

THE IMPACT OF COVID ON MACROECONOMIC FACTORS: A GLOBAL STUDY

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Abstract

In 2019, COVID-19, a global threat, exploited international travel and economic links. Declared a pandemic on March 11, 2020, governments implemented impactful measures. This paper tries to analyze the effect of the macroeconomic factors such as Foreign Direct Investment, Population Growth, Oil rents (% of GDP), Total Reserves (includes gold, current US\$), Official Exchange Rate (LCU), Total Unemployment (% of total labor force) (national estimate), Net Trade in Goods (BoP, current US\$), Manufacturing, value added (% of GDP), and Real Interest Rate (%), on the GDP per capita, globally in the pre- COVID-19 and during COVID-19 periods. The results were derived for a total of 207 countries for a substantial amount of time period, i.e., 2008-2018 as a pre- COVID-19 era and the complete time period of COVID-19's existence affecting the economies worldwide from 2019-2022. With such substantial data, some interesting results has been found, showing that the same factors which were significant in the pre- COVID-19 period were mostly not so influential on the people's income generating capacity during the covid times. The study empirically explores potential explanations for these changes and proposes avenues for future research.

Keywords: Covid (population health), Economic development, Panel data

JEL Classifications: I150, O100, C100

1. Introduction:

The impact of the macroeconomic factors on the earnings of the people had changed drastically from the pre-covid era to the times during the pandemic of novel COVID-19. The earning was brutally affected because of the spreading of the virus. As almost all the countries throughout the globe, was suffering from a sluggish to negative economic growth during the covid years, the earnings of the people were also affected. All the economies regardless of them being developed, developing or the under developed economies, had to endure the blow of the escalating novel Covid-19 virus. To contain its spreading and increase in the death rates, governments restricted travelling internationally as well as within the country from the high affected areas according to the reported number of covid cases. The lockdown affected many sectors of the economy. The tourism sector was greatly affected (Gupta, Santosh, Arora, et al. 2022), there was a huge burden on the health care sector and its infrastructure, work force was asked to work from home, schools were closed and online method of teaching and learning was adopted by the education system, and many businesses had to shut down due to lack of revenue generating assignments. The exports and imports had decreased and no new construction projects and other work projects were developing both in the organized and unorganized sectors, as a result of which the whole labour force especially, the daily wage workers' incomes were brutally affected. Many companies had to lay off their employees due to less work that the company was encountering, as well because the new set up of the work

culture demanded work from home because of the travel restrictions, it also required new and developed digital, technical skills and infrastructure, which was not acquired by everyone and hence were laid off. These laying off of the people from their jobs and not getting further jobs, impacted the labour force overall, their earnings hence their standard of living both in organized and unorganized sectors. Even though studies have been made regarding the healthcare services, socioeconomic realm, Gross Domestic Product, very little focus has been given to the financial aspect of the individuals globally. This study tries to aim to see how the GDP per capita has changed from the times before the novel COVID-19 virus hit everyone globally to during the pandemic times.

2. Literature Review:

In the recent times, various studies have been done on the economic effects of the Covid-19 virus. For instance, Nurmasari & Nur'aidawati (2021) in their paper, discussed the impact of the inflation, bank interest rates and currency rates on Composite Stock Price Index partially as well as simultaneously during the time period of the Covid-19 virus, Landmesser (2022), in their paper discussed about the changes in the exchange rates before and during covid times of selected countries. Tanin, Sarker, & Brooks (2021) tried to figure out whether there is any relationship between currency exchange and gold prices and whether the currency exchange impacts the gold prices especially during the years of the impact of Covid-19 virus. Sinaga (2022) assessed the effects of the foreign exchange rates, inflation rate, interest rates along with the trade balance on

the overall economic growth through an increase in the balance of payments. Sinaga has done a descriptive quantitative analysis. Many more works have been done regarding various aspects and segments of an economy and what effect did they have because of the emergence of the novel Covid-19 virus.

There have been studies which heavily been focused on the time series data or a selected groups of countries has been considered. Works with the time series data focusing on the impact of the Covid-19 virus on the Gross Domestic Product (GDP) has been done as well. But there has been a scope to study the impact of the virus on the individuals and their earnings in a panel data framework. Studying the variability of the earnings of the individuals globally gives us a comprehensive view on the impact of the virus worldwide as the GDP per capita affects many aspects of a human being and their standard of living and whether they meet the basic needs or not. This paper tries to gauge empirically how various macroeconomic variables impacted on the earnings of the individuals globally and the GDP per capita varied from the pre Covid-19 era and during the insurgence of the virus.

3. Data and Methodology:

3.1. Data and Data Source: In this analysis, two time-frames has been taken, viz., Pre-Covid-19 Phase and the During Covid-19 Phase.

- Pre-Covid-19 Phase: The data has been sourced from the World Development Indicators of the World Bank (<https://databank.worldbank.org>). Data of the macroeconomic factors of a total of 207 countries, has been

taken. For the pre-covid era, the years from 2008 to 2018 has been considered.

