Impact Analysis of Pandemic on Nigeria's Stock Market Performance

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Abstract

We empirically conducted a distinct analysis of the efficiency of the stock market before and during the Covid-19 pandemic in Nigeria as well as the impact of the Covid-19 pandemic on several indicators of stock market performance. Data were collected on stock variables on monthly basis for the pre-Covid-19 era (2018M02 to 2020M01) and Covid-19 pandemic era (2020M02 to 2022M01) from the Central Bank of Nigeria Statistical Bulletin, while data on the numbers of daily new confirmed cases (New cases and deaths) as well as the government response stringency index on COVID-19 pandemic were obtained from Our World in Data (OWID). We leveraged numerous advantages of the Data Envelopment Analysis (DEA) to estimate stock market efficiency before and during the Covid-19 pandemic for the purpose of comparison. Also, we employed the Autoregressive Distributed Lag Mixed Data Sampling (ADL-MIDAS) approach to conduct the impact analysis of the Covid-19 pandemic on stock market performance. We found that, in terms of efficiency, the stock market was more efficient during the Covid-19 pandemic than in the pre-Covid-19 era, being the only active market among other financial markets especially when several restrictions and total lockdown were imposed. In terms of returns and volatility, the study concluded that the Covid-19 pandemic did not significantly influence Nigeria's stock market performance negatively. However, the government stringency measures had a significant positive impact on the stock market return

in Nigeria. Our findings are instructive to policymaking and financial regulation.

Keywords: Covid-19 pandemic; Coronavirus; Stock market; Nigeria; ADL-MIDAS.

JEL Classification: G2; G12; G14; G23; I18; C32

1. Introduction

The outbreak of the novel Covid-19 virus disease and the consequential news effect that trailed the announcement of the virus as a global emergency by the World Health Organization (WHO) on the 30th of January, 2020 (WHO, 2020) triggered unprecedented changes and reactions from global markets and counter-measures by governments and institutions working in synergy. Governments across the globe adopted and enforced such measures as the closure of borders, imposition of restrictions on travel, strict adherence to social distancing, and quarantine measures (Yousfi *et al.*, 2021) to flatten the curve while international institutions complemented the efforts of governments with aids and medical supplies to ameliorate the impact of the pandemic.

The persistence of the pandemic as evident in the discovery of new cases and rising deaths fuelled fear and uncertainty that impeded the smooth functioning of markets and supply chains and consequently placed most world economies at the brim of economic crisis. The palpable influence that the pandemic had on different key markets and the consequential effect on macroeconomic variables across the globe have not only caused scholars like Burdekin & Harrison (2021) to compare the experiences that trailed the coronavirus pandemic with the Spanish Flu of 1918, but also reignited and reinforced the long-standing argument against globalization.

In Nigeria, the first confirmed case of the novel virus was recorded on the 27th of February, 2020. As of the 24th of October, 2021, a total of 3,207,523 samples have been collected and tested across all states in Nigeria out of which there were 210,295 confirmed cases, 198,191 discharged cases, 9,248 active cases, and 2,856 recorded deaths as shown in the left panel of Figure 1. Furthermore, the more explicit pattern of new daily cases and deaths presented in the right panel of Figure 1 reveals that both the recorded cases and deaths in Nigeria have undergone four cycles whose main drivers include the phases of lockdown, increased sophistication in testing capacity resulting in higher testing frequencies and the various waves of the virus. The cumulative incidence of coronavirus cases in Nigeria as presented by the Nigeria Centre for Disease Control (NCDC) on the 24th of October, 2021 is reported in the left panel of Figure 1 while the new daily coronavirus cases and deaths are presented in the right panel of the same figure. New cases are calculated in tens while new deaths are in units.
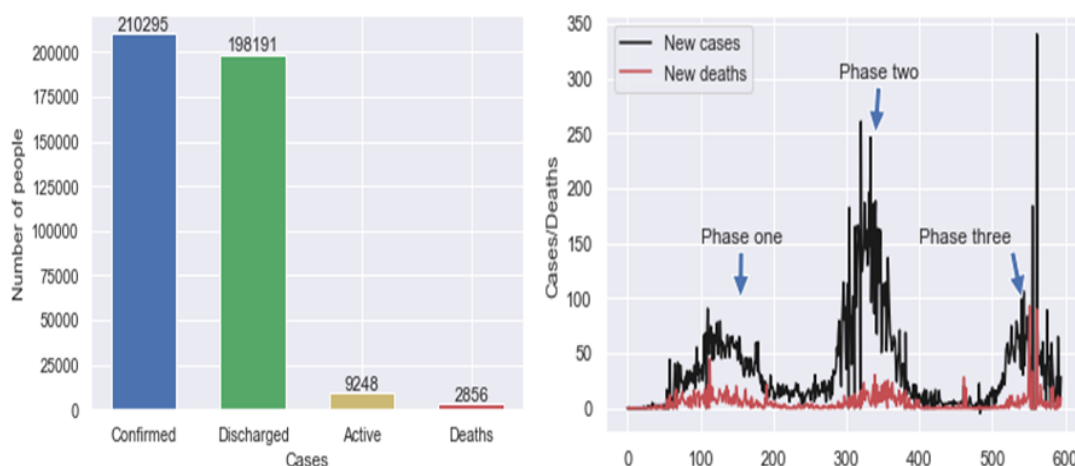
Figure 1. Stylized Facts on Nigeria's Covid-19 Cases and Deaths

