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COVID -19 effects on gross domestic product growth rate: an empirical study of selected nations

Firas Mohammed Dahham , Akel Abd Alkareem mohammed , Saddam Hamdan Akhad

Abstract:

The entire monetary market value of all finished products and services produced by a nation in a specific year it is considered as gross domestic product. It is regarded as a gauge of the nation's economic health. GDP makes it easier to determine a country's economic status at a given time and to calculate the extent of economic growth and its annual growth rate. There are three methods for calculating GDP, and it is regarded as a key factor for policymakers, investors, and corporations when making strategic decisions.. In this study researcher identified COVID-19 effect on GDP for selected nations because covid-19 considered as worldwide epidemic. For this study time period should be considered as 2012 to 2020 and most affected nations by Covid-19 would be selected for analysis. The major Findings of this study reveals United Kingdom, India and France were most affected nations by Covid-19 but significant impact on United Kingdom was identified to note in concern with GDP growth rate. All selected countries are indicated negative impact on GDP growth rate due to epidemic of Novel Corona Virus.

(Keywords: GDP: Gross Domestic Product, Covid-19: Novel Coronavirus 2019, Est.: Estimated, UNESCAP: United Nations Economic and Social Commission for Asia and the Pacific WTO: World Trade Organization).

INTRODUCTION:

Gross Domestic Product (GDP) is a financial measure of all products and services generated by a certain nation, and it provides information on that nation's economic health in a given year. The world's nations are now dealing with the Covid-19 (Novel Corona Virus) epidemic, which causes all economic operations linked to the manufacturing of products and services, supply chain management, value-added activities, and more to cease. The Covid-19 dilemma is a difficulty that has never been experienced before, according to UNESCAP, and it will cause a greater shock to global financial and economic activity. Given that it is obvious that many economies would contract, demand and supply issues are the primary cause of this shock. Many countries in the Asian-European area that are heavily dependent on tourism and the trade of commodities have shrunk as a result of COVID-19 developed nations. There are now darker days ahead for the WTO as a result of this disease and the effects of global economic interconnectedness.

LI**TERATURE REVIEW:**

(Warwick McKibbin, February 2020) have analyzed the global macroeconomic impacts of Covid-19: seven scenarios. They were analyzed that the outbreak of coronavirus named covid-19 has highly effected on chines economy and spreading worldwide. Due to covid-19 and its economic impact is highly uncertain which makes it difficult for policymakers to formulate an appropriate macroeconomic policy making in concern with economy. In relation with understand possible economic outcomes this paper explore seven different scenario for how covid-19 affect in coming years. The major finding of this paper demonstrate that even a contained outbreak could significantly impact on the global economy. The scale of cost is avoided by greater investment in public health systems in all economy and developing economies indicated health care systems are less developed and population density is high.

(Fernandes, April 2020) has analyzed economic effects of coronavirus outbreak (covid-19) on the world economy. In this report discussion was made economic impact of covide-19 crisis across industries and countries and economic channels through which economic activity will be impacted. Due to this major challenge for global policy makers to have a coordinated policy responses to the virus and its economic impacts. The major discussion on the report is that countries with more service oriented economies will be more affected by this virus and have more job risk for its economy. In this report result suggested on average each additional month of crisis costs 2.5-3% of global GDP and economic cost of recession are not equally distributed.

(Hartley, April 2020) have studied on the cost of covid-19: a rough estimate of the 2020 us GDP impact. In this study they identified the mitigation measures adopted like partial economic shutdown and social distancing will impacted heavy cost on society that is not identified. In this study researcher identified that impact varies by industry, and they were able to measure impact but helping with some assumptions like industries will remain in business sector in proportion to their degree of digitalization. Further they did granular dataset break down at the level of industrial activity within countries, which helpful to them to make GDP forecast at national level. Researcher estimated the real GDP growth rate will decline by 5% for each month of partial economic shutdown which means the economic cost of the first two months for fighting the epidemic will be $2.14 trillion.

(Konig & Winkler, 2020) have analyzed covid-19: Lockdowns, fatality rates and GDP Growth. An economic catastrophe has been brought on by the COVID-19 epidemic. This article examines the effects of voluntary social distance brought on by COVID-19 fatality rates and forced social distancing brought on by lockdown regulations on GDP growth in the first quarter. for a sample of 42 nations, three-quarters of 2020. Results from OLS and IV point to a crucial whereas panel regressions reveal that lockout stringency is the more important factor for the mortality rate, significant growth-driver More stringent metrics result from the inclusion of lagged factors decreased GDP growth in the same quarter but are connected to a beneficial, catching-up effect in the subsequent quarter.

