COVID-19 AND THE WORLD ECONOMY: DISRUPTION, RESPONSE, AND RECOVERY

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Abstract

This study examines the macroeconomic impact of the COVID-19 crisis by comparing key economic indicators across three distinct periods: pre-COVID, during COVID, and post-COVID. Using global data, the analysis reveals that real GDP growth increased significantly during the COVID period, rising from a median of 2.70% to 5.50% ($p<0.0001$), while GDP per capita (in both USD and PPP terms) remained statistically unchanged. However, inflation and unemployment rates both rose significantly during the pandemic, with inflation increasing from 2.20% to 3.50% ($p<0.0001$) and unemployment from 5.70% to 6.80% ($p=0.0599$). Fiscal indicators also deteriorated during the crisis: median government deficits rose from 1.80% to 4.00% of GDP ($p<0.0001$), and government gross debt increased from 48.80% to 55.85% of GDP ($p=0.0044$). In the post-COVID period, real GDP growth remained stable at around 2.80% ($p=0.3363$), and while nominal GDP per capita did not show a significant change, GDP per capita (PPP) increased meaningfully from $14,362 to $18,077 ($p=0.0296$). Inflation continued to rise sharply, reaching a median of 5.65% ($p<0.0001$), while the unemployment rate improved slightly to 5.30% ($p=0.0688$). Although the current account balance showed no statistically significant variation, both government deficits and debt levels remained elevated compared to the pre-COVID period, despite modest improvements. These findings suggest that the COVID-19 crisis had profound short-term macroeconomic effects, particularly on inflation, employment, and fiscal health, with some signs of partial recovery emerging in the post-pandemic phase.

Keywords: COVID, *crisis, inflation, unemployment, debt, deficit, GDP, current account, trade*

Clasificare JEL : *E24, E31, E60, E65, F44, H63, I15*

1. Introduction and context of the study

The COVID-19 pandemic has had profound and far-reaching effects on the global macroeconomy, triggering one of the most significant economic disruptions since the Great Depression. Virtually no country or sector remained unaffected as the crisis unfolded, exposing deep interdependencies in the global economy and challenging the resilience of existing macroeconomic frameworks. The shock was multidimensional, originating as a public health emergency but rapidly evolving into a full-scale economic crisis that impacted production, consumption, employment, trade, public finances, and financial markets.

A rapidly growing body of literature has documented the magnitude and complexity of the pandemic's economic fallout. McKibbin and Fernando (2021), using macroeconomic modeling, projected large global GDP losses even under relatively contained scenarios. Empirical studies such as those by Weiss et al. (2020), Fernandes (2020), and Maital and Barzani (2020) confirmed these projections, estimating real output contractions between 4.5% and 6% in 2020 alone. Researchers have also highlighted the heterogeneous nature of the impact, noting that economies dependent on tourism, trade, or informal labor were especially vulnerable.

The mechanisms behind the downturn were both demand- and supply-driven. Theoretical work by Fornaro and Wolf (2020) and Barua (2021) emphasized the combined effects of supply chain disruptions, production constraints, and deteriorating consumer and business expectations. Meanwhile, empirical analyses by Jawad and Naz (2023) and Long et al. (2022) revealed sharp

increases in unemployment, inflation volatility, depreciating currencies, and the limitations of monetary policy in stabilizing real economic activity. Sectoral studies, such as those by Roy (2020) and Kolahchi et al. (2021), documented major contractions in tourism, aviation, oil, manufacturing, and services, with disproportionate consequences for developing countries with limited fiscal space (Mou, 2020; Akbulaev et al., 2020).

Despite significant policy interventions, the recovery has been uneven and uncertain. While central banks and governments implemented emergency fiscal and monetary measures, the long-term structural consequences remain a subject of debate (Nicola et al., 2020; Khan et al., 2021). The literature also points to the evolving nature of the recovery, with lasting implications for labor markets, public debt, and inflation dynamics.

This study contributes to the existing body of research by offering a comparative, data-driven analysis of the macroeconomic impact of COVID-19 across three distinct phases: pre-COVID, during COVID, and post-COVID. Drawing on global economic data, it examines changes in real GDP growth, GDP per capita (both nominal and PPP-adjusted), inflation, unemployment, fiscal balances, and public debt. The findings indicate that while some indicators—such as real GDP growth—temporarily improved during the crisis, others—such as inflation, unemployment, and fiscal health—deteriorated significantly. In the post-pandemic period, partial recovery has occurred, particularly in employment and PPP-adjusted income, though inflation and public debt remain elevated. By situating these trends within the broader literature, this paper aims to deepen our understanding of the macroeconomic consequences of the pandemic and inform future policy responses.

