

The Impact of the COVID-19 Pandemic Crisis on the Real GDPs of the BRICS Countries and Algeria

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Abstract: The COVID-19 pandemic has led to a recession in the global economy since its onset at the end of 2019. According to the International Monetary Fund's World Economic Outlook report issued in October 2021, the global real GDP growth rate for 2019 was 2.9, then declined and reached -3. The BRICS organisation is a major player in the global economy, and Algeria's application to join it was recently rejected, Therefore, this study aims to discuss the impact of the pandemic on the real GDP of these countries by examining the variables during the pandemic period and the relationship between them, as the study concluded that it had a negative impact as a consequence of the lockdown decision more than being affected by the percentage of deaths from Covid-19 by relying on annual real GDP data and the annual incidence and mortality rate per million population for the countries under study during the pandemic.

Keywords: Algeria; BRICS countries; Covid-19; Global economy; Real GDP.

1. Introduction

In late 2019, a novel coronavirus known as COVID-19 was first identified in Wuhan, China, and quickly escalated into a worldwide pandemic due to its swift transmission. In response, nations globally implemented various strategies including compulsory face coverings, reduced workforce in organizations, shuttering of educational institutions, cessation of most non-essential activities, particularly in the tourism sector, and border closures.

These strategies, collectively termed "Lockdown," were effective in curtailing the virus's spread and safeguarding public health. However, they also precipitated an economic downturn, transforming the health emergency into a financial crisis. This shift resulted in a global economic contraction, with the world's real GDP plummeting to -3.1% in 2020 from a previous high of 2.9% in 2019.

1.1. Research problematic

Consequently, this research paper explores the following question: What is the impact of the COVID-19 pandemic on the real GDP of the BRICS nations and Algeria?

We also derive the following sub-queries from this research problematic:

What is the COVID-19 pandemic?

What is the percentage of COVID-19 infections and deaths for BRICS countries and Algeria?

What was the real GDP of these countries during this pandemic?

1.2. Hypothesis

There is a negative relationship between real GDP and COVID-19 mortality for BRICS countries and Algeria during the pandemic.

1.3. Study objectives

The objective of this study is to assess the repercussions of the COVID-19 pandemic on the real GDP of the BRICS countries and Algeria. It involves a review of existing literature and concepts related to COVID-19 and an analysis of how changes in real GDP correlate with COVID-19 mortality rates.

1.4. Study methodology

In order to study this issue, we will use the descriptive approach to address the COVID-19 pandemic in terms of definition. We will employ descriptive statistics, specifically using the SPSS26 software to create scatter plot correlation graphics, to examine the data concerning COVID-19 incidence and mortality rates alongside the real GDP of Algeria and the BRICS nations.

GDP data are from the International Monetary Fund website www.imf.org

COVID-19 infection data is from <https://ourworldindata.org/>

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2. Literature review

In our exploration of the existing literature, numerous scholarly works have been identified that discuss the economic repercussions of the COVID-19 pandemic globally. These include:

2.1 The research by Pradyot et al. (2021) analyzed the GDP of eight countries (USA, Mexico, Germany, Italy, Spain, France, India, and Japan) during the second quarter of 2020. Their findings indicated a downturn in economic growth with negative GDP figures across the studied nations.

2.2 The study of Zohal et al (2022). This study aimed to investigate China's GDP, where the results showed that the COVID-19 pandemic crisis caused it to decline from its beginning until the end of 2020, when the Chinese economy started to recover again, and the economic growth will continue through 2021 and peak in the first quarter.

2.3 The study of Çakmaklı et al (2020), in this study, the researchers fit the SIR model with Turkey in a general equilibrium framework. They found that the number of COVID-19 deaths has little impact on the sample's GDP growth, which was significantly affected by the lockdown restrictions taken by governments.

2.4 The study of Joseph et al (2023), in this paper, in order to study the impact of COVID-19 on GDP for a sample of 90 countries, the researchers used panel regressions. The study concludes that GDP is not significantly affected by the pandemic mortality rate but rather by the lockdown restrictions.

