigeria	8.006	6.671	6.310	2.653	-1.617	2.208	-1.794
Netherlands	1.343	-0.130	1.423	1.959	2.192	1.677	-3.741
Norway	0.702	1.034	1.970	1.967	1.072	0.852	-0.762
Nepal	4.816	3.525	6.011	3.976	0.433	6.657	-2.088
New Zealand	1.528	2.696	3.814	3.707	3.730	1.634	0.981
Oman	1.714	5.105	1.459	4.630	5.097	-0.825	
Pakistan	1.607	4.396	4.675	4.731	5.527	0.989	0.526
Panama	5.828	6.904	5.066	5.733	4.953	3.040	-17.949
Peru	8.332	5.853	2.382	3.252	3.953	2.204	-11.149
Philippines	7.334	6.751	6.348	6.348	7.149	6.119	-9.573
Poland	3.741	1.126	3.379	4.236	3.142	4.541	-2.702
Portugal	1.738	-0.923	0.792	1.792	2.019	2.489	-7.564
Qatar	19.592	5.556	5.334	4.753	3.064	0.775	-3.668
Romania	-3.901	3.771	3.609	2.954	4.703	4.127	-3.859
Russian	4.500	1.755	0.736	-1.973	0.194	2.033	-2.951
Saudi Arabia	5.039	2.699	3.652	4.106	1.671	0.331	-4.107
Sudan	3.469	6.797	7.043	4.010	3.575	-1.326	-1.562
Singapore	14.526	4.837	3.938	2.989	3.329	1.345	-5.391
Sierra Leone	5.346	20.716	4.557	-20.599	6.055	5.600	-2.162
Somalia			2.364	3.464	2.887	2.896	-1.495
Sweden	5.952	1.188	2.658	4.489	2.071	1.370	-2.818
Thailand	7.513	2.687	0.984	3.134	3.435	2.266	-6.087
United States	2.564	1.842	2.526	3.076	1.711	2.161	-3.486
South Africa	3.040	2.485	1.847	1.194	0.399	0.153	-6.960
Zimbabwe	19.675	1.989	2.377	1.780	0.756	-8.100	-8.000

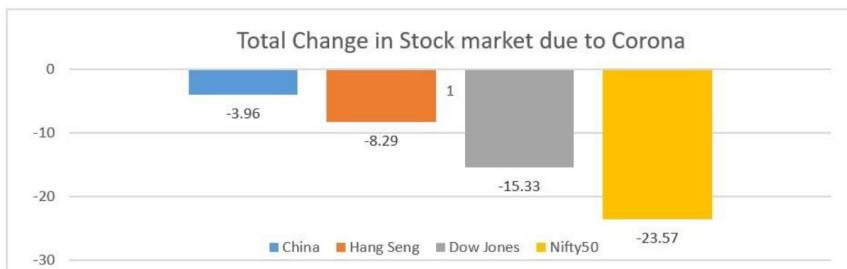
## 6.2 Stock Market



**Figure 8**

### Stock market due to Ebola

In Figure 8, analysis of four stock markets are visualised as reported in [4, 19]. They are China, Hang Seng, Dow Jones, and Nifty50. Ebola hampered GDP as well as the stock market. During Ebola, the world stock market was being affected by Ebola. China was the most affected countries having -8.85 beside Hang Seng -2.79, Dow Jones 4.24, and Nifty50 15.5. Nifty50 stood in the good and stable position among the four where China was struggling with Ebola.



**Figure 9**

### Stock market due to Coronavirus

Figure 9 presents visualization of total change in stock market due to coronavirus, where China was -3.96, Hang Seng -8.29, Dow Jones -15.33, and Nifty50 -23.57. During Coronavirus, China's stock market is excellent and stable among the stock market, besides the others have less stock market value [4, 19].