2. Literature Review

The COVID-19 pandemic has triggered one of the most significant global macroeconomic shocks since the Great Depression. The magnitude and multidimensional nature of its impact have spurred an extensive and rapidly growing body of literature exploring various macroeconomic consequences across countries, sectors, and policy domains.

A central theme emerging in the literature is the unprecedented contraction of global economic output. Early modeling efforts by McKibbin and Fernando (2021) highlight the wide-ranging GDP losses under different pandemic scenarios using a hybrid DSGE/CGE model, emphasizing that even a contained outbreak could cause substantial global economic costs. These projections are echoed by Weiss et al. (2020) and Maital and Barzani (2020), who estimate global GDP declines of 4.5% to 6% in 2020 and warn of persistent effects on poverty and labor markets. Fernandes (2020) further underscores the heterogeneity of outcomes, showing that countries more dependent on tourism and trade—like Spain, Greece, and Portugal—were disproportionately affected.

Several studies also explore the underlying mechanisms of the macroeconomic downturn. Fornaro and Wolf (2020) conceptualize the crisis as a combination of supply and demand shocks, driven by both production constraints and pessimistic expectations, which can lead to stagnation traps unless countered by aggressive investment policies. Complementing this theoretical insight, Barua (2021) maps the pandemic's impact through the AD-AS framework, capturing disruptions in demand, supply chains, prices, exchange rates, and trade.

Empirical analyses confirm significant disruptions to key macroeconomic indicators. Jawad and Naz (2023) find that interest rates initially rose and then declined, exchange rates depreciated, and unemployment surged across the U.S., Pakistan, and globally. Inflation and current account balances also fluctuated in response to declining imports and uncertain demand. Long et al. (2022) show that while central bank actions helped to contain inflationary pressures, they were less effective at curbing rising unemployment, underscoring the limits of monetary policy in mitigating real economy shocks.

The pandemic also had pronounced sectoral effects. Roy (2020) and Kolahchi et al. (2021) document sharp downturns in tourism, aviation, oil, manufacturing, and services, with cascading

effects on employment and investment. Mou (2020) and Akbulaev et al. (2020) elaborate on the sector-specific vulnerabilities, especially in developing economies where health systems and fiscal capacity are weak. Kumar et al. (2021) expand this perspective by examining the pandemic's repercussions on education, society, and the environment, illustrating the interconnectedness of economic and non-economic domains.

In the financial sphere, Mensi et al. (2022) analyze risk spillovers in green bond markets, revealing increased volatility and interconnectedness exacerbated by macroeconomic stress and global uncertainty. The broader financial implications are further explored by Bagchi et al. (2020) and Brodeur et al. (2021), who underscore the role of financial markets and policy responses in either amplifying or dampening economic volatility.

A regional focus is provided by Sawada and Sumulong (2021), who assess the economic impacts across developing Asia. They estimate GDP contractions of up to 9.5% in 2020 and emphasize the importance of domestic demand declines, tourism collapse, and global spillovers. Their findings align with Asare and Barfi (2021), who highlight the uneven impact on poverty alleviation and growth, particularly in low-income countries.

The historical and theoretical context of pandemics and economic crises is also addressed. Ceylan et al. (2020) draw comparisons with past pandemics to assess structural vulnerabilities, while Barua (2020) stresses the need for international cooperation and coordinated macroeconomic policies to counteract the global nature of the crisis. Mishra (2020) and Lahiri and Sinha (2021) call for urgent fiscal interventions to support vulnerable populations and stabilize economic systems.

Finally, the literature points to the uncertain and evolving nature of the recovery. Nicola et al. (2020) and Khan et al. (2021) highlight the socio-economic adjustments in labor, consumption, and production patterns, suggesting long-term structural changes. Feyisa (2020) emphasizes the potential for both short-term shocks and long-term economic transformation, depending on the pace and effectiveness of policy responses.

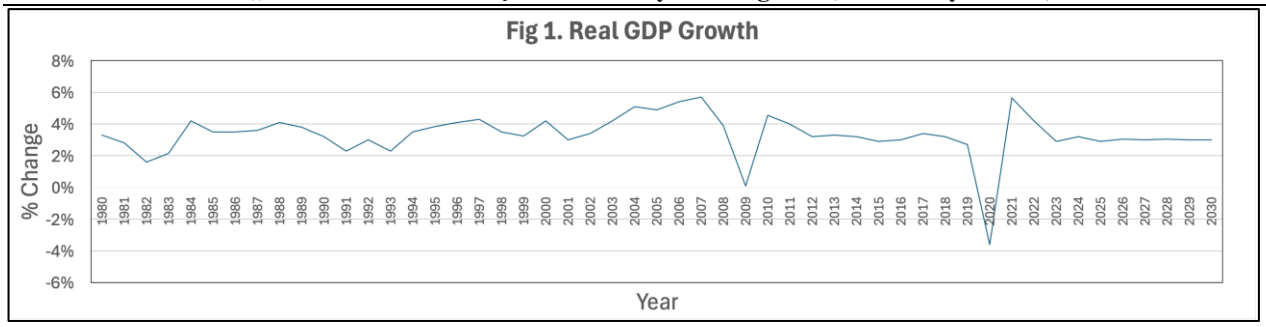
In sum, the COVID-19 crisis has exposed deep interdependencies in the global economy and tested the limits of existing macroeconomic frameworks. The literature converges on the need for robust public health investment, flexible macroeconomic policies, and international solidarity to navigate and recover from the unprecedented economic fallout of the pandemic.