(Darandary & Muhsen, 2020) have analyzed early estimates of the impact of the covid-19 pandemic on GDP: a case study of Saudi Arabia. The COVID-19 pandemic has had a highly diverse range of effects on several economic sectors. Early on in the economic shutdown, there was little to no economic information accessible about the situation. It became clear that certain industries would endure more than others as a result of the government's arbitrary measures to limit the epidemic. With the use of this data, researchers were able to calibrate demand shocks to specific industries and get preliminary estimates of the effects on sectorial and total GDP. Given the high degree of uncertainty, researchers created three scenarios for the Saudi economy that took into account the intensity of the shock, its sectorial distribution, and the amount of time required for recovery. As per estimates, the decline in real GDP in 2020 will be between -4.8 percent and -9.8 percent, while the budgetary remedies adopted by the authorities would increase real GDP by around 2.5 percent. The study also demonstrates how to account for a fundamental change in economic circumstances in light of the pandemic's ongoing evolution. researcher consider the scenario in which there is a second wave of the infection, which would result in a lengthy lockdown and secondary effects.

(Kirtrar, 2021) has studied the relationship of economic sentiment and GDP growth in Russia in light of the covid-19 crisis. In order to build on cyclical macroeconomic data in Russia, particularly during the coronavirus crises, the article's goal is to demonstrate the quantitative and analytical significance of the collective opinion of enterprises and families. Research Methods & Design make use of qualitative information from surveys that reach over 24 000 businesses and 5100 families across all of Russia. Information from 18 survey-based variables is included in the total economic sentiment indicator (TESI). The study techniques include a vector autoregressive (VAR) model using multiple regression, Hodrick-Prescott filtration, and cross-correlation analysis. Result For the years 1998 to 2020, the analysis demonstrates a nearly contemporaneous cyclic congruence between GDP growth and TESI dynamics.

(Pardhan & Drydakis, 2021) have worked on associating the change in new covid-19 cases to GDP per capita in 38 European countries in the first wave of the pandemic. Internationally, COVID-19 has had an impact on all nations. In 38 European nations over a 2-month period, we investigate correlations among changes in new COVID-19 recorded cases per million inhabitants and key macroeconomic and wellbeing metrics (1st April-31st May 2020). After adjusting for important health variables such public health spending, life expectancy, cigarette use, and sanitation, a statistically significant ($p = 0.002$) adverse relationship between the change in new COVID-19 cases and GDP per capita was calculated. The study indicated that new COVID-19 instances changed the least in Luxemburg, the European nation with the greatest GDP per capita, while they changed the most in nations with lower GDP per capita (i.e., Ukraine, Bulgaria, and Romania). The findings of this study suggest that a nation's Income per capita may be related to a reduced incidence of new COVID-19 cases during the first wave of the epidemic in Europe. The study's conclusion makes the case that in European areas, authorities should place a high importance on a nation's economic success.

(Joao, 2021) have analyzed impact of covid-19 on the convergence of GDP per capita in OECD Countries. This research's primary goal is to evaluate how the coronavirus illness of 2019 (Covid-19) will affect the GDP per capita in Organization for Economic Co-operation and Development (OECD) nations. Data from the OECD database for the fourth quarter of 2017 through the third quarter of 2020 were put into consideration for this purpose, together with advancements from the convergence theory for panel data. Additionally, spatial autocorrelation methods were used to analyse this statistical data. The research reveals that the epidemic, particularly in the first two quarters of 2020, erased the indicators of divergence that had been observed in OECD nations from the end of 2017 to the end of 2019, posing additional problems going forward. In regard to policy suggestions, it is advised that the European Union and international organizations establish tools in order to foster a globally balanced growth, avoiding effects beyond the macroeconomic.

(Basak, Abir, & Mamum, 2022) have analyzed a global study on the correlates of gross domestic product and covid-19 vaccine distribution. This study sought to investigate the relationship between GDP of multiple countries and the progression of COVID-19 vaccines, as well as the applicability of the global trend to the continental and the distribution pattern of COVID-19 vaccination advancement across all nations. From the open-access data source Our World in Data, we combined information on COVID-19 immunization and GDP. R-Studio was used for data processing and visualization. In nations with a population of one million or more, there was a significant correlation between per capita income and the percentage of vaccinated individuals. The discrepancy in vaccination rates between countries is accounted for by a GDP per capita difference of 50%.Across Asian nations, there is a substantial difference. Without sufficient vaccination of the less developed nations, the security of wealthier nations, who have immunized their populations, cannot be assured. Therefore, the international community should take action to speed up the COVID-19 vaccination campaign in all nations, regardless of their level of affluence.