### 6.3 Economic impact

In Table-2, shows that the economy is amazed by the Covid-19 pandemic as a percentage of GDP growth. In the main scenario, the economic effect ranges from 3.6% to 6.2%. The most affected country is Greece with 6.2%, and the lowest affected country is Japan with 3.6%. However, for all countries, the average economic impact of GDP is -4.5%, and the highest percentage occurs is -4.4%. To calculate the effect of GDP, we have taken the weight of tourism, the higher the impact of the crisis on the other supply chain disruptions and global trade. And most crucial is foreign exchange.

**Table 2**  
**Economic impact**

Country Name	Economic Impact(%)	confidence margin
Argentina	-4.30%	[from -5.7% to -3.0%]
Australia	-4.40%	[from -5.8% to -3.1%]
Austria	-5.50%	[from -7.1% to -3.9%]
Belgium	-4.30%	[from -6.0% to -2.6%]
Brazil	-3.90%	[from -5.3% to -2.7%]
Canada	-3.90%	[from -5.3% to -2.5%]
China	-4.30%	[from -5.6% to -2.9%]
France	-4.30%	[from -5.7% to -2.9%]
Germany	-4.80%	[from -6.3% to -3.2%]
Greece	-6.20%	[from -7.7% to -4.7%]
India	-4.00%	[from -5.3% to -2.7%]
Ireland	-4.80%	[from -6.8% to -2.8%]
Italy	-5.00%	[from -6.4% to -3.5%]
Japan	-3.60%	[from -4.9% to -2.3%]
Mexico	-5.40%	[from -6.9% to -3.9%]
Netherlands	-4.20%	[from -6.0% to -2.5%]
Norway	-4.40%	[from -5.9% to -3.0%]
Poland	-3.90%	[from -5.4% to -2.3%]
Portugal	-5.90%	[from -7.5% to -4.4%]
Russian	-3.60%	[from -5.0% to -2.2%]
Saudi Arabia	-4.40%	[from -5.8% to -2.9%]

*Contd...*

South Africa	-4.30%	[from -5.7% to -2.9%]
South Korea	-3.80%	[from -5.3% to -2.3%]
Spain	-5.20%	[from -6.7% to -3.7%]
Sweden	-4.50%	[from -6.1% to -3.0%]
Switzerland	-4.60%	[from -6.2% to -3.0%]
Turkey	-4.60%	[from -6.1% to -3.2%]
United Kingdom	-4.50%	[from -6.0% to -3.1%]
United States	-3.80%	[from -5.1% to -2.5%]

#### 6.4 Recovery

#### The whole world can Learn from China's Economic Recovery Response to COVID-19.

China was the first country that affected by covid-19 and also the first country where recover their economy as well. So, all country follows the China's recovery to recovery their economy. If we look at the China's recovery statement, we may know that as the \$7 trillion investments move ahead, local authorities need to ensure that concrete low-carbon development plans are plugged into the stimulus package. Using their intelligent, sustainable new infrastructure China rebuilding their everything as economy.

##### **First aspect: International cooperation on COVID response.**

The whole world affected by the covid-19 where every country stands to rises and falls together. The lockdown was the main weapon for all over the country to prevail the pandemic and revive their economy before made the vaccine. We tend to should continue the commonality and a cooperation as we tend to bear this difficult time and conjointly work for humanity's healthier and brighter future.

##### **Second aspect: Deepen regional economic integration.**

It is the utmost requirement of promoting and encouraging trade liberalization and trade facilitation and the investment in an appropriate manner and update multilateral trading system through the WTO. We must strive for integrating, and not disassembling. This is the righteous way to globalize the economy into more balanced and all-inclusive thereby providing advantages for all. The need remains to grow up macroeconomic policy to build a strong economy.

##### **Third aspect: Pursue sustainable all-inclusive development.**

So, we have to make a proper environment to make our business sustainable and social development worldwide and achieve green growth.

And we have to increasing invest on demanding products such as mask, sanitizer PPE which can prevent from covid-19 impact and export all products to others country. It will help to grow up the macroeconomic policy.