3. Data and Methodology

We use the IMF data on eight macroeconomic variables. These are "real GDP growth (%)", "GDP per capita ($)", "GDP per capita (PPP)", "Inflation (avg)", "Unemployment (%)", "CA balance (%GDP)" (i.e. current account balance), "Govt net lending/bor (%GDP)", and "Govt gross debt (%GDP).

We took the year 2019 as the pre-COVID period, the year 2021 as the COVID period, and the year 2023 as the post-COVID period. Using nonparametric tests (i.e. Mann-Whitney-Wilcoxon tests), we first compare the pre-COVID period values of the eight variables to the COVID period values of them. This comparison will allow us to see how these measures changed during the height of the COVID crisis. Then, we compare the pre-COVID period values to the post-COVID period values. This comparison will allow us to see whether these measures have returned to their pre-crisis levels. In total, there are 196 countries in the dataset.

Figure 1 shows the global real median GDP growth rate from 1980 to 2030. During the 1980s and 1990s, the growth rate remained relatively steady, fluctuating relatively between 2% and 4%. A slight dip occurred in 2009, followed by a gradual recovery. The sharpest change is shown in 2020, when the growth rate dropped significantly reaching -3.6%. This was followed by a strong rebound in 2021, with the median reaching 5.65%, the highest point over this period. After 2021, the trend declines slightly and stabilizes around 3% through 2030.



When we look at the median global GDP per capita from 1980 to 2030 in Figure 2, measured in both U.S. dollars and purchasing power parity (PPP), we see a steady upward trend in both series. In 1980, the median GDP per capita was $1,570 in USD and $2,860 in PPP. By 2019, these values rose to $6,370 and $14,508, respectively. A small decline is shown in 2020 for both measures, followed by an increase in 2021, reaching $11,234 in USD and $27,524 in PPP by 2030.

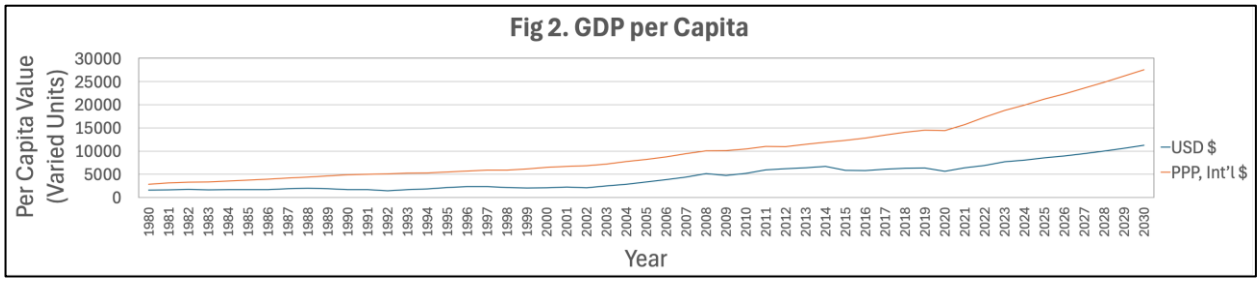
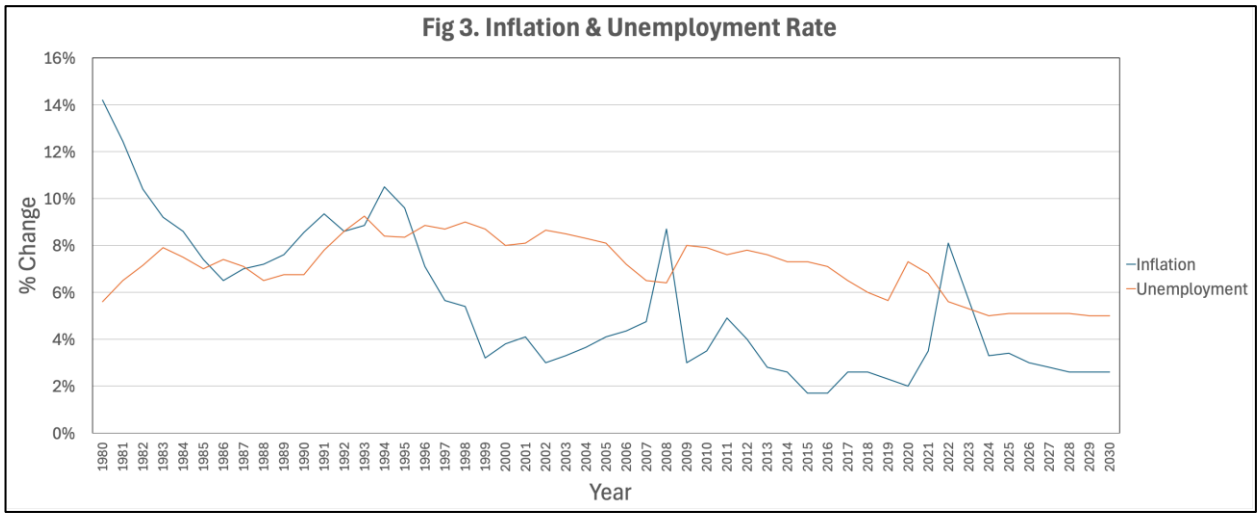