Source: Nigeria Centre for Disease Control & World Health Organization, 2021. Note: In the right panel, new deaths are represented in units while new cases are in tens.

Like every other country in the world, the measures taken by the Nigerian government to flatten the curve of the COVID-19 pandemic had significant effects on the key markets, especially the stock exchange markets. Stocks markets are inarguably one of the many markets that present robust scientific evidence for the pervasiveness of the devastating impact of the coronavirus disease on various spheres of human lives. There abound strong evidence that separately links the coronavirus pandemic to worsening stock prices, stock market returns, stock market efficiency, and stock market capitalization among other indicators of stock market performance (Alade *et al.,* 2020; Mishra & Mishra, 2021). The documented negative reaction of stock markets to the outbreak of the virus in most countries was not unexpected. 'Black Swan' events of this nature are generally known to adversely affect the performance of stock markets by creating a milieu of panic among stock market participants and fueling market uncertainty (He *et al.,* 2020). For example, the S&P 500 and Nasdaq index associated with the United States stock market plummeted and only showed signs of recovery after the adoption of the Coronavirus Aid, Relief and Economic Security (CARES) Act by the US government (Yousfi, 2021).

Despite numerous documented evidence of the coronavirus pandemic dampening or worsening stock market indicators in various parts of the world (s*ee* Adenomon *et al.*, 2020; Takyi & Bentum-Ennin, 2020; Al-Awadhi *et al.*, 2021; Burdekin & Harrison, 2021; Hung *et al*., 2021; Insaidoo *et al.*, 2021), such evidence are still scanty in the context of Nigeria. The dominant opinion is that the Nigerian stock market, unlike most countries, has been mildly affected by the novel coronavirus. As reflected in Figure 2, prior to the outbreak of the pandemic, the All-Share Index of the Nigeria Stock Exchange (NSE) initially hovered around an average of 29,000 but began to decline sharply from January 2020 when it stood at 28,842 (NSE, 2020). The shock to Nigeria's stock market that followed the announcement of the coronavirus disease