#### **Fourth aspect: Scientific and technological innovation**

We have to follow new development that booster our economics. We can build a new open technological system with higher standards that will create a more attractive business environment.

#### **Fifth aspect: More intuitive strategies to handle mental and emotional well-being of citizens**

Although, COVID-19 has taken a big toll on human lives worldwide, but it has also taught human race to indulge in quality mental health strategies and keep their emotional wellbeing sound enough in such times of pandemics [14].

## **7. Conclusion**

In this paper, pictorial representations show the impact on the GDP growth during pandemics. Where during cholera, Haiti was affected most. During Ebola destroyed Sierra Leone's economic growth was terrible. During coronaviruses, some countries are beaten very severely, such as China, India, Italy, Spain, and France. But the second wave of coronavirus destroyed the Indian economy very badly.

According to the UN-2020 report, over 110 million people were living with food insecurity. Because people were losing their employment, income, and food supply chains also disrupted. On the other hand, before lockdown India's food insecurity status was one of the poorest among all the countries and the rank was 102 out of 117 in the global hunger index (GHI 2019).

In the Covid-19 pandemic situation the others sector like materials sector, and financials sector, and consumer discretionary sector are closely connected with industrial sector that is related to the role of enterprises in the industrial sector in that pandemic period. China's stock market was very sensitive to the impact of Covid-19, but the impact duration did not last long that indicated the way of prevention of pandemic and control in China was better and timely measures implemented.

The bar-chart shows that during Ebola, China's stock market was severely affected, and the Hang Seng stock market was also affected. On the other hand, during Coronavirus, Nifty50 was most affected, and Dow Jones, China, and Hang Seng stock market were also affected. The economic

effect shows that Greece was affected most badly by the coronavirus. So, compared to all the pandemics, we see that the coronavirus is the most dangerous pandemic in the 21st century.

## References

- [1] K. Mishra and J. Rampal, "The COVID-19 pandemic and food insecurity: A viewpoint on India," *World Dev.*, vol. 135, p. 105068, 2020, doi: 10.1016/j.worlddev.2020.105068.
- [2] Gupta, V., Jain, N., Sachdeva, J., Gupta, M., Mohan, S., Bajuri, M. Y., & Ahmadian, A. (2022). Improved COVID-19 detection with chest x-ray images using deep learning. *Multimedia Tools and Applications*, 1-24.
- [3] P. Paramita Sahoo and S. Rath, "Potential Impact of Corona Virus on Agriculture Sector," *Res. Today*, vol. 2, no. 4, pp. 64–65, 2020, [Online]. Available: [www.bioticainternational.com](http://www.bioticainternational.com).
- [4] H. Kaur and S. Saxena, "Stock market sensitiveness: Impact of epidemic or pandemic," *Eur. J. Mol. Clin. Med.*, vol. 7, no. 8, pp. 2861–2870, 2020, [Online]. Available: <https://www.embase.com/search/results?subaction=viewrecord&id=L2010514622&from=export>
- [5] N. Fernandes, "Economic effects of coronavirus outbreak (COVID-19) on the world economy Nuno Fernandes Full Professor of Finance IESE Business School Spain," *SSRN Electron. Journal*, ISSN 1556-5068, Elsevier BV, pp. 0–29, 2020.
- [6] R. Lea, "The coronavirus crisis: economic costs mount up as the lockdown continues," Perspect. Arbuthnot Banking, online <https://www.arbuthnotlatham.co.uk/wp-content/uploads/2020/04/27-April-2020.pdf>, pp. 1–15, 2020.
- [7] S. Luo and K. P. Tsang, "China and World Output Impact of the Hubei Lockdown During the Coronavirus Outbreak," *Contemp. Econ. Policy*, vol. 38, no. 4, pp. 583–592, 2020, doi: 10.1111/coep.12482.
- [8] J. Jackson, M. Weiss, A. Schwarzenberg, and R. Nelson, "Global Economic Effects of COVID-19," *Congr. Res. Serv.*, no. 20, p. 78, 2020, [Online]. Available: <https://crsreports.congress.gov>