(Pratibha & Krishna, 2022) have analyzed the effect of covid-19 pandemic on economic growth and public debt: an analysis of India and the global economy. The goal of the study is to determine how the COVID-19 pandemic has impacted India's economic growth and public debt. The authors also make an effort to forecast economic growth and external debt (ED) for the following five years on a quarterly basis. Understanding how long and how quickly the economy will recover is the goal. As a result, this analysis clarifies how debt will be structured in the five years following the crisis. The authors used a dynamically integrated moving average (ARIMA) model to forecast India's GDP and ED over the following five years. This model was developed using the Box-Jenkins approach (Box and Jenkins, 1976), and the data stationarity was examined using the augmented Dickey-Fuller (ADF) test. Identification, estimation, diagnostics, and forecasting are the three basic processes in the approach for estimating and predicting the model. According to the analysis, the COVID-19 pandemic epidemic has a major impact on both public crisis and financial development. Due to the stoppage of economic activity and ongoing difficulties with the negative GDP numbers, the economy contracted in the first quarter of 2020. The

findings of the predicting indicate that ED will keep expanding in order to fulfil the rising demand for health expenditures, and that GDP will gradually steadily increase beyond the end of 2021. A persistent global recession with rising government debt has been seen to derail developing economies from the sustainable path.

(Thapa, Agrawal, & Anika, 2022) have worked on covid-19 and its impact on Indian Stock Market. Public corporations trade their financial securities on the stock exchange. The primary market is where public companies first list their shares. Bombay Stock Exchange (BSE) and National Stock Exchange are the two key markets in the context of India (nse). Through secondary market, investors may purchase and sell their shares. Every incident was dramatically altered by Covid-19. Every economic sector collapsed as a result of the COVID-19-caused "lockdown," which prevented any financial transactions and forced the closure of every industry. The Indian economy has never before seen such a severe collapse in both market forces. At the start of the epidemic, the stock market was first affected by the economic collapse. After a few months, however, the market began to recover as the COVID-19 dropped. In this study, the GDP, the Indian industry, the commodities market, the stock market's COVID 19 index, stock return, investor behaviour, and the state of the economy are all taken into account.

(Oniore, 2022) has analyzed covid-19 pandemic and optimal debt to GDP ratio threshold in sub Saharan Africa. In order to evaluate if there is a threshold beyond which budget deficit becomes detrimental to the country ’s economic growth, the paper employed the GDP Indicators to track the evolution of the debt-to-GDP ratio in 45 Sub-Saharan African countries during the COVID-19 Epidemic. The main findings showed that a high debt-to-GDP ratio is not always a bad thing as long as Sub-Saharan African economies are growing; in fact, the majority of countries with debt-to-GDP ratios over the 77 predetermined percentage had increasing economic growth. The study also found that the region's nations may have high debt-to-GDP ratios.

(Olkiewicz, 2022) has worked on the impact of economic indicators on the evaluation of business confidence during the covid-19 pandemic period. Business trust is crucial for businesses since it has a big impact on how decisions are made and assures the steady growth and operation of a firm. For the period of 2015–2021, our study assessed Poland, the G7, the E27, and other nations. For the sake of the study, the aforementioned actions were taken, among others: Data from the database search were used: EUROSTAT, GUS, OECD, TRADING ECONOMICS; literature analysis; development of the study research questions; economic variables negatively influencing company confidence during the COVID-19 pandemic period. According to the research findings, there is a connection between the COVID-19 pandemic and the growth of the economy indicators and BCI.

OBJECTIVES OF THE STUDY:

- To know most affected nations by Covid-19
- To analyze effect of covid-19 on Gross Domestic product growth rate of selected countries

PERIOD OF STUDY:

The period of the study helpful to researcher for identifying the time period on which research has been carried out. For this study time period has been considered as 2012 to 2020.

SCOPE OF THE STUDY:

Functional Scope: The functional Scope of the study is Gross Domestic Product which means total production of nation in relation with production of goods and services in particular year.

Geographical Scope: This study mainly considered selected countries like United State, India, Brazil, France, Germany, United Kingdom, Russian Federation and Korea Republic.