Figure 3 shows the median global inflation and unemployment rates from 1980 to 2030. In the early 1980s, median inflation is high, starting at 14.2% and remaining above 6% through the mid-1980s and 1990s. From there, inflation steadily declines, reaching around 3.8% by 2000. In the following years, it remains relatively stable, ranging between 3% and 5% until 2007. In 2008, a noticeable spike occurs, with inflation rising to 8.7%, followed by a sharp drop to 3% in 2009 staying low until 2021. A second sharp increase is shown in 2022, when inflation jumps to 8.1%, before declining to 5.7% in 2023.



The unemployment rate follows a more stable path. It begins at 5.6% in 1980 and rises to 7.9% in 1983. After that, it fluctuates within a narrow band between 6% and 9% for most of the period. There is a slight jump in 2020 to 7.3% from a previous low of 5.65% in 2019. In the following years, unemployment steadily declines, reaching 5% by 2030.

The median global current account balance is shown from 1980 to 2030 is shown in Figure 4, measured as a percentage of GDP. The values remain negative throughout the entire period, indicating consistent current account deficits. In 1980, the median balance is -3.2%. The deficit widens slightly in the early 1980s, reaching -4.1% in 1981, and then begins to improve. By 2004 the median value reaches its highest point at -0.8%. After 2004, the balance begins to decline again, falling to -3.3% in 2008. During the 2010s, the account balance fluctuates between -1.8% and -2.7%. In 2020, the deficit narrows to -1.2%, but by 2030, it settles slightly higher at -1.75%.

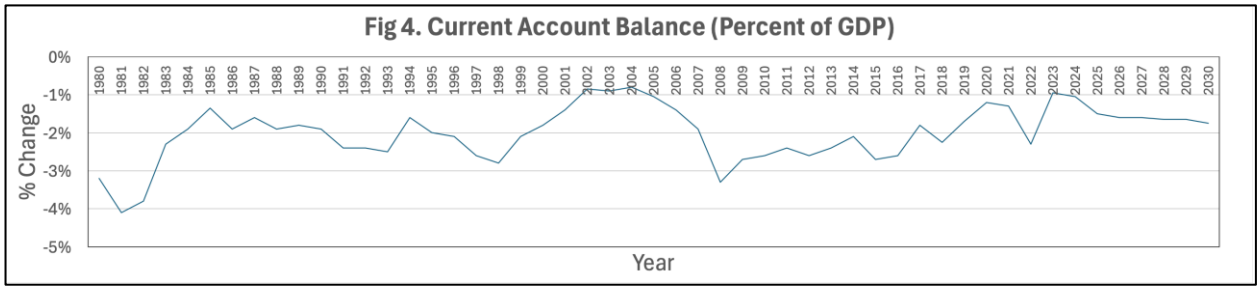
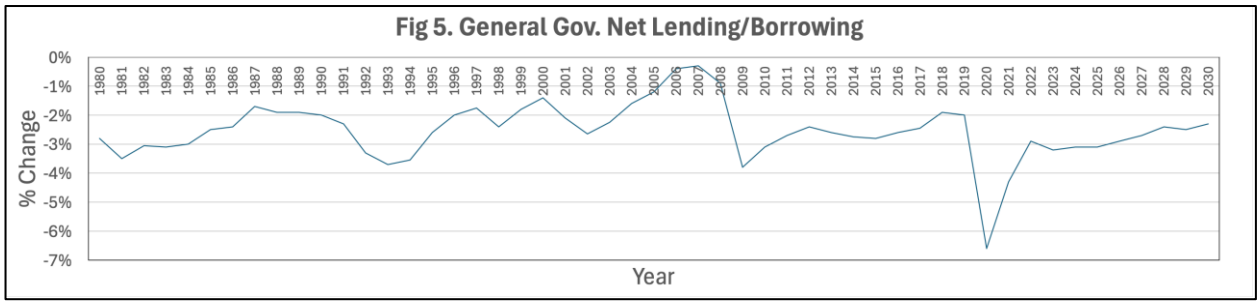