as a global pandemic and the discovery of cases in Nigeria persisted, but the effect was however short-lived as the NSE index began to show signs of recovery after it reached its lowest of 21,300 two months after in March 2020. By the end of two months, the stock market of Nigeria had had its worst hit and began recovering by trending upward since late March 2020 after which it reached its peak of 42,412 in January 2021. Currently, this stock market indicator fluctuates around 40,000 and its trend seems to have diverged from its pre-Covid-19 levels.
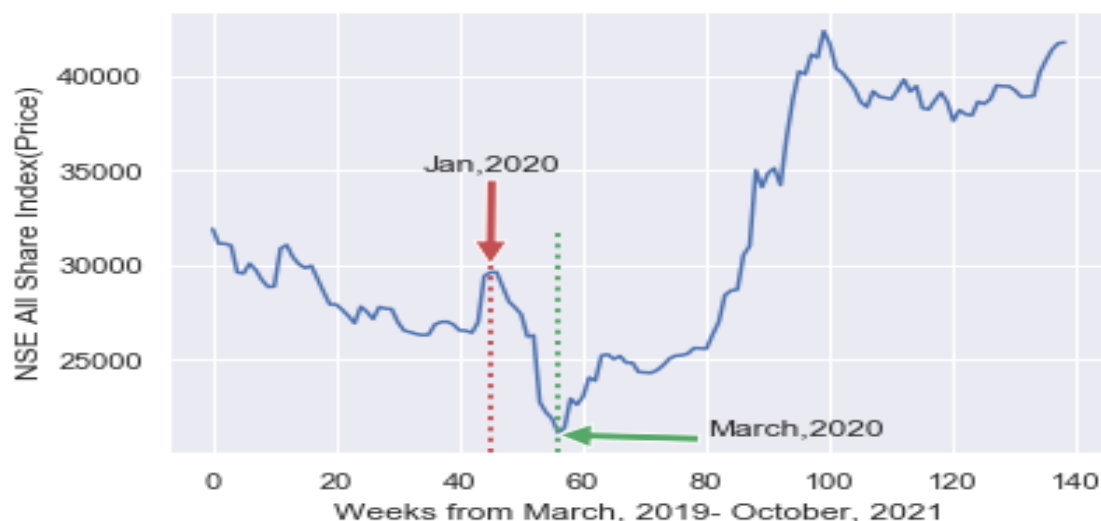

Figure 2. NSE all Share Index

Source: Nigerian Stock Exchange Monthly Reports, 2021

Some empirical questions that arise from this observed trend shift of the Nigeria stock market performance are whether the coronavirus disease or other underlying structural factors peculiar to Nigeria accounts for this shift and whether the efficiency of the stock market has also diverged significantly from its level before the Covid-19 pandemic. Also, do other stock market indicators exhibit similar characteristics? The few studies that have explored the link between the pandemic and stock market performance in Nigeria (*see* Adenomon *et al.*, 2020; Alade *et al.*, 2020; Babarinde, 2020) have mostly concerned themselves with restrictive indicators of stock market performance. The authors are currently unaware of any study in Nigeria that has sufficiently examined the impact of the Covid-19 pandemic on a broad set of key indicators of stock market performance (notably, stock market return, stock market volatility, stock market capitalization, and stock market efficiency) within a single study.

1.1 Motivation for the Study

The key markets of the world are inarguably affected by the pervasiveness of the devastating impact of the coronavirus disease. In Nigeria, there were crises in the money market due to systemic failure, a high level of inflation, uncontrollable human behaviour toward incentives to take too many risks, and a shortage of foreign exchange (forex). Also, the Central Bank of Nigeria (CBN) policy of selling forex directly to the importers has not been helpful as it is

usually leading to round-tripping and a high level of parallel market currency premium. Despite the increase in oil prices and proceeds, Nigeria is still experiencing a shortage or scarcity of forex because of trade imbalance over the years. This implies that the demand for forex has outstripped its supply. Therefore, the shortage of forex has reduced the investors' confidence and constituted a crisis in the foreign exchange market as well. Thus, the only financial market that can stimulate the economy, especially in the period of the COVID-19 pandemic is an investment in the real sector which relies heavily on capital from the stock market. During the pandemic, the stock market remained the opium of the real investors. Therefore, the study sets out to determine the efficiency of the stock market and to conduct an impact analysis of the Covid-19 pandemic on stock prices, stock market returns, stock market volatility, stock market capitalization, and stock market efficiency.

The rest of the paper is organized as follows: Section 2 deals with the empirical review of literature; Section 3 highlights the methodology and model specifications; Section 4 presents data description and preliminary analysis, and Section 5 provides the estimation and empirical evidence, while Section 6 presents the conclusion and policy implications based on the findings.

1.2 Review of Empirical Literature

The global health emergency occasioned by the outbreak of the novel coronavirus disease has caused an explosion of attention on the implications of the pandemic for world economies. Scholarly interests have been recorded in the analysis of the impact of the pandemic on key macroeconomic variables and segments of the economy, including financial markets and stock markets across various levels of aggregation-global, regional and country-specific. Interests in the stock market strand of the literature show clustering of themes around such stock market indicators as market efficiency, market volatility, market returns, and market capitalization among others.