3. The COVID-19 pandemic

3.1. The initial COVID-19 case emerged in Wuhan, China, in December 2019. The swift proliferation of the virus, coupled with the initial uncertainty about its origin, prompted the World Health Organization (WHO) to issue a global health emergency in January 2020. This

was escalated to a pandemic declaration on March 11, owing to the sudden and widespread increase in infections and fatalities worldwide (World Health Organization, 2020, p. 1).

3.2. Corona virus

Single-chain RNA viruses known as corona viruses (CoVs) infect humans and animals and cause disease in both, affecting the respiratory tract as well as other diseases such as Middle East Respiratory Syndrome (MERS) (Jorge Hidalgo & al, 2022, p 1).

3.3. Definition of COVID-19

COVID-19 is classified as a distinct illness characterized by respiratory issues and low oxygen levels in the blood (Gattinoni, L & al, 2020, p1).

3.4. The English name for COVID-19 is derived as follows

"CO" is the first two letters of the word "corona", "VI" is a derivation of the first two letters of the word "virus" "D" is the first letter of the English word "disease", and "19" because it appeared in 2019.

The WHO formalized the name "COVID-19" on February 11, 2020, based on naming protocols established in conjunction with the World Organization for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO).

4. The impact of the COVID-19 pandemic on the real GDP of Algeria and the BRICS countries

4.1. The number of COVID-19 infections and deaths in the studied countries

The table below provides the figures for COVID-19 infections and deaths, adjusted per million of the population:

Table 1. Number of COVID-19 infections and deaths in Algeria and BRICS countries

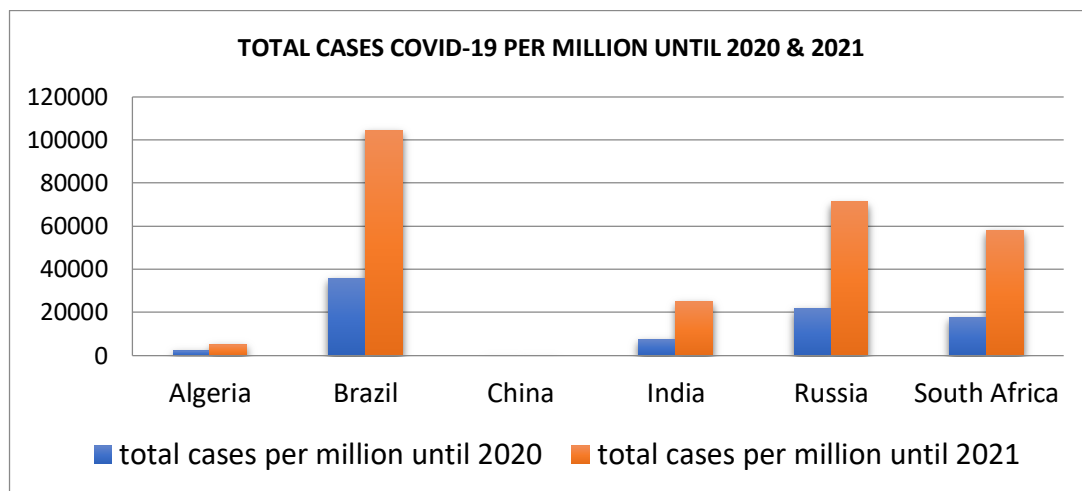
Countries	2020				2021			
	Total cases 2020	total cases per million until 2020	Total deaths 2020	Total deaths per million 2020	Total cases 2021	total cases per million until 2021	Total deaths 2021	Total deaths per million 2021
Algeria	99 610,00	2 254,74	2 756,00	62,38	218 432,00	4 944,37	6 276,00	142,06
Brazil	7 681 032,00	35 838,04	195 072,00	910,16	22 291 839,00	104 008,92	619 334,00	2 889,68
China	93 679,00	65,70	4 634,00	3,25	115 168,00	80,77	4 636,00	3,25
India	10 286 709,00	7 308,17	148 994,00	105,85	34 861 579,00	24 767,32	481 486,00	342,07
Russia	3 127 347,00	21 552,64	56 271,00	387,80	10 320 405,00	71 124,80	302 671,00	2 085,91
South Africa	1 057 161,00	17 799,64	28 469,00	479,34	3 458 286,00	58 227,90	91 145,00	1 534,63

Source: Prepared by researchers based on data from <https://ourworldindata.org/covid-deaths>

The table illustrates variations in COVID-19 infection and death rates across different countries. To neutralize the impact of population density on these statistics, we employed per million inhabitants as a standard metric for infection and death concentrations, as depicted in

Figures (01) and (02).

