COVID-19 Pandemic and Changing World Business Environment: The Nigerian Experience

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Abstract

The COVID-19 pandemic has generated shocks that have caused economic fluctuations globally, calling for an understanding of the behaviour of macroeconomic variables. This study presents an early review of the macroeconomic impact of the COVID-19 pandemic in Nigeria. The aggregate supply and aggregate demand (AS-AD) model provides the theoretical motivation for the study. From the findings, while the number of infected cases reflects significant correlations with economic activity from the perspective of a trend analysis, the estimates from dynamic ordinary least squares (DOLS) show that nexuses between the number of confirmed cases and attendant macroeconomic outcomes are largely insignificant with the expected signs. The study has therefore shown that the COVID-19 pandemic has insignificant negative impacts on basic macroeconomic variables in Nigeria such as inflation, employment, exchange rate, GDP growth, among others. In other words, time is required before the established correlations withstand empirical scrutiny in terms of causality. As the government has engaged the Economic Sustainable Plan (ESP, 2020), which is a post-COVID-19 recovery plan, it is hoped that the attendant policies would be properly implemented so as to provide the critical mass to repositioning the country's economy on the path towards inclusive and sustained economic development.

Keywords: *Western Model Democracy, Failure, Nigeria, Indigenous Demowase*

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Background to the Study

The corona virus outbreak, later coded as COVID-19, hit the world like a thunderbolt towards the end of December, 2019. At its inception in Wuhan city in China, it was regarded as a regional health challenge whose global potential risk was summarily underestimated. Although, many countries were in solidarity with China upon this health disaster, COVID-19 was nonetheless not perceived as a threat with a global scale. In fact, the World Health Organization (WHO) declared that the health crisis in China had no global potential threat. However, given that the modern world is entrenched in the concept of globalization and position of China as the manufacturing hub of the world; a seemingly less risky Chinese health issue metamorphosed into a global scale with lethal consequences (Price and van Holm, 2020; Ezeaku and Asongu, 2020). As at the 20th of June2020, statistics showed that the total global confirmed cases of COVID-19 were 8,753,853 while the global death toll was 463,281. This indicated a 5.29 percent fatality rate and about 20 percent recovery rate (WHO, 2020). Africa, being a highly vulnerable continent, soon recorded imported cases of COVID-19. The total confirmed cases of COVID-19 in Africa stand at 287,385 cases; with about 132,959 recoveries and 7,708 deaths recorded (WHO, 2020).

These represent a 46.3% recovery rate and about 2.3% fatality rate, respectively. However, there have been a lot of debates on the reasons for the low cases of COVID-19 recorded in Africa (World Bank, 2020; OECD, 2020; Diop and Asongu, 2020). This seems ironical given the level of public health infrastructure, governance structure, porous borders, weak institutions, interalia, in the region. It was rather argued that the low number of confirmed cases of COVID-19 recorded in Africa was due to low testing capacity and not necessarily because of location or the effectiveness of containment policies.

Nigeria recorded the first case of COVID-19 on the 27th February, 2020. As at 20th June, the total confirmed cases in Nigeria stood at 19,606 with 6,718 discharged and 506 deaths, representing about 35 percent recovery rate and 2.6 percent fatality rate, respectively. What is evident in the trend of the COVID-19 pandemic in Nigeria is that there has been an increase in community transmission. Since the gradual relax of the lockdown in the country, cases of COVID-19 pandemic have increased by about 60 percent and the corresponding deaths recorded have also increased by about 33 percent; implying that the country has entered a second wave of infection based on community transmission.

The corona virus pandemic represents public health, business environment and economic crisis. While the public health crisis addresses disease containment measures, treatment and development of vaccines; economic crises are reflected in supply and demand shocks as well as oil price shock, consequent upon disruptions in economic activities caused by global lockdown. The outbreak of the corona virus has thus disrupted the conduct of major macroeconomic policies across the globe.

Like many resource-dependent developing countries, Nigeria has faced the brunt of the fluctuations in the price of crude oil -which accounts for about 70 percent of her gross domestic product (GDP) and 65 percent of total government revenue. The rise in government spending

driven by the need to combat the effect of COVID-19 had increased the country's fiscal deficit and her susceptibility to high public debt vulnerabilities. Furthermore, the depressing global capital flows which put serious pressure on Nigeria's foreign exchange reserve and exchange rates (KPMG, 2020), has also affected the conduct of sundry monetary policies in the country. This situation is expected to result into macroeconomic consequences on outcomes such as economic growth, inflation, unemployment and exchange rates.

The preponderance of the vulnerabilities of macroeconomic variables due to the consequence of infectious diseases on the economy therefore calls for proper understanding of the macroeconomic effects of COVID-19 in Nigeria. This line of research becomes essential for some reasons. First, since the outbreak of the COVID-19 pandemic, there have been a number of early reviews of its impact from both policy and empirical perspectives. Given its novel nature, the trend is to assess the impact of the pandemic from different perspectives in order to understand the country-specific characteristics. But the attention of many has been to understandably focus on the short-run effect of COVID-19 on several economic variables. With the second wave of the virus coming due to the ease of the lockdown measures in most countries of the world, the focus would rather be on how to conduct macroeconomic policy in the presence of the pandemic. Such decisions would permeate both public health and economic policies in the post COVID-19 era in Nigeria.

Second, an optimistic projection of the future trajectory of the effect of the pandemic on the global economy is that it would result into a relatively mild and short-lived global recession, followed by a V-shaped recovery (Wren-Lewis, 2020). It is therefore important for emerging markets to understand the best approach to cushion the effect on their economies. This becomes imperative to position the economy to attract the necessary investment needed to undertake meaningful developmental policies. Essentially, a developing country like Nigeria already battling with poor performance of basic development indices and poor business environment is likely to aggravate her challenges with the permanent changes that the pandemic has brought to the world. Given the heterogeneous households and firms characteristics, it is important to understand the country-specific characteristics as the nation continues the gradual relaxation of the nationwide lockdown in order to protect livelihoods and save the economy from collapse.