Figure 5 shows the median global general government net lending or borrowing as a percentage of GDP from 1980 to 2030. The values are negative throughout the period, indicating that most countries operated under fiscal deficits. In the 1980s and 1990s, the deficit typically remains between -1.5% and -4%. There is an increase in the mid-2000s, with the deficit narrowing to -0.3% in 2007. After 2008, the balance declines again, reaching -3.8% in 2009. After this, there is a gradual increase until a sharp drop in 2020, when the median deficit widens to -6.6% before increasing to -2.9% in 2022.



When looking at the median global general government debt as a percentage of GDP in Figure 6 from 1980 to 2030, we see an overall pattern of long-term increase with periods of both decline and sharp rises. In 1980, the median debt was 43.6% of GDP. The values fluctuate through the 1980s and 1990s reaching 55.2% in 2002. A downward trend follows, with debt falling to its lowest point of 33.95% in 2008. After 2008, the trend reverses, and debt rises steadily across the next decade. A sharp increase is shown in 2020, when the median debt jumps to 59.6%. Although there is a slight decline in the following years, the values remain elevated, ending at 52.5% in 2030.

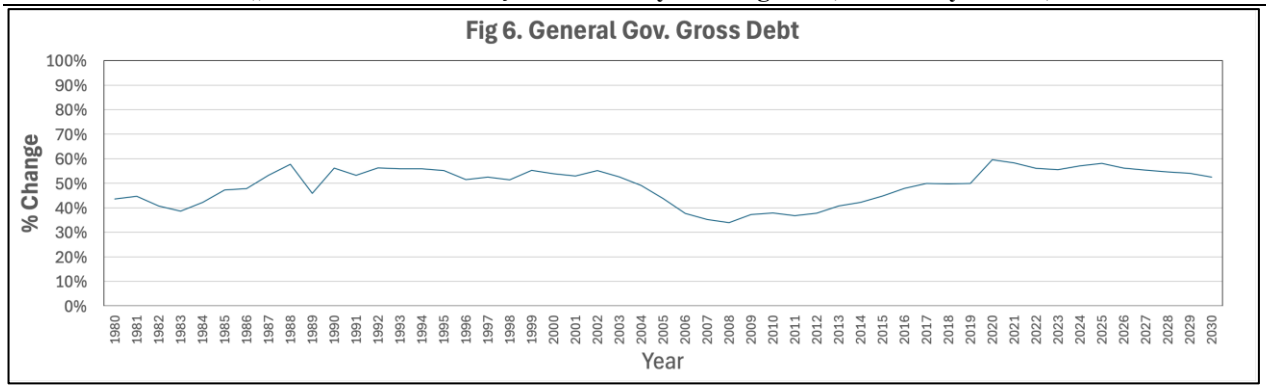


Table 1 shows the summary statistics for the pre-COVID, COVID, and post-COVID periods. The median value of the "Real GDP growth" was 2.70% during the pre-COVID Period. Interestingly, this increased to 5.50% during COVID and later dropped to 2.80% post-COVID. The median GDP per capita was $6,132 during the pre-COVID period. This dropped to $6,061 during COVID and later increased to $7,092 post-COVID. The median GDP per capita (PPP) was $14,362 during the pre-COVID period. This increased to $15,332 during COVID and later increased to $18,077 post-COVID.