HYPOTHESIS:

H_0 = There is no effect of COVID-19 on Gross Domestic Product of selected countries

H_1 = There is effect of COVID-19 on Gross Domestic Product of selected countries

SELECTION OF COUNTRIES:

The countries are selected basis on most influence of Covid-19 on particular nation and criteria of influence should be considered as number of cases in particular country.

DATA COLLECTION:

For the study **Secondary Data Source** are considered in which particularly relevant websites and official government data are taken.

DATA ANALYSIS AND INTERPRETATION: (GDP Growth Rate in)

Country Name	2012	2013	2014	2015	2016	2017	2018	2019	2020
United States	2.250	1.842	2.526	3.076	1.711	2.333	2.996	2.161	-3.405
India	5.456	6.386	7.410	7.996	8.256	6.795	6.533	4.042	-7.252
Brazil	1.921	3.005	0.504	-3.546	-3.276	1.323	1.784	1.411	-4.059
France	0.313	0.576	0.956	1.113	1.095	2.291	1.865	1.843	-7.855
Germany	0.418	0.438	2.210	1.492	2.230	2.680	1.086	1.056	-4.570
United Kingdom	1.470	1.890	2.991	2.623	2.263	2.134	1.651	1.672	-9.396
Russian Federation	4.024	1.755	0.736	-1.973	0.194	1.826	2.807	2.033	-2.951
Korea, Rep.	2.403	3.165	3.202	2.809	2.947	3.160	2.907	2.244	-0.852

(Source: www.worldbank.org, www.worldometers.info)

Above table indicated GDP Growth Rate of selected countries during the study period of 2012-2020. United State indicated in the year 2012 GPD as 2.25% and it reduced to 1.84% in the year 2013. In the year 2014 the GPD growth rate for the country was 2.52% which is indicated growth in the GDP rate further in the year 2015 the growth rate is also increased as 3.07%. but in the year 2016 the rate is decreased up to 1.71% respectively. For the year 2017, 2018 and 2019 the rate was 2.33%, 2.99% and 2.16% respectively. It seems overall constant trend in GDP growth rate for that time period. For the year 2020 it seems drastic change in GDP growth rate as -3.41. For India GDP growth rate indicated in the year 2012 as 5.45% and in the year it was increase up to 6.38%. for the year 2014 the GDP rate was increased up to 7.41% and it was also increase in the next year as 7.99%. for the study period like 2012 to 2020 the highest GDP growth rate have been identified in the year of 2016 as 8.25%. for the year 2016 the GDP growth rate was decreased up to 6.79% and next year also it was decrease up to 6.53% respectively. For the year 2018 and 2019 the ratio look like 6.53% and 4.04% respectively. After the year 2016 the growth rate of GDP seems like in decreasing trend for during the study period. In the year 2020 the GDP growth rate is look like as -7.25% which indicated the that due to covid-19 effects. In relation with Brazil the GDP growth rate was in the year 2012 indicated as 1.92%, in the year 2012 after that for the year 2013 the growth rate was increase up to 3.05% which is highest increase during the study period. For the year 2014 the GDP growth rate was 0.50 which is indicated decrease in economic development further for the year 2015 and 2016 GDP growth rate indicated negative development for the Brazil Economy. For the year 2015 the rate was -3.54% and for the year 2016 the rate was -3.27% which was indicated no development of Brazilian Economy for that time period. For the year 2017, 2018 and 2019 the development of GDP was increased as 1.32%, 1.78% and 1.41% respectively but Brazilian Economy also evidence to effect of Covid-19. For the year 2020 the GDP growth rate of Brazil was -4.06 which was indicated may be due to covid-19 it also affected. For the France in the year 2012 the GDP growth rate was 0.31% further in the year 2013 the rate was 0.57% which indicated slickly increase in the growth rate within a year. For the year 2014 and 2015 the rate was 0.95% and 1.11% respectively which also increase as compare to previous years. In