Following the introductory section, the stylized facts about the COVID-19 pandemic in Nigeria is presented in section two. Section three discloses the literature review on the effect of infectious diseases on the economy while section four covers the empirical design and data. Section five discusses the trend analysis and the DOLS estimates generated from the analysis of the macroeconomic effects of the COVID-19 pandemic in Nigeria. The last section presents both the findings, conclusion and recommendations.

Stylized Facts about the COVID-19 Pandemic in Nigeria
As stated earlier, Nigeria recorded its first case of COVID-19 on the 27th of February, 2020. This index case was an imported case by an Italian on a business trip to Ogun state, Nigeria. Consequent upon this and in consonance with the measures taken across the world, the country took various measures to contain the spread of the COVID-19 pandemic and these

included: full or partial lockdowns, testing, contact tracing, case isolation, among others. Leveraging on previous disaster management and containment skills such as the handling of the Ebola virus that broke out between 2014 and 2016, the country instituted a proportional response by constituting a Presidential Task Force (PTF) which was saddled with the responsibility of managing the government response to the pandemic. A summary of the macroeconomic policies undertaken by the government to insulate the economy from the impact of the pandemic is presented in Table 1 below:

Table 1: Key Macroeconomic Policy Responses by the Nigerian Government as of May 21, 2020

Policy Category	Description
Fiscal	₦984 million contingency fund released to Nigeria's centre for disease control (NCDC).
	₦6.5billion released for the purchase of testing kits, opening isolation centres and training medical personnel.
	Lagos State got a grant of ₦10billion to increase capacity for containing the outbreak.
	Review of 2020 Budget and a cut in capital spending by ₦1.5trillion.
	Provision of ₦500billion fiscal stimulus package (styled COVID-19 Intervention Fund) to support healthcare facilities, provide relief for tax payers and incentive to employers.
	Introduction of Import duty waivers for pharmaceutical firms.
	Regulated fuel prices have been reduced, and an automatic fuel price formula introduced to ensure fuel subsidies are eliminated.
	Increase of the social register by 1 million households to 3.6million to help cushion the effect of the lockdown.
Monetary and	Maintenance of current monetary policy rate (MPR) by the Central Bank of Nigeria (CBN) in March. Additional measures introduced include.
macro-	Reduction of interest rates on all applicable CBN interventions from 9 to 5 percent.
financial	Introduction of one-year moratorium on CBN intervention facilities.
	Creation of a ₦50 billion targeted credit facility.
	Injection of 3.6 trillion liquidity into the banking system; ₦100 billion to health sector, ₦2 trillion to the manufacturing sector, and ₦1.5 trillion to the real sector to impact industries.
	₦1 trillion support to the agriculture sector to prevent food shortages. Introduction of regulatory forbearance to restructure loans in impacted sectors.
	₦120 billion private sector special intervention initiative targeted at fighting COVID-19.
	Receipt of ₦42.6 billion in April, including $50 million grant from the European Union.
	Establishment of Nigeria Solidarity and Support Fund to raise $50 million to support physical infrastructure of healthcare centres in Local Governments and existing Social Investment Program.
Exchange	Adjustment of the official exchange rate by 15 percent.
Rate and	Ongoing unification of various exchange rates under the investors and exporters (I&E) window, Bureau de Change, and retail and wholesale windows.
Balance of Payments	The authorities committed to let the I&E rate move in line with market forces, and it has so far depreciated by about 4 percent.
	A few pharmaceutical companies have been identified to ensure they can receive FX and naira funding.
	The CBN has resumed FX supply in some other windows because I&E window turnover has been low since April.

Source: IMF Policy Tracker (2020)

Nigeria has been severely affected by the spread of COVID-19 and the associated sharp decline in oil prices. As a commodity-exporting and resource-dependent nation, the pandemic widened the fiscal deficits in the country because of government proportional responses. Government spending and the susceptibility to high public debt vulnerabilities also increased. Thus, the country demanded for financial assistance from multilateral organizations and official bilateral creditors—including temporary debt relief—in order to cushion plausible effects of the pandemic (World Bank, 2020). The major economic damages of the pandemic in Nigeria are reflected in the falling development index, such as manufacturing index and fixed investment. The aggressive containment measures yielded positive results as the total confirmed cases of COVID-19 in Nigeria within the first nine weeks were about 1154 cases with just about 3% fatality rate. Nevertheless, it became apparent that Nigeria could no longer afford a total lockdown because the damage caused by the pandemic was already perceptible in most sectors of the Nigerian economy. The most vulnerable sectors are the manufacturing sector and the service sector such as education, distribution, among others. On April 27th, the President approved a phased and gradual easing of lockdown measures in Federal Capital Territory (FCT), Lagos and Ogun State. Nevertheless, new nationwide measures were introduced, including night-time curfew, ban on non-essential inter-state passenger travel, partial and controlled interstate movement of goods and services, and mandatory use of face masks or coverings in public. The post-lockdown era has, however, changed the narrative for Nigeria. It has commenced the second wave of the COVID-19 outbreak in the country which is driven by community transmission. There has been a sporadic increase in the number of confirmed cases which averaged about 500 cases per day. Due to the nature of the livelihood of the citizens, the fallacy of disbelief about the existence of the virus and its elitist status; many asymptotic patients have become the agents of community transmission in the country. As at June 20th 2020, the total number of confirmed cases in Nigeria was about 19,606 with about 2.5 percent fatality rate. Table 2 shows the weekly analysis of the COVID-19 cases in Nigeria.