A significant chunk of the literature has focused on analyzing the impact of the pandemic on stock market efficiency. For example, the study of Ozkan (2021) examines this relationship for six (6) developed economies (United States, United Kingdom, Spain, Germany, Italy, and France) and establishes that the stock markets of these economies deviated from efficiency during some periods of the pandemic. Additionally, the result of the study reveals that the US and UK stock markets show the largest deviation from their efficiency levels relative to other economies considered. Unlike earlier attempts (such as Aslam *et al*., 2020; Mensi *et al*., 2020) at linking the pandemic to stock market efficiency that adopts variants of Multifractal Detrended Fluctuation Analysis (MF-DFA), the study of Ozkan (2021) is more robust as it adopts the Wild Boostrap Automatic Variance Ratio Test which takes the conditional heteroskedasticity and non-normality which mostly characterize financial data into account.

A similar cross-country study by Okorie and Lin (2021) also presents inconclusive evidence on the effect of the pandemic on stock market efficiency in the four (4) economies considered-United States, Russia, India, and Brazil. The results from their Martingale Difference Spectral and Conditional Heteroskedasticity Tests show that, irrespective of the time horizon considered, the efficiency of stock markets is unimpaired by the pandemic in the United States and Brazil. However, the study reports a noticeable decline in information inefficiency in Russia's stock

market and a worsening of information inefficiency in the Indian stock market.

There also exists substantial evidence linking the pandemic to major increases in stock market volatility. For instance, the work of Baker *et al*. (2020) which is corroborated by Baig *et al*. (2020) shows that the most recent pandemic is characterized by the highest level of stock market volatility ever recorded when compared to other infectious diseases in recent times including the 1918 Spanish Flu. Mishra and Mishra (2021) also report a similar result in their study of 15 Asian stock markets within an ARCH and GARCH framework. Their result shows evidence of the COVID-19 pandemic raising stock market volatilities and uncertainties in most countries considered within the analysis.

Studies along the volatility line have also identified conditions that might exacerbate or dampen the impact of the COVID-19 pandemic on stock market volatility (see, for instance, Sharma, 2020; Engelhardt *et al*., 2020). Sharma (2020) establishes that COVID-19 has a significant effect on stock market volatility, but the effect differs in the countries considered. While the stock markets in countries with higher incomes experience higher jumps but faster decay in volatility, the converse is true in countries with lower incomes considered in the study.

A paltry number of studies have also focused on the implications of the Covid-19 Pandemic on stock market returns. Nguyen *et al*. (2020) contributes to this strand of the literature and concludes, based on results from their event study research that focused on how recent epidemics including the novel coronavirus disease affect listed Chinese companies, that COVID-19 has had the most impact on stock market returns relative to other epidemics. Additionally, the study finds evidence of differential impacts of the observed epidemics both across industries and share types. Similarly, the more recent study by Al-Awadhi *et al*. (2021) also establishes that the pandemic negatively affects the stock market returns of the listed Chinese companies. Even though the study of Al-Awadhi *et al*. (2021) is more recent and of the same spatial coverage (Chinese companies), its weak methodological alignment with Nguyen *et al*. (2020) makes it difficult to compare their findings.

On the contrary, the country-specific study of Insaidoo *et al*. (2021) finds no significant evidence linking the pandemic to stock market returns. However, this study of Ghana's economy based on an E-GARCH model presents evidence that links the coronavirus pandemic with increases in the volatility of stock returns. This volatility raise hypothesis is also reinforced by the study of Nigeria's economy by Adenomon *et al*. (2020). Also, the quadratic and exponential GARCH models estimated by the study provide evidence of reductions in stock market returns lacking in Insaidoo *et al*. (2021). The findings of the research of Hung *et al*. (2021) on the Vietnamese economy establish a similar pattern as their random effect model reveals that confirmed cases of the coronavirus negatively and significantly affect returns of stock markets in Vietnam, although this effect is more felt before the lockdown and in the second wave. The consensus opinion emanating from most studies is that stock market returns respond negatively to the COVID-19 pandemic.