the year 2017 the GDP growth rate was higher as compare to other year as 2.29% but after that the growth rate seems in decreasing trend as 1.86% and 1.84% respectively. In the year 2020 the growth rate was -7.85% which also indicted as negative as compare to other countries. For Germany in the year 2012 the growth rate was 0.41% which is increase in the next year 2013 and it was stood at 0.43%. for the year 2014 growth rate saw drastic change and stood at 2.21%. it was also second highest rate for the study period. In the year 2015 the growth rate was 1.49% which saw slickly decrease in the overall GDP rate. For the year 2016 and 2017 the GDP growth rate was 2.23% and 2.68% which was highest during the study period after that it was decreased up to 1.08% in the year 2018 and in the year 2019 it was minor decrease up to 1.05%.for the year 2020 the GDP growth rate saw -4.57% which may happen due to covid-19. In the case of United Kingdom for the year 2020 higher change have been identified. In the year 2020 GDP growth rate seems as -9.39% which was highly negative out of selected nations. It was also said that may covid-19 was higher affected on United Kingdom during the study period. In the year 2012 the GDP growth rate saw 1.47% which is increased in next year up to 1.89%. for the year 2014 the GDP growth rate saw 2.99% which is higher during the study period and then for the year 2015 the GDP rate was decrease up to 2.62%. for the year 2016 and 2017 the rate was 2.26% and 2.13% have been identified which indicated not any major changes during that time period. For the year 2018 and 2019 the growth rate was 1.65% and 1.67% have been saw which also indicted slickly decrease in growth rate as compare to previous years. For Russia GDP growth rate saw 4.02% in the year 2012 and it was decrease up to 1.75% in next year. For the year 2014 GDP growth rate was 0.73% and further it was decreased in the year 2015 as -1.97%. it was major change during the study period for the Russia. For the year 2017, 2018 and 2019 the growth rate was 1.83%, 2.81% and 2.03% have been identified and it also saw increasing trend during three years of time period. In the year 2020 the ratio was -2.95% which saw minor impact have been identified due to covid-19. For republic Korea the growth rate indicated in the year 2012 as 2.40% after that it was increased up to 3.16% in the year 2013 and further with minor decrease it was stood at 3.20% in the year 2014. For the year 2015 and 2016 the growth was 2.81% and 2.94% have

been identified respectively. In the year 2017 GDP growth rate was second highest as compare to previous years. For the year 2018 and 2019 the growth rate was 2.90% and 2.24% respectively. In the year 2020 the growth rate was -0.85% which indicated there was not any significant impact of covid-19 on Korean Economy.

From 2012 to 2020 GDP growth rate data were helpful to analyze and identify the impact of covid-19 on most affected nations in concern with number of cases. It is seemed that United Kingdom have highly affected in relation with GDP growth rate because the rate of GDP was -9.39% and second one was France because it's GDP rate was -7.85% in the year 2020. Remaining selected nations like United States have -3.40%, India -7.25%, Brazil -4.06%, France -7.85%, Germany -4.57%, Russian Federation -2.95% and Korea Republic -0.85% GDP growth have been identified.

Table No. 2 Paired t-test for impact of Covid-10 on selected Nations GDP

t-Test: Paired Two Sample for Means		
	2019	*2020*
Mean	2.057659	-5.04247
Variance	0.79986	8.221936
Observations	8	8
Pearson Correlation	-0.12873	
Hypothesized Mean Difference	0	
df	7	
t Stat	6.453985	
P(T<=t) one-tail	0.000174	
t Critical one-tail	1.894579	
P(T<=t) two-tail	0.000349	
t Critical two-tail	2.364624	

(Source: Calculated from MS Excel)

Above table indicted paired t-test to know whether covid-19 impacted on GDP growth rate or not and results of above test indicated one and two tails *p-value is less than* 0.05 which means *null hypothesis* should be rejected and stated that there is significant negative impact of covid-19 on gross domestic growth rate for selected nations.

FI**NDINGS:**

- In concern with number of cases United States have been highly affected nation from most eight affected nations but due to Covid-19 effect on GDP growth rate will be -3.40 % in the year 2020.
- United Kingdom has sixth most affected nation from the word but impact on GDP growth rate will be considered as -9.39% which is highest effect of Covid-19 on GDP growth rate but there were also other factors affected which were not mentioned here.
- The GDP growth rate of India was-7.25% which is second highest rate among selected most affected nations by Covid-19 but in concern with effect of Covid-19 Second position after United States.
- Brazil and Germany have Third and Fifth position in most affected countries by Covid-19 and in the year 2020 GDP growth rate was -4.05% and -4.57% respectively.
- United State, Russian and Korea Republic have First, Seventh, and Eights position in most affected nations but GDP growth was -3.41%, -2.95% and -0.85% respectively.
- Overall selected countries indicated negative trend due to Covid-19 effect on economic activities of the countries and United kingdom is most affected nation but slightly low impact of Covid-19 have been identified on Korea for selected nations.

With the help of above data and analysis it may said that Covid-19 have significant impacted on GDP growth rate for various highly affected nations.

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