Table 2: Weekly Analysis of the COVID-19 Pandemic in Nigeria

Date	Total Confirmed Cases	Total Discharged	Total Fatalities	Total Number screened
Week 1	1	0	0	1
Week 2	1	0	0	23
Week 3	2	0	0	48
Week 4	22	2	0	133
Week 5	97	3	1	NA
Week 6	214	25	4	NA
Week 7	318	70	10	NA
Week 8	542	166	19	7636
Week 9	1182	222	35	10918
Week 10	2388	385	85	17566
Week 11	4151	745	128	25951
Week 12	5621	1472	176	33970
Week 13	7526	2174	221	44458
Week 14	9855	2856	273	62583
Week 15	12233	3826	342	76802
Week 16	15682	5101	407	90464
Week 17	19606	6718	506	111052

Source: Nigeria Centre for Disease Control (NCDC, 2020)

To further analyze the issues underlying the pandemic, we present the demographic characteristics of confirmed cases in Nigeria. This would help in describing the trend of the pandemic according to the severity of confirmed cases. This analysis is also important to help the narratives surrounding the ease of lockdown across the States of the federation. This is necessary to decipher if the cases of COVID-19 in Nigeria are State-specific or not, and test the effectiveness of the containment measures of the State Governments. As Table 3 depicts, Lagos state has about 43 percent of the entire confirmed cases in Nigeria with a total number of 8, 407 cases. This is obviously due to its strategic place in the nation's economy. Lagos state is the commercial nerve of the country and as a metropolis with huge a number of migrants from the hinterland, hence, there is a high population density. This could have contributed to the increased number of cases. Another probable reason for this high number is that Lagos state has higher testing capacity than other states. So far, the State has tested a greater number of suspected cases of COVID-19 in the country. It is therefore not surprising for the State to have the highest number of confirmed cases.

Table 3: State by State Analysis of COVID-19 cases in Nigeria as at June, 20th 2020

States Affected	No. of Cases (Confirmed)	(Lab No. of Cases (on admission)	No. Discharged	No. of Deaths
Lagos	8,407	6,848	1,436	123
FCT	1,549	1,046	475	28
Kano	1,184	422	712	50
Rivers	866	480	356	30
Oyo	860	569	282	9
Edo	779	587	161	31
Ogun	623	250	358	15
Kaduna	552	256	286	10
Delta	501	360	124	17
Borno	466	82	353	31
Gombe	451	211	226	14
Bauchi	447	114	322	11
Katsina	426	171	233	22
Jigawa	317	120	191	6
Ebonyi	234	97	137	0
Abia	221	125	93	3
Plateau	220	101	114	5
Imo	205	181	21	3
Nasarawa	184	90	88	6
Kwara	180	52	122	6
Bayelsa	155	117	29	9
Sokoto	135	6	115	14
Ondo	134	76	42	16
Enugu	126	92	29	5
Zamfara	76	0	71	5
Kebbi	67	21	40	6
Anambra	66	6	51	9
Niger	66	31	33	2
Akwa Ibom	65	23	40	2
Yobe	56	3	45	8
Osun	54	4	46	4
Adamawa	42	1	37	4
Benue	39	27	12	0
Ekiti	34	4	28	2
Taraba	18	8	10	0
Kogi	3	3	0	0

Source: Nigeria Centre for Disease Control (NCDC, 2020)

The other two states that came behind are Abuja and Kaduna. While the increased number of cases in Abuja is due to its status as the Federal Capital Territory and the administrative capital of the nation; the number of cases recorded for Kano State defied the explanation. In essence, the number of confirmed cases of the COVID-19 pandemic in Kano state did not follow the same trend like the other two states. Other States come far behind these three States as the number of confirmed cases stood between 100 - 500. Starting with the highest, Edo and Ogun states recorded a little above 500 numbers of cases while states like Oyo, Rivers, Kaduna, Burno, Kastina and Bauchi respectively, have about 400 cases. Other States of the Federation with confirmed cases with more above 300 are Gombe and Jigawa. The fourth category of COVID-19 cases in Nigeria listed states like Ebonyi, Abia, Kwara, Plateau, Nasarawa, Imo and Sokoto with a number as small as about 100. Finally, the last set of States in Nigeria, which are at the lower rung of confirmed cases, include Zamfara, Anambra, Ondo, Yobe, Kebbi, Enugu, Osun, Niger, Akwa Ibom, Adamawa, Benue. Bayelsa, Ekiti, Taraba and Kogi, respectively. The major significance of this demographic distribution of the COVID-19 pandemic in Nigeria is that it illustrates the flow of economic activities according to States. This also shows the nature of the dominant sectors in the States. This feature would help the central government to plan policy responses according to State characteristics. This would ensure the efficiency of any social programme rolled out to cushion the effect of the pandemic on the citizens.

Literature Review

The literature on the macroeconomic effect of COVID-19 is still scant because as we write, the pandemic is still increasing across the world with other regions becoming epic centres. A good premise to start the review therefore is to glean a similar incidence from a historical perspective. Studies on the economic consequences of infectious diseases date back to the 1918-19 Spanish Influenza. In retrospect, the Great Influenza provides the primordial premise for the study of the macroeconomic consequence of the COVID-19 pandemic. The past epidemic sheds light on the economic costs especially in the presence or absence of stringent containment policies. Basic macroeconomic consequences of past pandemics such as 1918 influenza included: (i) low sales due to customer sentiments, (ii) high cost to the service sector since they are most affected by facemask and social distancing, and (iii) strain on economic activities, among others (Boissay and Rungcharoenkitkul, 2020; Barro et al. 2020).