- During Covid-19 Phase: For the times when the novel Covid-19 virus affected the countries on a global scale, the years 2019 to 2022 were referred to, with the same number of countries taken in the pre-Covid-19 era, i.e., 207. from the World Development Indicators of the World Bank.
- 3.2. Variables: The variables that has been considered are GDP per capita, Foreign Direct Investment {net inflows (BoP, current US\$)}, Population Growth, Oil rents (% of GDP), Total Reserves (includes gold, current US\$), Official Exchange Rate (LCU), Total Unemployment (% of total labor force) (national estimate), Net Trade in Goods (BoP, current US\$), Manufacturing, value added (% of GDP), and Real Interest Rate (%) (Nurmasari & Nur'aidawati 2021, Sinaga 2022)
- 3.3. Empirical model: As, in this study, the impact of Covid-19 on the macroeconomic factors globally is being considered, we have taken a total of 207 countries along with the time frames to be from 2008-2018 and 2019-2022, hence, it is a panel data. The dataset being a panel data, the test that has been run is the Breusch and Pagan Lagrange Multiplier (LM) Test, which showed that the Fixed Effect and Random Effect Tests has to be explored. Further, after the above tests were run, Hausman Test was done, which finally confirms that the Fixed Effect model has to be adopted.

4. Results:

Table: 1

	Pre-Covid Period (2008-2018)	During Covid Period (2019-2022)
Data	Panel	Panel
Base Model	Fixed effect	Fixed effect
Dependent Variable	GDP per capita	GDP per capita
R-Square:		
Within	0.451	0.747
Between	0.186	0.259
Overall	0.285	0.149
Foreign direct investment, net inflows (BoP, current US\$)	0.009 (S.E.: .007)	0.021 (S.E.: .012)
Population growth (annual %)	-0.011 (S.E.: .014)	-0.020** (S.E.: .044)
Oil rents (% of GDP)	-0.044*** (S.E.: .011)	0.029 (S.E.: .019)
Total reserves (includes gold, current US\$)	0.079*** (S.E.: .019)	0.193* (S.E.: .102)
Official Exchange rate (LCU)	0.008 (S.E.: .035)	-0.036 (S.E.: .108)
Unemployment, total (% of total labor force) (national estimate)	-0.091*** (S.E.: .024)	-0.075* (S.E.: .038)
Net trade in goods (BoP, current US\$)	0.006 (S.E.: .005)	-0.009 (S.E.: .012)
Manufacturing, value added (% of GDP)	-0.252*** (S.E.: .071)	-0.146 (S.E.: .152)
Real interest rate (%)	-0.011* (S.E.: .006)	0.03 (S.E.: .017)
Constant	3.39*** (S.E.: .238)	2.006* (S.E.: 1.099)
Note: *p<0.1;**p<0.05;***p<0.01		

Table: 2

Pre-Covid Period (2008-2018)		During Covid Period (2019-2022)
Breusch and Pagan Lagrangian Multiplier test for random effects		
chibar2 (01)	264.72***	5.51***
Hausman Test		
chi2(9)	22.40***	22.40***

The Table: 1 shows a comparison between the two time periods taken in

our study, i.e., the pre and during covid years. Fixed effect test has been run for

both the periods: Pre-Covid era (2008-2018) and During Covid era (2019-2022). During both the years 2008-2018 and 2019-2022, globally, the net inflows of the Foreign Direct Investment was positively related to the per capita GDP but it was not significant in any of the time periods to affect the revenues of the general public.

In the pre-covid times, the impact of both the oil rents and total reserves including gold were significant. The relationship between oil rents with GDP per capita is seen to be negative, whereas, the total reserves including gold with GDP per capita was positive. On the other hand, during the years, 2019-2022, oil rents were now positively related to our dependent variable and also was now no longer significant. The significance of the total reserves including gold had reduced during the pandemic as well.

The annual increase in the population growth during pre-covid times had a negative relationship with the dependent variable but it wasn't significant. During the covid times, the annual population growth rate was still negatively related to the GDP per capita, but it was significant in nature. Exploring further, we can see that the official exchange rate was also not significant enough whereas the national estimates of total unemployment rates of the of the countries was significant as well was negatively related to our dependent variable, i.e., GDP per capita between the years of 2008-2018. From the results, we also found that the official exchange rate was positively related and the significance of the unemployment rate had reduced from the pre-covid to the during covid times.

Next, in the pre-covid times, the Net Trade in Goods was not significant but positively related with the dependent variable. The Net Trade in Goods during the pandemic was still not significant but had turned to be negatively related with per capita GDP. Between 2008-2018, Manufacturing, as a value-added component of the GDP, is highly significant and in negative relationship with GDP per capita. It can also be observed that the y-intercept is significant, whereas, it suffered a decline in its significance levels during the covid years. The real interest rates were no longer significant and was positively related too, between 2009-2022, unlike it was in the pre-pandemic period.