Fig.1. COVID-19 infections per million in Algeria and the BRICS countries



Source: Prepared by the researchers based on the data of Table (01)

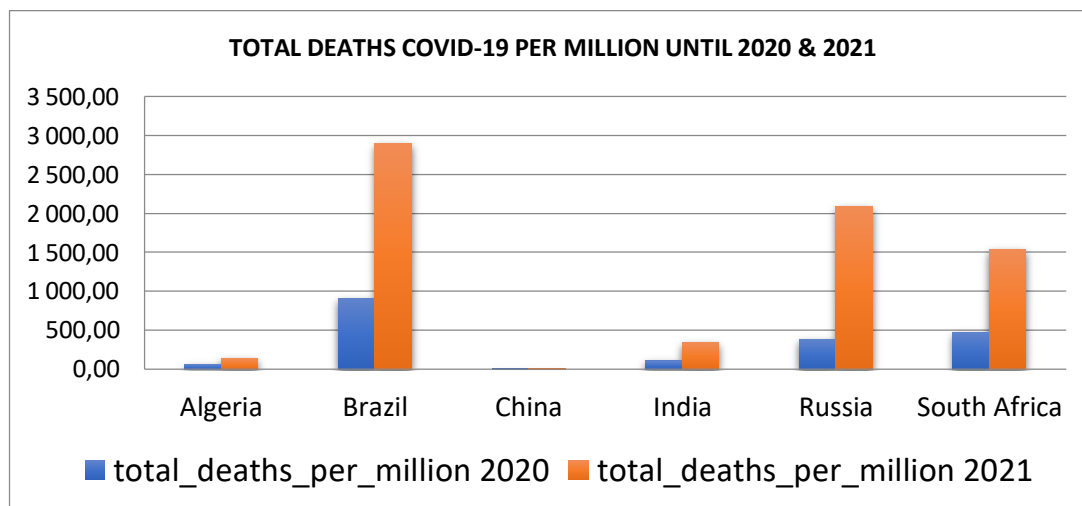
This figure shows that the concentration of COVID-19 infections and deaths varies by country, with Brazil having the highest percentage compared to Russia and South Africa, which had moderate infection values, while it was low in Algeria, India, and China, where the ratios were very low.

We also find that infections were higher in 2021 than in 2020, indicating that the first wave of the COVID-19 pandemic had a lesser impact on countries than the subsequent waves.

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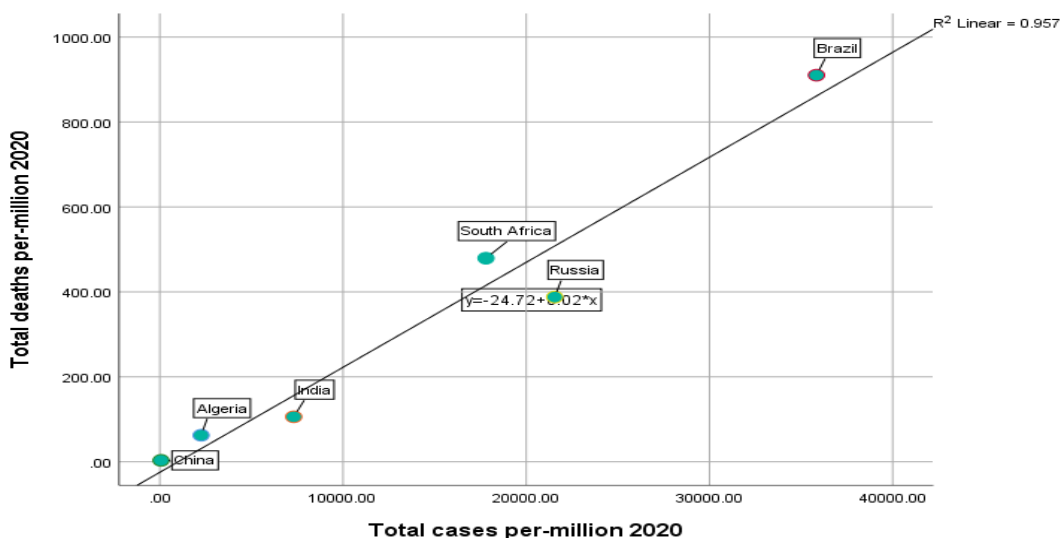
Fig.2. COVID-19 deaths per million populations in Algeria and BRICS countries in 2020 and 2021