Table 1. Summary Statistics

Panel A. Pre-COVID							
Year	**N**	**Min**	**Max**	**Mean**	**Median**	**Skewness**	**Kurtosis**
Real GDP growth	196	-27.70	13.40	2.65	2.70	-2.93	21.68
GDP per capita ($)	196	261.01	113,830	15,097	6,132	2.04	4.40
GDP per capita (PPP)	196	582.82	124,750	23,141	14,362	1.68	3.31
Inflation (avg)	196	-3.20	19,906.00	107.32	2.20	13.96	194.93
Unemployment (%)	196	1.00	28.70	7.51	5.70	1.90	4.07
CA balance (%GDP)	196	-68.80	40.00	-2.07	-2.10	-1.13	9.76
Govt net lending/bor (%GDP)	196	-25.40	31.00	-1.70	-1.80	1.17	11.24
Govt gross debt (%GDP)	196	0.00	260.40	57.06	48.80	2.37	8.49
Panel B. COVID							
Year	**N**	**Min**	**Max**	**Mean**	**Median**	**Skewness**	**Kurtosis**
Real GDP growth	196	-14.50	37.50	5.73	5.50	1.06	6.65
GDP per capita ($)	196	274.35	136,190	16,203	6,061	2.27	6.04
GDP per capita (PPP)	196	888.18	140,411	24,741	15,332	1.73	3.65
Inflation (avg)	196	-3.00	1588.50	16.65	3.50	12.79	170.59
Unemployment	196	1.90	34.30	8.36	6.80	2.11	5.61
CA balance (%GDP)	196	-43.80	46.80	-1.68	-2.10	0.16	3.90
Govt net lending/bor (%GDP)	196	-20.10	44.50	-3.78	-4.00	3.40	29.05
Govt gross debt (%GDP)	196	0.00	360.90	65.29	55.85	2.82	13.88
Panel C. Post-COVID							
Year	**N**	**Min**	**Max**	**Mean**	**Median**	**Skewness**	**Kurtosis**
Real GDP growth	196	-20.80	75.10	3.36	2.80	7.29	80.43
GDP per capita ($)	196	327.26	132,564	17,536	7,092	2.10	4.87
GDP per capita (PPP)	196	971.29	147,019	28,710	18,077	1.55	2.62
Inflation (avg)	196	-7.70	667.40	15.45	5.65	9.34	98.69
Unemployment	196	1.00	47.60	6.85	5.30	4.11	22.95
CA balance (%GDP)	196	-49.10	32.30	-1.51	-1.30	-0.51	4.37
Govt net lending/bor (%GDP)	196	-37.30	26.30	-2.40	-2.80	0.01	11.67
Govt gross debt (%GDP)	196	0.00	259.60	61.19	52.70	1.83	5.92

The median inflation rate was 2.20% during the pre-COVID period. This increased to 3.50% during COVID and later increased to 5.65% post-COVID. The median unemployment rate was 5.70% during the pre-COVID period. This increased to 6.80% during COVID and later dropped to 5.30% post-COVID.

The median Current account balance was -2.10% of GDP (i.e., deficit) during the pre-COVID period. This was flat at -2.10% of GDP during COVID and later decreased to -1.30% (i.e., smaller deficit) post-COVID. The median government deficit was 1.80% during the pre-COVID period. This increased to 4.00% during COVID and later dropped to 2.80% post-COVID. The median government gross debt was 48.80% of GDP during the pre-COVID period. This increased to 55.85% during COVID and later dropped to 52.70% post-COVID.

4. Empirical Results

Table 2 compares the pre-COVID period to the COVID period. The median real GDP growth went up significantly from 2.70% to 5.50% during the COVID period (p<0.0001). There was no statistically significant change in GDP per capita ($) and GDP per capita (PPP). The median GDP per capita was $6,132 pre-COVID, and it slightly decreased to $6,061 during COVID (p=0.3774). The median GDP per capita (PPP) was $14,362 pre-COVID, and it slightly increased to $15,332 during COVID (p=0.2833).

Table 2. Comparison of Pre-COVID Period versus COVID Period

	Pre-COVID		COVID		Mann-W.
Variable	**Mean**	**Med.**	**Mean**	**Med.**	**p-value**
Real GDP growth	2.65	2.70	5.73	5.50	<0.0001
GDP per capita ($)	15097	6132	16203	6061	0.3774
GDP per capita (PPP)	23141	14362	24741	15332	0.2833
Inflation (avg)	107.32	2.20	16.65	3.50	<0.0001
Unemployment (%)	7.51	5.70	8.36	6.80	0.0599
CA balance (%GDP)	-2.07	-2.10	-1.68	-2.10	0.4984
Govt net lending/bor (%GDP)	-1.70	-1.80	-3.78	-4.00	<0.0001
Govt gross debt (%GDP)	57.06	48.80	65.29	55.85	0.0044

The inflation rate went up significantly. The median inflation rate went up from 2.20% to 3.50% (p<0.0001). The unemployment rate also went up significantly. The median unemployment rate went up from 5.70% to 6.80% (p=0.0599).

The Current account balance was flat at -2.10% of GDP (i.e., deficit). On the other hand, the median government deficit went up significantly. It went up from 1.80% to 4.00% (p<0.0001). Also, the median government gross debt went up significantly. It went up from 48.80% of GDP to 55.85% of GDP (p=0.0044).