Studies also exist on the macroeconomics of recent viruses such as HIV/AIDS (1993), SARS (2003), Avian influenza (2003-19) and Ebola (2014), among others. For instance, the HIV/AIDS virus has been found to have significant direct and indirect economic consequences on all the economic agents- individual households, firms and governments. This correspondingly disrupted livelihood, reduced labour supply, limited the level of labour productivity and output and increased provision for social security, among others. Until the development of the antiretroviral therapies which reduced the vulnerabilities of carriers and increased their life spans, various countries had to bear the economic costs of this virus (Cuddington, 1993a, 1993b; Mckibbin and Fernando, 2020). Lee and McKibbin, (2004) estimated the global economic costs of SARS and found that it resulted into about 0.1% loss in global GDP while Hai et al. (2004) assessed the short-term impact of SARS on the Chinese economy and showed that it lowered the GDP growth by 1-2 percent. Furthermore, Burns et

al. (2006) evaluated the economic consequences of avian influenza and found that it resulted into about 0.1 percent and 4 percent loss in global GDP and Asian GDP, respectively. The economic consequence of the Ebola epidemic, a virus predominant in the West African region, was the focus of World Bank Report (2014). The estimates of the computer general equilibrium (CGE) model showed that the Ebola virus lowered the GDP in Guinea, Liberia and Sierra Leone by about 2.1 percent, 3.4 percent and 3.3 percent respectively, within the first year of the pandemic.

Boissay and Rungcharoenkitkul (2020), did an early review of the macroeconomic effect of COVID-19 using the US data, most especially relative to past pandemics. Basic macroeconomic consequences of past epidemics such as the 1918-19 Influenza, SARS (2003), H5N1 avian influenza (2003-19), Ebola (2014-16) and the present COVID-19 pandemic include: fall in GDP growth and decline in manufacturing production activities, among others. They found that the economic cost of the COVID-19 pandemic can be proxied by GDP foregone, most especially based on the comparison between the current GDP forecast and the COVID-19 outlook. In the light of the April 8th U.S data, the study estimated that COVID-19 would lead to output loss which ranged between 5-9 percent for the United States and between 4 and 4.5 percent for the global economy. The study recommended that a better understanding of the transmission channel of the COVID-19 shock to the economy, the interaction between economic decisions and the pandemic and the policy trade-off would assist in reducing the macroeconomic effect of the pandemic. From a pessimistic perspective, Fornaro and Wolf (2020) modelled the impact of COVID-19 on macroeconomic policy in order to assess the macroeconomic implications of the pandemic. They asserted that COVID-19 would cause a negative supply shock to the world economy by forcing factories to shut down and disrupting global supply chains (OECD, 2020). The virus also depressed the global demand. They found that corona virus caused a fall in demand and involuntary unemployment. Social distancing impaired the ability of households to spend. The macroeconomic impact of a negative supply shock was triggered by the coronavirus spread. Economic agents become pessimistic about future growth, employment and economic activities. They concluded that the coronavirus would cause a short-lived negative supply shock. Drastic policy interventions, including both monetary and fiscal might prevent the negative supply shock from severely affecting employment and productivity. Loayza and Pennings (2020) examined the conduct of macroeconomic policy in the time of COVID-19 in for developing countries. They opined that the pandemic reflected both worldwide public health emergency and an international economic crisis whose consequences surpassed the global financial crisis of 2008-2009. The study found that, first; the human and economic costs of the COVID-19 are likely to be higher in developing countries because of the structure of their economies which aggravates the impact of shutdowns and reduction in economic activities. Second, factors such as lower health care capacity, larger informal sectors, shallower financial markets, less fiscal space, and poorer governance are likely to stymie the gains of sundry containment measures taken. In order to reduce the vulnerability of citizens due to the pandemic, a viable macroeconomic policy that would strengthen monetary transmission and fiscal space as well as increase fiscal multipliers is worthwhile. This would ensure macroeconomic stability and enhance the quality of governance.

The World Bank (2020) provided an explanation for the late arrival of COVID-19 and the rapid spread across Sub-Saharan Africa. The study asserted that the low number of cases recorded in the region could be best explained by the insufficient testing capacity in many countries which might have understated the true number of infections. This pessimistic view undermines the containment measures taken by these African countries and the possibility of indigenous cure for the virus which might be viable due to regional specific characteristics.

The study projected a grave macroeconomic effect of the pandemic on the region which includes a decline in economic growth of Sub-Saharan Africa from 2.4 percent in 2019 to -2.1 and -5.1 in 2020 which might lead to a possible recession in the region. Output loss in the region was estimated to be between US$37 billion and US$79 billion while the region's three largest economies—Nigeria, South Africa, and Angola—would witness persistent weak growth and investment consequent upon the fluctuations in commodity prices. The studies on the short-run and medium-run specific macroeconomic variables provide early review of the effect of COVID-19 on the performance of these variables using data based on macroeconomic responses to historic pandemic events for aggregate 'Europe' (i.e. France, Germany, the Netherlands, Italy, Spain and the United Kingdom). Jorda et al. (2020) found that the macroeconomic consequence of COVID-19 is similar to that of the great historical pandemic of the last millennium which caused low returns to assets, depressed investment opportunities due to excess capital per unit of surviving labour and increased desire to save as well as the increase in precautionary savings in a bid to rebuild depleted wealth.