Source: Prepared by the researchers based on the data of Table (01)

As for the number of deaths from COVID-19 19 was not different for the countries compared to the number of infections in Figure (01), as we find that Brazil is also the first in terms of the high mortality rate, as the percentage of infections was very high compared to other countries, which had moderate mortality, such as Russia and South Africa, and in both India, Algeria and China, deaths were close to the number of infections, which reflects their good management of the health crisis in terms of prevention and treatment, which we address thoroughly in Figures (03) and (04), which examine the relationship between the number of infections on the change in deaths per million population for the years 2020 and 2021.

Fig.3. Correlation between the infection rates per million individuals and the subsequent alterations in death rates per million during the year 2020



Source: Prepared by the researchers based on data in table (01) and using spss 26

For the year 2020, we find that there is a positive correlation between mortality and infection with COVID-19 and it appears that the data is divided into three categories according to the relationship between infections and deaths from the virus:

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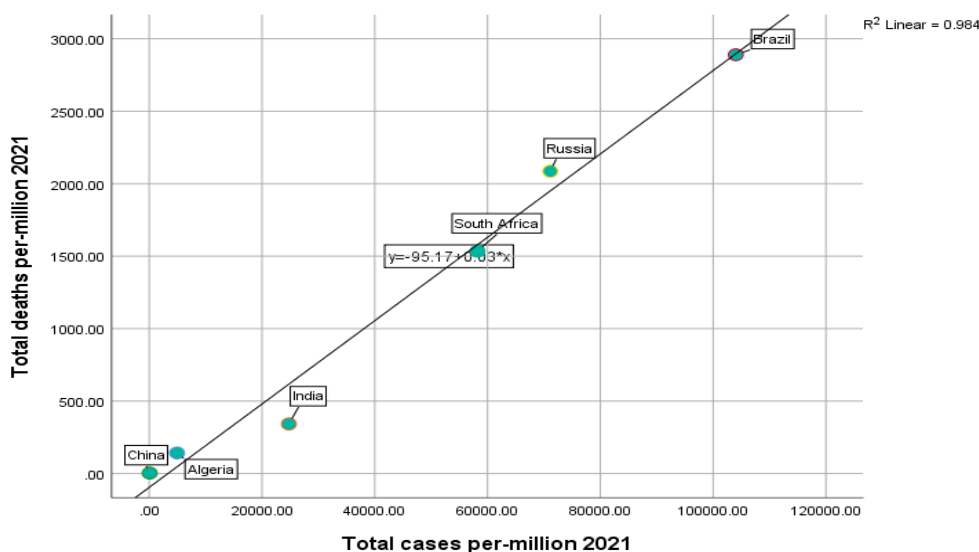
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Category 01 more than 30000 cases per million: Brazil, through which we observe the difficulties faced by the authorities to confront the high number of infections, which were not enough to reduce the mortality rate.

Category 02 between 10000 and 30000 cases per million: Despite relatively moderate infection levels, the significant mortality rates observed suggest inefficiencies in the response and treatment strategies of the health authorities during 2020, as seen in both Russia and South Africa.