Furthermore, the Table: 2 projects the results for which, the Hausman Test was ran and finally, it was chosen to go for the Fixed Effect Test rather than the Random Effect Test.

5. Inference:

After comparing the two time periods, i.e., pre and during the Covid-19 stricken years, the striking difference between the two time periods was that, a few variables lost their relative significance as well as their relationship changed from being directly related with the dependent variable to being indirectly related and vice versa. Population growth from being non-significant in the pre-covid times to being significant in the covid years. The indirect relationship between the per capita GDP with the population growth rightly justifies that since, GDP per capita is $= \frac{\text{Total GDP}}{\text{Total Population}}$, if population increases, the GDP per capita will decrease and vice versa. During the pandemic, population growth became significant at $p < 0.05$ level, unlike the pre pandemic phase which indicates

towards the fact that when there were no travel restrictions, no lockdown, and international trade were high, the individuals had higher sources of income and more opportunities, such that the impact of the population growth on their income was limited.

Again, the oil rents, which was highly significant and indirectly related with our x variable in our pre-pandemic period, we observe it to be no longer significant once the Covid-19 struck the nations. The indirect relationship can be well explained by the fact that as oil prices increases, the transportation costs will increase, which in turn will increase the market price of the final commodities. This will raise the general price level in the economy giving a push to the inflation rate. Hence, the real value of the income of the individuals will decrease. Furthermore, the oil rents ceased to be significant during the pandemic explains us the less demand of the crude oil for transportation as there were nation-wide lockdowns and restrictions on travelling. Later, the new political developments in the world affair, such as Russia-Ukraine war opened up many opportunities to avail substitutes to the crude oils that were being used earlier and new methods of generating energies like solar energy, electrical vehicles, etc., limiting our dependency on the crude oil as earlier.

The total reserves including golds which were significant in the pre-covid era were less significant during the pandemic years. This could be because, earlier the government used the reserves for the development purposes, which raised the productivity in the economy increasing the income of its people. But, during the pandemic the development activities and many other

economic activities had to take a halt, the significance of the reserves was reduced.

Unemployment rate which was negatively related to the per capita income and also was highly significant in the pre-covid years, their significance level altered and decreased during the covid years. The negative relationship rightly implies that if unemployment rate increases, per capita GDP will decrease. The reduction of its significance level could be because there were other aspects as well which had more impact on the reduction in the earnings of the people, such as increase in death rates due to covid virus, population growth, etc.

Net trade in goods, i.e., Exports-Imports (X-M), changed from being directly related to indirectly proportional to our x variable. This explains the impact of the Covid-19 virus on the international trade, which decreased during the years 2019-2022 and since exports were low and imports were relatively more of the essential goods, income of the public was inversely related to the net trade in goods during the pandemic.

Manufacturing (the value-added percentage to GDP) from being highly significant in the pre-pandemic phase to being non-significant in 2019-2022 points out that the manufacturing sector was suffering from the impact of the virus. The demand for the commodities were reduced and production also declined during the pandemic.

Lastly, the real interest rate indicates at the purchasing power of the people, as the real interest rate is the market interest rate which is adjusted for inflation in the economy. From being negatively related and significant at

$p < 0.1$ level in the pre pandemic phase, during the covid years, it was positively related and non-significant. This shows that in the during the Covid-19 period, there was a lot of other factors impacting the income earnings of the public, which gives more scope for us, the researchers to delve into.

6. Conclusion:

The advent of the pandemic of Covid-19 virus happened when the world wasn't prepared for it. The economies worldwide were brutally faced an adverse effect of the virus. The impact of the economies depended upon the structure of the particular economy and on which sector they were dependent on. In everything, the real sufferers were the individuals either in terms of health or income. The impact of the COVID-19 depended also on the openness of a country's economy and tackling it depended heavily on the development of the country, its infrastructure, the geo-political scenario in that country which drives the policy devised by the government containing the spread of the virus and limiting the rapidly increasing death tolls and also limiting the impact of the virus in the long run. There are socio-economic aspects as well which affected the working and decision taking capabilities of the individuals affecting their productivity and the running of the economy during the pandemic as well. The policies of the government along with the social structure decided on the rate of the adjustment by the people, i.e., how quickly the people adjusted to the current situation and how receptive they were to the changes required. The new patterns and skill set that had to be developed and adopted during the

pandemic relied on the social framework and also the education system along with the developments done in the country's infrastructure and the social changes undertaken by the government and other authorities in the past. This paper does not deal with the socio-political outlook of the Covid-19 virus outbreak but rather focuses on the macroeconomic factors affecting the incomes of the people overall before the advent of the virus and after its spreading in 2019, which provided us with various conjectures that pointed us towards the role of socio-political framework affecting the economy overall and its people's earning. Future studies can be done on this point as well as the comparison of the impact on the earnings of the organized and unorganized sectors as well.

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