- [9] <https://www.wri.org/insights/4-investment-areas-stimulate-chinas-economy-after-covid-19>
- [10] <https://www.reuters.com/article/us-china-economy-gdp-idUSKBN29N04S>
- [11] <https://www.institutmontaigne.org/en/blog/chinas-mercantilist-recovery-after-covid-19>
- [12] Gupta, V., Santosh, K. C., Arora, R., Ciano, T., Kalid, K. S., & Mohan, S. (2022). Socioeconomic impact due to COVID-19: An empirical assessment. *Information Processing & Management*, 59(2), 102810.
- [13] Gupta, V., Jain, N., Virmani, D., Mohan, S., Ahmadian, A., & Ferrara, M. (2022). Air and water health: industrial footprints of COVID-19 imposed lockdown. *Arabian Journal of Geosciences*, 15(8), 1-18.
- [14] Dhingra, S., Arora, R., Katariya, P., Kumar, A., Gupta, V., & Jain, N. (2021). Understanding Emotional Health Sustainability Amidst COVID-19 Imposed Lockdown. In *Sustainability Measures for COVID-19 Pandemic* (pp. 211-235). Springer, Singapore.
- [15] Jain, N., Gupta, V., Chakraborty, C., Madan, A., Virmani, D., Salas-Morera, L., & Garcia-Hernandez, L. (2022). Empirical Assessment of Bacillus Calmette-Guerin Vaccine to Combat. *Cmc-Computers Materials & Continua*, 213-231.
- [16] Singh, V., Poonia, R. C., Kumar, S., Dass, P., Agarwal, P., Bhatnagar, V., & Raja, L. (2020). Prediction of COVID-19 corona virus pandemic based on time series data using Support Vector Machine. *Journal of Discrete Mathematical Sciences and Cryptography*, 23(8), 1583-1597.
- [17] Bhatnagar, V., Poonia, R. C., Nagar, P., Kumar, S., Singh, V., Raja, L., & Dass, P. (2021). Descriptive analysis of COVID-19 patients in the context of India. *Journal of Interdisciplinary Mathematics*, 24(3), 489-504.
- [18] Gupta, V., Jain, N., Virmani, D., Mohan, S., Ahmadian, A., & Ferrara, M. (2022). Air and water health: industrial footprints of COVID-19 imposed lockdown. *Arabian Journal of Geosciences*, 15(8), 1-18.

- [19] Saxena, M. S., & Kaur, H. (2020). Stock market sensitiveness: impact of epidemic or pandemic. *European Journal of Molecular & Clinical Medicine*, 7(8), 2861-2870.
- [20] Francois Godement and Viviana Zhu, (2020), China's Mercantilist Recovery After Covid-19, Institut Montaigne. Link: <https://www.institutmontaigne.org/en/analysis/chinasmercantilist-recovery-after-covid-19>.
- [21] Singh, Karan Deep; Goel, Vindu; Kumar, Hari; Gentleman, Jeffrey (25 March 2020). "India, Day 1: World's Largest Coronavirus Lockdown Begins". The New York Times. ISSN 0362-4331.
- [22] "India coronavirus: All major cities named Covid-19 'red zone' hotspots". BBC. 16 April 2020. Retrieved: <https://www.bbc.com/news/world-asia-india-52306225>.
- [23] COVID-19 pandemic in India. In Wikipedia, The Free Encyclopedia. Retrieved 07:54, September 28, 2022, Retrieved:[https://en.wikipedia.org/w/index.php?title=COVID19\\_pandemic\\_in\\_India&oldid=1108130737](https://en.wikipedia.org/w/index.php?title=COVID19_pandemic_in_India&oldid=1108130737)

*Received May, 2022*

*Revised June, 2022*