Category 03 less than 10000 cases per million: Countries like India, Algeria, and China managed to effectively manage the pandemic throughout 2020. In Algeria, for instance, numerous preventive actions were enforced, including quarantines, movement restrictions, border closures, and mandatory mask-wearing, among other measures, and it also expedited the provision of health equipment. The health sector worked hard to provide the most appropriate treatment for the virus to patients, without forgetting the solidarity of the Algerian society at that time, all these efforts were able to contain the health situation and avoid a high mortality rate similar to that of Category 03 countries, which had a similar mortality rate.

Fig.4. Correlation between the infection rates per million individuals and the variations in mortality rates per million populations in 2021.



Source: Prepared by the researchers based on data in table (01) and using spss 26

For the year 2021, we find that the percentages increased for the countries, but they always remained centred on three categories, as shown in Table 04:

Category 01 more than 100000 cases per million: Brazil exhibits a significant proportion of infections, underscoring the challenges encountered by governmental bodies in mitigating the dissemination of the disease and in administering effective treatments to those affected, as reflected by the elevated mortality rates.

Category 02 between 40000 and 100000 cases per million: Russia and South Africa are still in it, with significant percentages of infections and deaths, which reflects the extent of the struggle that the two countries were in order to preserve the lives of their citizens.

Category 03 less than 40000 cases per million: India, Algeria, and China have demonstrated substantial efforts to control the pandemic. Notably, China's vaccine production and distribution strategy has been pivotal, with Algeria being among the initial beneficiaries to administer these vaccines to its populace. Moreover, these countries have shown commendable efforts in treating patients and managing oxygen supplies, which were critically limited.

4.2 The Real GDP in Algeria and BRICS for 2019, 2020, 2021 and 2022

As a result of the pandemic sweeping all countries of the world, forcing most of them to lock down, affecting global supply chains, causing a contraction in the real GDP of the world in general and emerging countries, as shown in Table (02):

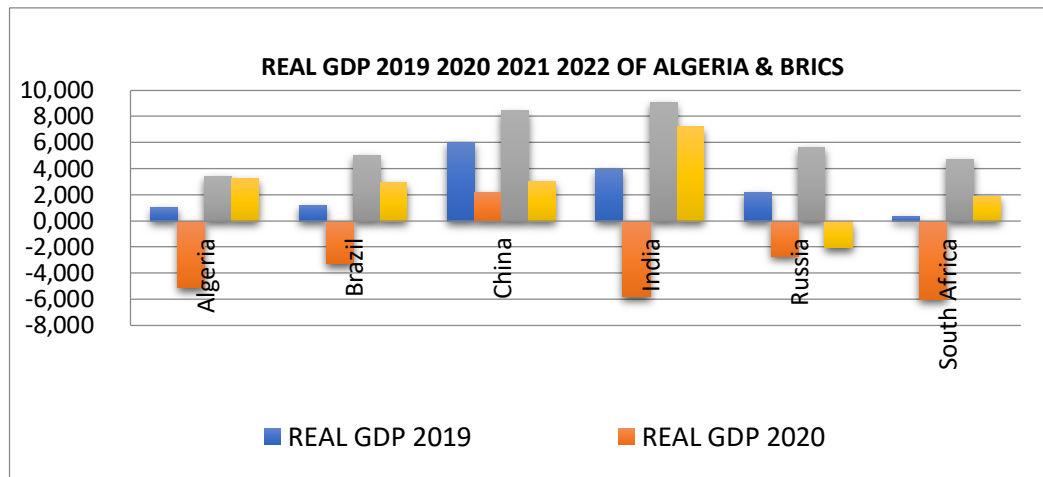
Table 2. Real GDP in Algeria and BRICS 2019 2020 2021 2022

Countries	REAL GDP 2019	REAL GDP 2020	REAL GDP 2021	REAL GDP 2022
Algeria	1,0	-5,1	3,4	3,2
Brazil	1,2	-3,3	5,0	2,9
China	6,0	2,2	8,4	3
India	3,9	-5,8	9,1	7,2
Russia	2,2	-2,7	5,6	-2,1
South Africa	0,3	-6,0	4,7	1,9

Source: Prepared by researchers based on data from https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD/BRA/DZA/CHN/IND/ZAF/RUS

The table illustrates the profound impact of the 2020 pandemic on the real GDP of these nations, as distinctly shown in Figure (05).