The investigation into the relationship between the COVID-19 pandemic and Nigeria's stock market capitalization amidst the various indicators of stock market performance appears to have received somewhat limited attention. Along this line, the result of the Vector

Autoregressive Model (VAR) applied to daily time series data by Alade *et al.* (2020) shows no statistically significant effect of the pandemic on the stock market in Nigeria.

Table 1. Literature Matrix

Paper Title	Author(s)	Temporal and Spatial Scope	Data and Methodology	Finding(s)
Covid-19 and Its Impact on the Stock Market in GCC	Asma and Qaisar (2021)	Sept, 2019-July, 2020 • GCC countries	Daily time series data • Mann-Whitney Test • Heteroskedastic t-test	• Negative short-term impact. • GCC stock markets are less affected than global markets.
Impact of Covid-19 on Stock Market Efficiency: Evidence From Developed Countries	Ozkan (2021)	July 29, 2019- Jan 25, 2021 • Developed countries (US, UK, Spain, Germany, Italy, and France)	Daily time series data • Wild Bootstrap Automatic Variance Ratio Test • Automatic Portmanteau Test	• Deviation from market efficiency during some periods of the pandemic • More pronounced deviations in the US and UK.
The Impact of COVID-19 on Stock Market Performance in Africa: A Bayesian structural Time Series Approach	Takyi and Ennin (2020)	Oct 1st, 2019- June 30th, 2020 • Africa (13 countries)	Daily time series data • Bayesian Structural Time Series Model	• Negative effect on stock market performance in most countries.
Stock Market Performance and COVID-19 Pandemic: Evidence From a Developing Economy	Insaidoo et al. (2021)	Jan 2nd, 2015- Oct 13th, 2020 • Ghana	Daily time series data • E-GARCH	• Negative but insignificant impact on stock returns. • Increased the volatility of stock returns.
Covid-19 and Instability of Stock Market Performance: Evidence From the U.S.	Hong et al. (2021)	Jan 1st,2019- June 30th, 2020 • United States	Daily time series data • Bai and Perron (1998, 2003) and Elliot and Muller (2004) structural break tests	• Unique break in return predictability and price volatility consistent with the outbreak of the pandemic.

Stock Market Reactions to COVID-19 Pandemic Outbreak: Quantitative Evidence from ARDL Bounds Tests and Granger Causality Analysis	Ghergina et al. (2020)	Dec 31st, 2019–April 20th, 2020 • USA, UK, France, Spain, Italy, China, Germany and Romania.	Daily time series data • ARDL • Granger causality	• Evidence for effect of Italian Covid-19 cases on Romanian financial market in the short and long term. • No evidence for the effect of China's Covid-19 cases on Romanian financial market in the short and long term.
COVID-19 Pandemic and Nigerian Stock Market Capitalization	Alade et al. (2020)	Mar 1st, 2020-May 31st, 2020 • Nigeria	Daily time series data • VAR	• No evidence of impact on stock market.
COVID-19 Pandemic Effect on Trading and Returns: Evidence From the Chinese Stock Market	Bing and Ma (2021)	Jan 1st, 2019-Mar 31st, 2020 • China	Daily time series data • SVAR	• Foreign investors played a stabilizing role in stock market during the pandemic. • Institutional investors do not help stabilize the market.
Effects of the COVID-19 pandemic on the US stock market and uncertainty: A comparative assessment between the first and second waves	Yousfi et al. (2021)	Jan 5th, 2011-Sept 21st, 2020 • United States	Daily time series data • Multivariate GARCH • Dynamic Conditional Correlation DCC)	• Higher co-movement between Covid-19 cases and stock market in both waves.
Adaptive Market Hypothesis: The Story of the Stock Markets and COVID-19 Pandemic	Okorie and Lin (2021)	June 3rd, 2019-July 31st, 2020 • United States, Russia, Indian and Brazil	Daily time series data • Martingale Difference Spectral Test • Conditional Heteroscedasticity Test	• Market efficiency unaffected across all time horizons in US and Brazil stock markets. • Information inefficiency worsened in Indian stock market but improved in Russia's.