Dingl and Neiman (2020), analysed the employment effect of COVID-19 on U.S labour force due to the cliché of social distancing and work from home which have become the new normal during the pandemic. They found that, based on US jobs classifications done, only about 34% of jobs can plausibly be performed at home and this accounts for about 44% of all wages. The greater percentage attributed to U.S. jobs that cannot be performed from home explained the increase in the number of applications for unemployment benefit in the country. Thus, the share of jobs that cannot be performed at home is an important variable in predicting economic performance during and post-COVID-19. The study concluded that, due to COVID-19, many employees are unable to travel to work. Hence, identifying which jobs cannot be performed from home would be useful for policy makers to target social insurance payment to those that need them. KPMG (2020) examined the economic impact of COVID-19 in Nigeria with emphasis on business activities. Findings revealed that the pandemic has a twin shock on the Nigerian oil-dependent economy, namely, global and domestic shocks as well as oil price shock. The study opined that the twin shocks are expected to affect the economy through the supply, demand and financial channels. The study concluded that, unlike the threat of Ebola, Zika and SARS viruses which faded with time, the social-economic impact of the pandemic might still persist well after the virus had been conquered.

Empirical Design and Data
Empirical Design
The aggregate demand and aggregate supply (AD-AS) model, consistent with Blanchard and Quah (1989), and Cover et al. (2006); provides the theoretical motivation for the empirical analysis of the macroeconomic effect of COVID-19 in Nigeria. The AD-AS model presents

the framework that explains economic fluctuations based on the interaction of aggregate demand (AD), short-run aggregate supply (SRAS), and long-run aggregate supply (LRAS). Undoubtedly, the COVID-19 pandemic has caused both supply and demand shocks among others. In a bivariate framework, aggregate demand and supply shocks cause significant fluctuations in economic activities. While the AD shock is assumed to have no long-run effect on output, a supply shock causes changes in basic macroeconomic variables; such as output and prices, in line with changes in SRAS and LRAS, respectively. Taking a cue from Blanchard and Quah (1989), and Cover et al. (2006), the framework of a simple AD-AS model is presented thus:

$$yt\,s = t\text{-}1yt\ + a\,(pt - t\text{-}1pt)\ \Sigma\,t,\ \alpha > 0 \qquad (1)$$

$$(yt + pt)d = t\text{-}1\,(yt + pt)d + t \qquad (2)$$

$$ydt\ = yst \qquad (3)$$

where yt and pt, are the logarithms of output and the price level respectively, during period t; t-1 and t-1 are their expected values given information available at the end of period t-1; the superscripts s and d represent supply and demand; while Σt and t, respectively, denote the serially uncorrelated structural AS and AD shocks. Equation (1) is a Lucas (1972) AS curve in which output increases in response to unexpected increases in the price level and positive realizations of the AS shock εt. Equation (2) is the AD relationship; nominal aggregate demand equals its expected value plus a random demand disturbance, t.

While Equations (1)–(3) represent a simplified model of the aggregate economy, the model implies that demand shocks can play a significant role in the fluctuations of macroeconomic variables. However, in the absence of restrictions, the demand and supply shocks are contemporaneously uncorrelated. In the light of the above foundations, the empirical model for analyzing the macroeconomic effects of COVID-19 is expressed as follows:

$$mac\text{-}vt = f(c\text{-}pandem\,t) \qquad (4)$$

where mac_v is a vector of macroeconomic variables including growth in gross domestic product (gdpgr), inflation (inf), unemployment (unemp), crude oil price (oil_pr) and exchange rate (exr). The identity c_pandem is a vector of variables relating to the COVID-19 pandemic in Nigeria. In estimable form, Equation (4) can be re-specified as follows:

$$mac\text{-}vt = yo + y1C\text{-}Pandem\,t + \Sigma t \qquad (5)$$

Where γ0 is a constant which shows the level of macroeconomic performance without the effects of the COVID-19 pandemic, tis an error term assumed to be normally distributed with zero mean and constant variance(tN(0,2)).

The dynamic ordinary least square (DOLS) proposed by Stock and Watson (1993) is employed in the study. The use DOLS estimation technique not only allows for series of

integration of higher order but also controls for issues surrounding endogeneity and heteroscedasticity by using the lead and lag of independent variables. More importantly, it overcomes the violation of the best linear unbiased estimator (BLUE) assumption which is probable in using the OLS methodology. Following Stock and Watson (1993) and Pablo (2010), the DOLS framework is specified as follows:

$$mac\text{-}vt = +c\text{-}pandem\ t +dc\text{-}pandem(L)c\text{-}pandemt +\Sigma t \qquad (6)$$

All the definitions about the variables remain ditto except for the leads and lags included in the Equation (6).

Data
The study uses a daily data on COVID-19 pandemic for the period of Feb 28th to June 20th 2020 for Nigeria. The Nigeria Centre for Disease Control releases daily updates on COVID-19 cases in Nigeria. The NCDC data represents national figures on total confirmed cases, total discharged, total fatalities and total number of laboratory tests carried out since the first case of the virus was recorded. The national COVID-19 cases were further disaggregated state cases in order to represent the spread of the virus across the country. At a later date, the NCDC started providing information on the demographic characteristics of the confirmed cases. Data for global cases were sourced from the John Hopkins University database which provides daily updates on global cases of COVID-19 while the Africa Centre for Disease Control provides relevant data on COVID-19 cases in the region. The macroeconomic variables used which are consistent with the recent literature (Mckibbin and Fernando, 2020; Ezeaku and Asongu, 2020) include: GDP growth rate, inflation, unemployment, exchange rate and crude oil price. Some of the macroeconomic data were disaggregated in daily frequency to ensure uniformity. The selected macroeconomic data were sourced from the National Bureau of Statistics e-library and the Central Bank of Nigeria Statistical bulletin, respectively.

Analysing the Macroeconomic Impact of COVID-19 in Nigeria
Trend Analysis
We first present the trend analysis of the impact of the COVID-19 pandemic on macroeconomic variables in Nigeria. Starting with trend analysis of crude oil prices presented in Figure 1, the corona virus, though public heath crises, has significant implications for the global economy due to its plausibility to generate various oil price shocks. Nigeria, as a resource-dependent nation, was therefore hit by different shocks at the global marketplace. The first effect of the pandemic on the Nigerian economy was its vulnerability due to oil price shock. The fall in the prices of crude oil at the international market had serious implications for Nigeria's fiscal fragility.