Fig.5. Real GDP in Algeria and BRICS 2019 2020 2021 2022



Source: Prepared by the researchers based on data in Table (02) and using Excel

We note that the 2020 values are very low compared to the 2019 values, as we find that the real GDP of Algeria, India, Russia and South Africa was negative in 2020. While China experienced a noticeable reduction in GDP, it did not reach negative levels, largely due to the economic slowdown triggered by lockdown measures and disruptions in supply chains. This period also coincided with the oil crisis, which saw a significant drop in oil prices in 2020, adversely affecting the GDP of oil-exporting nations.

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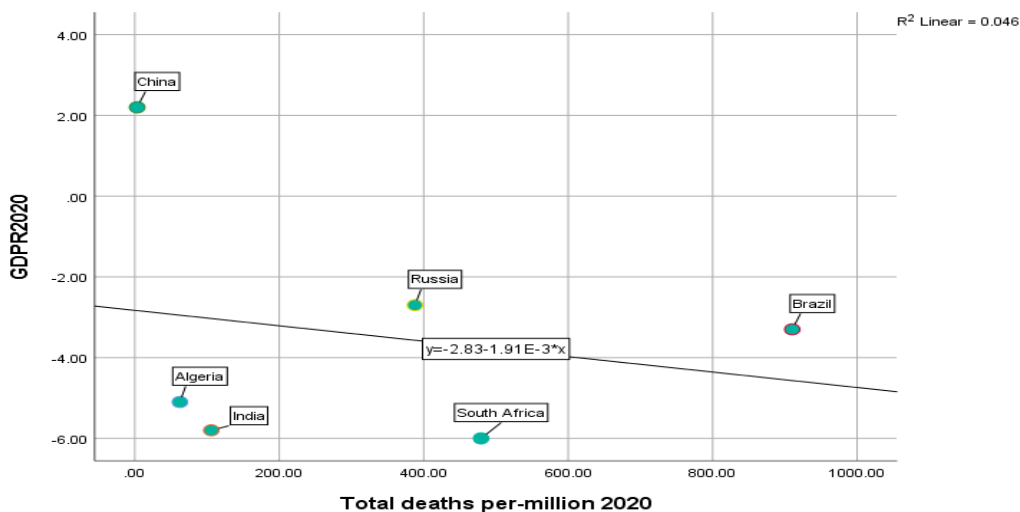
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After that, the values returned to increase in 2021, which indicates the beginning of recovery for most countries, as a result of the gradual return of activities, but the growth rates returned to decline in 2022, due to the Ukrainian-Russian war.

4.3 The correlation between COVID-19 deaths per million populations and the change in real GDP in Algeria and BRICS countries for 2020 and 2021

We exemplify it through statement (06) represented by the Scatter plots graphic, which is as follows:

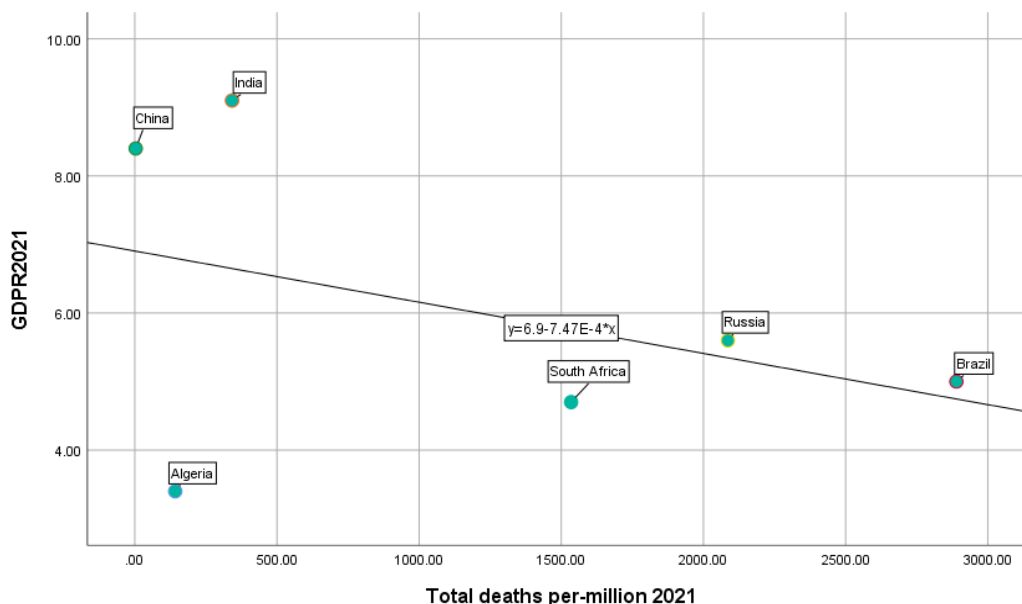
Fig.6. Correlation between the number of COVID-19 deaths per million populations and the change in real GDP in Algeria and BRICS countries for 2020



Source: Prepared by the researchers based on data from Table (01) and (02) using spss 26

During 2020, there was a clear negative correlation between COVID-19 mortality rates per million people and the annual real GDP. Countries with higher death rates generally experienced a decline in real GDP, with China being the exception. Which is explained as the economic result of containing the pandemic by closing supply chains and low oil prices that affected the economy of oil producing countries, most notably South Africa, whose GDP shrank to -6%, to rise again in 2021 as shown in Figure (07):

Fig.7. Correlation between the number of COVID-19 deaths per million populations and the change in real GDP in Algeria and BRICS countries for 2021



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Source: Prepared by the researchers based on data from Table (01) & (02) using Spss 26

Through it, we note that there is a negative correlation, although there is an increase in the real GDP of countries compared to the increase in mortality, but what is striking in statement (07) is that the position of India is different from most countries compared to its position in statement (06), where we find that the pace of deaths in 2021 was similar to 2020, but the real GDP moved from -5.8 in 2020 to 9.1 in 2021, in addition to China, whose real GDP returned to rise in 2021 to 8.4 against the mortality rate that remained low.

As for Algeria, it is clear from statements (06) and (07) that its priority was to contain the pandemic and minimize human losses in 2020, while in 2021 it began to open economic activity and ease measures with the start of vaccination, which made the GDP rate recover to 3.41% while maintaining the low mortality rate.

In South Africa, Russia and Brazil, while real GDP rates increased in 2021 compared to 2020, deaths due to COVID-19 doubled in 2021, illustrating the difficulty countries have had in preventing and treating COVID-19.

5. Conclusion

This analysis leads to the conclusion that the COVID-19 pandemic profoundly affected the economic dynamics of Algeria and the BRICS nations, barring China, which managed to mitigate the severe economic repercussions experienced by others. These countries entered a recession in 2020, which impeded the growth of their real GDP. Nonetheless, extensive efforts were made by most countries through various strategies to control the epidemic's spread and rejuvenate their economies.

In the case of Algeria, it was one of the first to close borders, apply quarantine, wear masks and purchase vaccines in order to contain the pandemic and gradually open economic activities in line with not spreading the infection to enter into transformative recovery

measures, as confirmed by the Middle East and Asia Regional Economic Outlook Report (2021) issued by the International Monetary Fund (IMF).

According to the World Economic Outlook (2021) by the International Monetary Fund (IMF), the real GDP of Algeria and various other countries is expected to recover in 2021 following a contraction, albeit at differing velocities due to variations in crisis response and vaccine accessibility, which have been pivotal in driving medium-term economic expansion since April 2021.

Nonetheless, the growth trajectories dipped once more in 2022, impacted by the Russian-Ukrainian conflict. This trend underscores that health or security crises, along with lockdown measures, consistently exert a detrimental effect on global real GDP levels.

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