Relative Stock Market Performance during the Coronavirus Pandemic: Virus vs. Policy Effects in 80 Countries	Burdekin and Harrison (2021)	Mar, 2020- Dec, 2020 • 80 countries	Weekly panel data • Pooled OLS	• Recorded cases worsen relative stock market performance than recorded deaths. • Lockdowns worsen stock market performance while government support stimulates stock market performance.
The Impact of Covid-19 on Stock Market Return in Vietnam	Hung et al. (2021)	Jan 2nd, 2020- Dec 13th, 2020 • Vietnamese companies	Daily panel data • Random Effect Model	• Confirmed cases negatively affect stock returns of companies. • Impacts on stock returns were more severe before the lockdown and the second wave.
On the Effects of Covid-19 on the Nigerian Stock Exchange Performance: Evidence from GARCH Models.	Adenomon et al. (2020)	Jan 2nd, 2020- April 16th, 2020 • Nigeria	Daily time series data • Quadratic and Exponential GARCH Models	• The pandemic reduced stock returns and raised its volatilities.
COVID-19 Pandemic and Stock Market Reaction: Empirical Insights from 15 Asian Countries	Mishra and Mishra (2021)	Dec 31st, 2019- Aug 31st, 2020 • 15 Asian Countries	Daily time series data • ARCH and GARCH • Random Effect	• The pandemic resulted in increased market uncertainties and raised volatilities.
COVID-19's Impacts on the Kuwaiti Stock Market's Performance	Kandari et al. (2021)	Mar 28th, 2020- Apr 20th, 2020 • Kuwait	Daily time series data • Event Study Methodology	• The pandemic spurred the stocks of banking, telecommunication and consumer goods sectors.
Corona Virus and Stock Prices in Nigeria: A Vector Autoregressive Multivariate Time Series Analysis	Babarinde (2020)	Mar 2nd, 2020- Sept 25th, 2020 • Nigeria	Daily time series data • Event Research • VAR	• The pandemic was not a significant determinant of movements in stock prices. • No evidence of

				causality from pandemic to stock prices. • Confirmed and fatal cases weaken stock prices while discharges improve it.
The Impact of Covid-19 Pandemic on Stock Market Return Volatility: Evidence from Malaysia and Singapore	Yong et al. (2021)	July 1st, 2019-Aug 31st, 2020 • Singapore and Malaysia	Daily time series data • GARCH Models	• Stock market returns persistence decreases for both countries during the pandemic.
Death and Contagious Infectious Diseases: Impact of the Covid-19 Virus on Stock Market Returns	Al-Awadhi et al. (2021)	Jan 10th, 2020-Mar 16th, 2020 • Chinese companies	Daily panel data • Fixed Effect	• The pandemic negatively affects stock returns of companies.
Impact of the Novel Corona Virus on Stock Market Returns: Evidence from GCC Countries	Bahrini and Filfilan (2020)	Apr 1st, 2020-Jun 26th, 2020 • GCC Countries	Daily panel data • Fixed Effect	• Confirmed deaths have negative effect on stock markets. • Confirmed cases have no significant influence on stock markets.
Epidemics and Chinese Firms' Returns: Is Covid-19 Different?	Nguyen et al. (2020)	2002-2020 • Chinese companies	Daily panel data • Event Study Methodology	• Relative to other epidemics, Covid-19 has the greatest impact on stock returns. • Epidemics considered affect industries differently and their negative effects are more seen in B-shares than A-shares.

1.3 Summary of Gaps in Literature

Although much scholarship has been devoted to understanding the consequences of the novel coronavirus pandemic for several indicators of stock market performance at the global level, there is still a dearth of country-specific studies with an explicit focus on the efficiency of

Nigeria's stock market. Investigating the impact of the Covid-19 pandemic on the efficiency of the Nigerian stock market is important because the literature recognizes that the workings of the efficient market hypothesis are often impeded by events associated with fear, panic, war, political, economic, and financial crises, shocks and pandemics as these events are capable of causing the prices of assets to diverge from their fundamental levels (see Charles et al., 2015; Khediri and Charfeddine, 2015; Verheyden et al., 2015; Charfeddine and Khediri, 2016; Rahman et al., 2017; Charfeddine et al., 2018; Lalwani and Meshram, 2020).