Figure 1: Trend of Crude Oil Prices from 2019 -2020

Crude oil Price

(Dollar)

0
10
20
30
40
50
60
70
80

(Day)
01/02/2019
01/18/2019
02/05/2019
02/21/2019
03/11/2019
03/27/2019
04/12/2019
05/03/2019
08/09/2019
08/28/2019
09/13/2019
10/01/2019
10/17/2019
11/04/2019
11/20/2019
12/06/2019
12/24/2019
01/14/2020
01/30/2020
02/17/2020
03/04/2020
03/20/2020
04/07/2020
04/27/2020
05/14/2020

Source: CBN Statistical Bulletin, (2020)

Nigeria lacks the structural capacity to handle the epidemic given an unfavourable public-debt-to-GDP ratio since her debt is subject to exchange rate volatility. With a shallow tax base and less efficient tax administration, a counter cyclical fiscal policy is hard to implement. With this scenario, the government is unable to meet its fiscal responsibility and hence, the decision to cut the 2020 budget appropriation, which affected critical sectors of the economy such as health and education. Government also issued a Sukuk bond from the capital market in order to augment government expenditure on the critical project. However, it is not clear whether such domestic debt would yield appropriate benefits for the economy amidst structural deficiencies, weak institutions and fiscal fragility. GDP Growth: The impact of COVID-19 on the GDP growth in Nigeria is presented in Figure 2.

As shown, the country recorded a negative growth rate at the first quarter of 2020 which emanated as a result of different shocks related to disruption in economic activities. Four basic shocks that contribute to the fall in the growth rate of the Nigerian domestic economy are production shocks which include cost of production, cost of labour input, raw materials, and, transportation. Others are labour shocks and shocks to consumption demand and government expenditure (Mckibbin and Fernando, 2020). These shocks, which are offshoots of general lockdowns, cumulatively resulted into reduction in economic activities, and hence in economic growth.

Figure 2: Trend Analysis of Inflation and GDP growth in Nigeria

Inflation	GDP Growth
Percent	Percent
13	3
12.5	2.5
12	2
11.5	1.5
11	1
10.5	0.5
10	**0**
Months	**Quarters**

Source: Nigerian Bureau of Statistics (NBS, 2020)

Inflation: Figure 2 further depicts the trend analysis of core inflation between 2019 and 2020. As shown, core inflation was 12.26 percent in April but increased to 12.40 percent in June and this corresponds to the decline in GDP growth from 2.55 percent in the last quarter of 2019 to 1.87 percent in the first quarter of 2020. The review of petroleum pump price in the country due to the fall in the global crude oil prices did not have significant effects on domestic prices as both headline inflation and food inflation increased within the period. A good explanation for this in economic theory is that prices are sticky downwards.

Figure 3: Trend Analysis of Unemployment and Exchange Rate

	Unemployment rate				Exchange rate Naira
	40				400
	35				350
	30			33.5	300
	25	25.3	23.1	23.1	250
percent	20		20.42		200
	15	14.23			150
	10				100
	5				50
	0				0
	Year				**Month**

Source: Nigerian Bureau of Statistics (NBS, 2020)
*** Unemployment rate projections.

Unemployment Rate: Figure 3 shows the effect of COVID-19 on unemployment. The trend shows an increase in the level of unemployment in the country at the incidence of COVID-19. The unemployment rate is projected to be about 33.5 percent in the year 2020 due to the pandemic. This is plausible because the COVID-19 pandemic caused shocks to labour demand and labour supply. The Ministry of Labour and Productivity put the total number of job losses in Nigeria during the pandemic to about 39.5 million. The employment structure in Nigeria is dominated by informality. Hence, the livelihood of those involved in the informal sector of the economy was seriously affected during the lockdown.

Also, economic activities were totally disrupted during the total lockdown and even when it was lifted, the implementation of social distancing made it difficult for the economy to return to status quo before advent of the pandemic. Facing the new normal in the ways of life and social interaction has its economic implication on economic activities. The sector that was mostly affected is the education sector which consists of both private and public stakeholders.

Since schools are not opened, most private institutions are not paying; hence they are laying off their staff and by extension, throwing the workers into the job market again. The ripple effect of this explains the projections on job loss figures in Nigeria.

Exchange Rate: Figure 3 also shows the trend of exchange rate during the COVID-19 pandemic in Nigeria. As shown, the naira depreciated sharply against the US dollar on March 23, 2020 from $306.50/naira to$360.5/naira. This depreciation could be explained by depressing global capital flows which put serious pressure on Nigeria's foreign exchange reserve and exchange rates (KPMG, 2020). The pandemic muffled the global capital flows to developing countries like Nigeria due to the disruption in economic activities and level of production. This also suspended trading activities on the capital market which in turn reduced the level of capital flows globally. Since foreign portfolio investment is a driver of investment in both capital and fixed income markets, and as well plays a significant role in enhancing capital importation into the country, this has a negative impact on exchange rate in Nigeria.

Modelling the Impact of COVID-19 on Macroeconomic Variables in Nigeria
The DOLS results presented in Table 4 show the estimates of the analysis of the macroeconomic impact of COVID-19 in Nigeria. As depicted, the pandemic has negative effects on major macroeconomic variables in Nigeria. Specifically, findings revealed that the total number of confirmed cases of the COVID-19 pandemic resulted into a decline in GDP growth in Nigeria. This is plausible because of the nationwide lockdown which caused significant disruptions in economic activities. Findings also showed a negative effect of confirmed cases on inflation because production/supply shocks put pressure on general prices. Table 4 further showed that total confirmed cases of COVID-19 caused a decline in unemployment rate and crude oil prices and a rise in exchange rate which implies depreciation in naira. However, it is important to the note that the underlying findings are not significant. Moreover, even when the underlying estimates pertaining to nexuses between the number of cases of COVID-19 and economic indicators in Nigeria are not significant; this study is consistent with contemporary literature in reporting insignificant findings because beyond the need to fight publication bias, insignificant findings have economic/statistical significance.