Table 3 compares the pre-COVID period to the post-COVID period. The median real GDP growth was almost flat at 2.70%-2.80% (p=0.3363). Also, there was no statistically significant change in GDP per capita ($). The median GDP per capita was $6,132 pre-COVID, and it slightly increased to $7,092 post-COVID (p=0.1352). On the other hand, the median GDP per capita (PPP) went up significantly. It was $14,362 pre-COVID, and it increased to $18,077 post-COVID (p=0.0296).

Table 3. Comparison of Pre-COVID Period versus Post-COVID Period

	Pre-Covid		Post-Covid		Mann-W.
Variable	**Mean**	**Med.**	**Mean**	**Med.**	**p-value**
Real GDP growth	2.65	2.70	3.36	2.80	0.3363
GDP per capita ($)	15097	6132	17536	7092	0.1352
GDP per capita (PPP)	23141	14362	28710	18077	0.0296
Inflation (avg)	107.32	2.20	15.45	5.65	<0.0001
Unemployment (%)	7.51	5.70	6.85	5.30	0.0688
CA balance (%GDP)	-2.07	-2.10	-1.51	-1.30	0.2770
Govt net lending/bor (%GDP)	-1.70	-1.80	-2.40	-2.80	0.0108
Govt gross debt (%GDP)	57.06	48.80	61.19	52.70	0.0772

The inflation rate went up significantly. The median inflation rate went up from 2.20% to 5.65% post-COVID ($p<0.0001$). On the other hand, the unemployment rate went down significantly. The median unemployment rate went down from 5.70% to 5.30% ($p=0.0688$).

The Current account balance did not change significantly. It was -2.10% of GDP (i.e., deficit), and it decreased to -1.30% of GDP post-COVID ($P=0.2770$). On the other hand, the median government deficit went up significantly. It went up from 1.80% to 2.80% ($p<0.0108$). Also, the median government gross debt went up significantly. It went up from 48.80% of GDP to 52.70% of GDP ($p=0.0772$).

Overall, the inflation rate, the unemployment rate, the government deficits, and the government gross debt deteriorated during COVID, but the unemployment rate improved post-COVID, while the inflation rate continued to increase. The GDP per capita (PPP) improved post-COVID. On the other hand, government deficits and governments' gross debt later somewhat recovered (i.e., declined) post-COVID, although they were still at elevated levels compared to the pre-COVID period.

5. Conclusion

The COVID-19 pandemic has left a lasting imprint on the global macroeconomy, revealing both the vulnerabilities and resilience of national economies in the face of systemic shock. This study examined macroeconomic dynamics across three phases—pre-COVID, during COVID, and post-COVID—using global data to evaluate key indicators such as real GDP growth, GDP per capita, inflation, unemployment, fiscal deficits, and public debt. The findings underscore the complex and uneven nature of the crisis and its aftermath.

During the pandemic, real GDP growth paradoxically increased, largely due to baseline effects and stimulus-driven recoveries in some regions. However, this growth masked deeper structural weaknesses, as inflation and unemployment rose significantly, and fiscal health deteriorated sharply. Government deficits and debt levels surged in response to emergency spending needs, reflecting the scale of intervention required to prevent economic collapse.

In the post-COVID period, partial normalization emerged. Unemployment rates improved modestly, and GDP per capita (PPP) showed significant gains, suggesting a recovery in living standards, particularly in emerging markets. Nonetheless, inflation continued to rise—posing challenges to monetary authorities—and both government deficits and public debt remained elevated compared to pre-pandemic levels, highlighting persistent fiscal pressures.

Overall, this study confirms that the COVID-19 crisis produced profound short-term macroeconomic disruptions and set in motion longer-term trends that continue to shape the global economic landscape. The analysis complements existing literature by quantifying the magnitude and direction of these changes across time. As policymakers confront new global uncertainties, including geopolitical tensions and climate-related shocks, the lessons from the COVID-19 crisis underscore

the importance of building economic resilience through flexible policy frameworks, robust public health systems, and coordinated international responses. Future research should continue to monitor the evolving macroeconomic landscape, particularly with respect to structural transformations in labor markets, inflation dynamics, and fiscal sustainability in the post-pandemic world.