On the front of publication bias, by reporting insignificant estimates, the study contributes to the literature on fighting publication bias because, in social sciences strong and significant results are preferred over weak and insignificant findings (Rosenberg, 2005; Franco et al., 2014; Asongu, 2015; Asongu and Biekpe, 2018). With regard to the insignificant estimates, their economic/statistical meaning may be traceable to the fact that the available data do not yet enable researchers to establish the significant effects of the macroeconomic consequences of the COVID-19 pandemic in Nigeria. This line of interpretation is broadly consistent with contemporary narratives on understanding, inter alia: the effects of information asymmetry on the market power in the African banking industry (Boateng et al., 2018) and the greater diffusion of mobile money innovations in Africa (Asongu et al., 2020).

Table 4: DOLS Results of the effect of Covid-19 on Macroeconomic Variables in Nigeria

Regressors	(1) GDP growth	(2) Unemployment	(3) Inflation	(4) Exchange rate	(5) Oil price
t_conf_cases	-7.311	-1.201	-2.010	0.005	-0.002
	(2.180)	(1.370)	(4.800)	(0.052)	(0.019)
t_discharged	5.240	-1.961	-6.300	-0.051	0.0241
	(2.931)	(1.841)	(6.440)	(0.052)	(0.026)
t_death	-3.091	0.002	-0.001	-0.489	0.519
	(4.601)	(0.002)	(0.001)	(0.821)	(0.404)
t_no_screened	2.571	2.651***	8.060**	0.004*	-0.003**
	(1.110) **	(6.951)	(2.430)	(0.001)	(0.001)
Constant	1.872	33.512***	12.286***	333.171***	30.590***
	(0.001) ***	(0.002)	(0.007)	(6.015)	(2.961)
Observations	107	107	107	107	107
R^2	0.438	0.953	0.635	0.403	0.463

Standard errors are in parenthesis
*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Note: t_conf_cases, t_discharged, t_death and t_no_screened represent, total confirmed cases, total discharged, total deaths and total number screened, respectively.

Summary of Findings
Findings from the trend analysis have shown that the COVID-19 pandemic has insignificantly caused a decline in basic macroeconomic variables in Nigeria. This was consequent upon the sundry measures taken to contain the spread of the virus. The number of infected cases has therefore had significant correlations with economic activity from the perspective of a trend analysis. However, the estimates of the DOLS show that nexuses between the number of confirmed cases and attendant macroeconomic outcomes are largely insignificant with the expected signs. Moreover, the insignificant positive sign for exchange rate is plausible because the devaluation of the naira was a deliberate policy action which was not motivated by market forces. The findings of this study are consistent with the literature as the Bretton Wood institutions have projected that the GDP growth in Nigeria would fall by as high as 5.4% in the year 2020 which would most likely cause economic recession in the country during the same year (IMF, 2020; World Bank, 2020). Ultimately, the differences in significance between findings of the trend analysis and corresponding DOLS estimates imply, time is required before the established correlations withstand empirical scrutiny in terms of causality.

The findings of this study obviously leave space for further research especially as it pertains to engaging more updated data to assess if the established correlations can be translated to causality for better informed policy decisions. Moreover, departing from the macroeconomic realm and examining microeconomic consequences of the COVID-19 pandemic would improve scholarship on the understanding of domestic economic development externalities of the global pandemic.

Conclusion

The outbreak of the COVID-19 pandemic is entering the second wave as most nations of the world have begun the gradual relaxation of the lockdown measures earlier imposed. This has however, increased the number of confirmed cases of the pandemic as well as fatality rates due to increased community transmissions. The proclivity of the COVID-19 pandemic to generate shocks, which cause economic fluctuations, calls for an understanding of the behaviour of macroeconomic variables; as we await to defeat the virus with the development of vaccines and the embrace of the new normal in the social arena.

This study has examined the macroeconomic impacts of the COVID-19 pandemic in Nigeria. In estimating the effect of COVID-19 related shocks, the aggregate demand and aggregate supply model has provided the theoretical anchor with which to explain the performance of macroeconomic variables, as induced by exogenous factors. After an exploratory or trend analysis, dynamic ordinary last squares (DOLS) have been used to assess whether the established correlations can be translated to causality. This methodology is basically motivated by its desirable characteristics which increase the chances of generating reliable estimates.

Recommendations

The study recommends a deliberate policy action that would stabilize the fluctuations in the economy and enhance the performance of basic macroeconomic variables. This would involve taking account of the country-specific characteristics to facilitate the process. As the country launches her Economic Sustainable Plan (ESP, 2020), it is hoped that the policy would accelerate Nigeria's economic recovery, restore and insulate critical sectors of the economy from the effects of the COVID-19 pandemic.

References

Asongu, S. A., (2015). Finance and growth: New evidence from meta-analysis, *Managerial Finance, 41*(6), 615-639.

Asongu, S. A., & Biekpe, N., (2017). ICT, information asymmetry and market power in African banking industry, *Research in International Business and Finance, 44*(April), 518-531.

Asongu, S. A., Biekpe, N., & Cassimon, D., (2020). Understanding the greater diffusion of mobile money innovations in Africa, *Telecommunications Policy, 44*(8) September 2020, 102000.