6. Bibliography

[1] **Akbulaev, N.**, **Mammadov, I.**, and **Aliyev, V.** (2020). Economic impact of COVID-19. *Sylwan, 164*(5).
[2] **Asare, P.**, and **Barfi, R.** (2021). The impact of Covid-19 pandemic on the Global economy: emphasis on poverty alleviation and economic growth. *Economics, 8*(1), 32–43.
[3] **Bagchi, B.**, **Chatterjee, S.**, **Ghosh, R.**, **Dandapat, D.**, **Bagchi, B.**, **Chatterjee, S.**, and **Dandapat, D.** (2020). Impact of COVID-19 on global economy. In *Coronavirus outbreak and the great lockdown: Impact on oil prices and major stock markets across the globe*, 15–26.
[4] **Barua, S.** (2020). Understanding Coronanomics: The economic implications of the coronavirus (COVID-19) pandemic.
[5] **Barua, S.** (2021). Understanding coronanomics: The economic implications of the COVID-19 pandemic. *The Journal of Developing Areas, 55*(3), 435–450.
[6] **Brodeur, A.**, **Gray, D.**, **Islam, A.**, and **Bhuiyan, S.** (2021). A literature review of the economics of COVID-19. *Journal of Economic Surveys, 35*(4), 1007–1044.
[7] **Ceylan, R. F.**, **Ozkan, B.**, and **Mulazimogullari, E.** (2020). Historical evidence for economic effects of COVID-19. *The European Journal of Health Economics, 21*, 817–823.
[8] **Fernandes, N.** (2020). Economic effects of coronavirus outbreak (COVID-19) on the world economy.
[9] **Feyisa, H. L.** (2020). The World Economy at COVID-19 quarantine: contemporary review. *International Journal of Economics, Finance and Management Sciences, 8*(2), 63–74.
[10] **Fornaro, L.**, and **Wolf, M.** (2020). Covid-19 coronavirus and macroeconomic policy.
[11] **Jawad, M.**, and **Naz, M.** (2023). Impact of COVID-19 pandemic on macroeconomic aspects. *Journal of Open Innovation: Technology, Market, and Complexity, 9*(3), 100126.
[12] **Khan, A.**, **Khan, N.**, and **Shafiq, M.** (2021). The economic impact of COVID-19 from a global perspective. *Contemporary Economics, 15*(Special Issue), 64.
[13] **Kolahchi, Z.**, **De Domenico, M.**, **Uddin, L. Q.**, **Cauda, V.**, **Grossmann, I.**, **Lacasa, L.**, and **Rezaei, N.** (2021). COVID-19 and its global economic impact. In *Coronavirus Disease-COVID-19* (pp. 825–837). Cham: Springer International Publishing.
[14] **Kumar, V.**, **Alshazly, H.**, **Idris, S. A.**, and **Bourouis, S.** (2021). Evaluating the impact of COVID-19 on society, environment, economy, and education. *Sustainability, 13*(24), 13642.
[15] **Lahiri, S.**, and **Sinha, M.** (2021). A Study of the Socio-Economic Implications of the COVID-19 Pandemic. *Australasian Accounting Business & Finance Journal, 15*.
[16] **Long, H.**, **Chang, C. P.**, **Jegajeevan, S.**, and **Tang, K.** (2022). Can Central Bank mitigate the effects of the COVID-19 pandemic on the macroeconomy? *Emerging Markets Finance and Trade, 58*(9), 2652–2669.
[17] **Maital, S.**, and **Barzani, E.** (2020). The global economic impact of COVID-19: A summary of research. *Samuel Neaman Institute for National Policy Research, 2020*(2020), 1–12.
[18] **McKibbin, W.**, and **Fernando, R.** (2021). The global macroeconomic impacts of COVID-19: Seven scenarios. *Asian Economic Papers, 20*(2), 1–30.
[19] **Mensi, W.**, **Rehman, M. U.**, and **Vo, X. V.** (2022). Impacts of COVID-19 outbreak, macroeconomic and financial stress factors on price spillovers among green bonds. *International Review of Financial Analysis, 81*, 102125.
[20] **Mishra, M. K.** (2020). The World after COVID-19 and its impact on Global Economy.
[21] **Mou, J.** (2020, July). Research on the Impact of COVID19 on Global Economy. In *IOP Conference Series: Earth and Environmental Science* (Vol. 546, No. 3, p. 032043). IOP Publishing.

[22] **Nicola, M.**, **Alsafi, Z.**, **Sohrabi, C.**, **Kerwan, A.**, **Al-Jabir, A.**, **Iosifidis, C.**, ... and **Agha, R.** (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International Journal of Surgery, 78*, 185–193.
[23] **Roy, S.** (2020). Economic impact of Covid-19 pandemic. *A preprint, 1*, 29.
[24] **Sawada, Y.**, and **Sumulong, L.** (2021). Macroeconomic impact of COVID-19 in developing Asia.
[25] **Weiss, M. A.**, **Schwarzenberg, A. B.**, **Nelson, R. M.**, **Sutter, K. M.**, and **Sutherland, M. D.** (2020). Global economic effects of COVID-19. *Washington, DC: Congressional Research Service.*