Barro, R, Ursua, J., & Weng, J., (2020). The coronavirus and the Great Influenza Pandemic: lessons from the 'Spanish flu' for the coronavirus' potential effects on mortality and economic activity NBER Working Paper, No 26866, Cambridge.

Blanchard, O. J., & Quah, D., (1989). The dynamic effects of aggregate demand and supply Disturbances, *American Economic Review, 79*(4), 655-73.

Boateng, A., Asongu, S. A., Akamavi, R., & Tchamyou, V. S., (2018). Information Asymmetry and Market Power in the African Banking Industry, *Journal of Multinational Financial Management, 44*(March), 69-83.

Boissay, F. & Rungcharoenkitkul, P. (2020). Macroeconomic effects of COVID-19: An early review, *Bank for International Settlements Bullettin*. ISBN: 978-92-9259-369-8.

Cover, J. P., Enders, W. & Hueng, C. J. (2006). Using the aggregate demand-aggregate supply model to identify structural demand-side and supply-side shocks using a bivariate VAR, *Journal of Money Credit and Banking, 38*(3), pp. 777-90.

Cuddington, J. T., (1993a). Further results on the macroeconomic effects of AIDS: the dualistic, labour-surplus economy, *World Bank Economic Review 7*(3), 403-17.

Cuddington, J. T., (1993b). Modeling the macroeconomic effects of AIDS, with an application to Tanzania, *World Bank Economic Review 7*(2), 173-89.

Dingl, J., & Neiman, B., (2020). *How many jobs can be done at home?" COVID Economics*, Issue 1, 3 April 2020, 1-8.

Diop, S., & Asongu, S. A., (2020). *The COVID-19 pandemic and the new poor in Africa: The straw that broke the camel's back*, African Governance and Development Institute Working Paper, No. 20/038, Yaoundé.

Ezeaku, H. C., & Asongu, S. A., (2020). *COVID-19 and cacophony of coughing: Did international commodity Prices catch influenz*a?" African Governance and Development Institute Working Paper, No. 20/040, Yaoundé.

Fornaro, L. & Wolf, M. (2020). *COVID-19 Coronavirus and Macroeconomic Policy: Barcelona GSE Working Paper Seri*es, No 1168, 1-10

Franco, A., Malhotra, N., & Simonovits, G., (2014). "Publication Bias in the Social Sciences: Unlocking the File Drawer", Science, 345(6203), pp. 1502-1505.

Hai, W, Zhao, Z., Wang, J., & Hou, G. Z. (2004). The short-term impact of SARS on the Chinese economy, Asian Economic Papers, 3, (1).

Jorda, O., Singh, S. & Taylor, A. M. (2020). "Longer-run Economic Consequences of Pandemics". COVID Economics Issue 1, pp 1-15.

KPMG, (2020). *COVID-19: A business impact series- economic impact and pandemic planning: KPMG COVID-19 Publication*, Issue 1, 1-4.

Lee, J. W. & McKibbin, W. (2004). *Globalization and disease; The case of SARS' Asian economic Papers* 3. (1). MIT Press Cambridge USA. pp 113-131 (ISSN 1535-3516).

Lee, J. W. & McKibbin, W. (2004). *Estimating the global economic costs of SARS in S. Knobber, A. Mahmoud, S. Lemon, A. Mark, L. Sicitz, and K. Oberholtzer (Editors), Learning from SARS: Preparing for the next Outbreak*, The National Academies Press, Washington DC (0-309-09154-3)

Loayza, N. V. & Pennings, S. (2020). Macroeconomic Policy in the Time of COVID-19: A Primer for Developing Countries". World Bank Research and Policy Brief, No 28, 1-9.

Lucas, R. E. Jr. (1972). Expectations and the neutrality of money, *Journal of Economic Theory* 4(2), 103–124.

Mckibbin, W. J., & Fernando, R., (2020). The global macroeconomic impacts of COVID-19: Seven Scenarios, Centre of Excellence in Population Ageing Research (CEPAR) Research Paper, 2 March, 2020, 1-43.

Memertzis, M., Sapir, A., Tagliapietra, S. & Wolff, G., (2020). *An effective economic response to the Coronavirus in Europe,* Policy Contribution 06/2020, Bruegel. OECD (I2020).http://www.oecd.org/newsroom/global-economy-faces-gravest-threat-since-the-crisis-as-coronavirus-spreads.htm(Accessed: 27/06/2020).

Price, G. & van-Holm, E. J. (2020). *The effect of social distancing on the spread of Novel Coronavirus: Estimates from linked state-Level infection and American time use survey data*, Urban Entrepreneurship and Policy Institute, University of New Orleans, New Orleans.

Rosenberg, M. S., (2005). The file-drawer problem revisited: A general weighted method for calculating fail-safe numbers in meta-analysis, Evolution, 59(2), 464-468.

World Bank (2014). *The economic impact of the 2014 Ebola Epidemic: Short- and medium-term estimates for West Africa*, Mimeo, October.

World Bank (2020*). Assessing the economic impact of COVID-19 and policy responses in Sub-Saharan Africa, Africa's Pulse*, 21, 22-26.

WHO (2020). WHO Coronavirus Disease (COVID-19) dashboard world health organization, https://COVID19.who.int/?gclid=CjwKCAjw_-D3BRBIEiwAjVMy7MGyuO7YKDq7gIKRNbUi30bBC8ZcEftUZ0HQ2z4p2Z-ZMiREya2DdxoC5Q4QAvD_BwE (Accessed: 27/06/2020).

Wren-Lewis, S. (2020). *The economic effects of a Pandemic,* https://mainlymacro.blogspot.com/2020/03/the-economic-effects-of Pandemic.html (Accessed: 27/06/2020).

World Bank (2020). *Assessing the economic impact of COVID-19 and policy responses in Sub-Saharan Africa, Africa's Pulse,21*, 22-26.