Additionally, most available studies in the case of Nigeria (Adenomon et al., 2020; Alade et al., 2020; Babarinde, 2020) have been somewhat restrictive in that they consider limited indicators of stock market performance. This study fills that gap in the stock market literature of Nigeria by focusing on broader indicators of stock market performance which include stock market prices, stock market returns, stock market capitalization, stock market efficiency, and stock market volatility all within a single study. Based on the above literature gaps, the study intends to answer the following research questions:

i Is stock market efficiency during the Covid-19 pandemic differ from the pre-Covid-19 period?

ii What is the real impact of the Covid-19 pandemic on stock market performance?

2. Methodology and Model Specifications

The basis for considering the Covid-19 pandemic in the predictive model for stock market performance, especially on the Nigerian economy is conditioned on its strong dependence on the real sector, which relies heavily on capital from the stock market due to crises in the money market and shortage of forex because of the failure of the CBN policy of selling forex directly to importers. Theoretically, the role of the Covid-19 pandemic in the stock market analysis is motivated by the extensively cited stock market efficiency theory or efficient market hypothesis, which suggests that the present stock price on an asset today is its true value, reflecting any data that could drive its price up or down (Ozkan, 2021). The theoretical foundation sees the prevailing health structure in an economy (in this case, the Covid-19 pandemic) as a determinant of stock market performance such that in the production mix, such that labor and capital are affected by the pandemic (*see* Wei, Chen & Chang, 2021). The most important thing that determines the direction of the stock market is the state of the economy, and the state of the country in which the stock market is based. The stock markets are not stable unless there are good economic conditions prevailing in a country. Following the extant studies on the effect of the Covid-19 pandemic on stock market performance (*see* Asma & Qaisar, 2021; Ozkan, 2021; Hung *et al.*, 2021; Dong *et al.*, 2021), we express the functional relationship in Eqn. 1:

$$smkp_t = \alpha + \beta Covid_t + \delta RSI_t + \varsigma_t \qquad 1$$

Where *smkp_t* represents the stock market performance (stock efficiency, prices, returns, and volatility) at time t; *Covid_t* represents the Covid-19 pandemic cases and deaths, and the government response stringency index (RSI) while ς_t is the disturbance term. Adding a

government response stringency index becomes important to explain the comprehensive measure and the intensity of the government response based on specific policy and response categories (Wei, Chen & Chang, 2021). A priori, we expect a negative impact of Covid-19 cases and deaths on stock efficiency, prices, and returns. However, a positive impact is expected from the government response stringency index on stock efficiency, prices, and returns. In terms of stock volatility, we expect a reverse relationship respectively.

2.1 Efficiency of Nigeria's Stock Market before and during Covid-19 Pandemic

Arguments on different methods of obtaining efficiency have been well documented in the literature. Parametric methods of efficiency analysis such as the Stochastic Frontier Approach (SFA), the Thick Frontier Approach (TFA), and the Distribution Free Approach (DFA) have significant advantages by differentiating and modeling the random noise from inefficiency (Asmare & Begashaw, 2018). However, these methods require the correct specification of the model. Also, the task of separating random noise from the true inefficiency may be restrictive in most cases. On the other hand, the nonparametric method, especially the Data Envelopment Analysis (DEA) has numerous advantages. The DEA method of efficiency analysis has been constantly applied to the agricultural and market sector (Ahmed, 2015; Asmare & Begashaw, 2018). The DEA has been widely adopted due to the following reasons: it has a unique ability to measure the efficiency of multiple-input and multiple-output Decision-Making Units (DMUs) without assigning prior weight to the input and output. It imposes no a priori parametric restrictions on the underlying technology (Ahmed, 2015). It measures the relative efficiency of the decision-making units without the exact functional form or model specification between inputs and outputs. In addition, it does not have as many restrictive assumptions as parametric statistical inference (Ahmed, 2015; Asmare & Begashaw, 2018).

Based on the foregoing, this study adopts the nonparametric approach of DEA to obtain the efficiency of Nigeria's stock market in the pre-Covid-19 and Covid-19 eras for the purpose of comparison. To obtain efficiency, we estimate the model below:

$$\text{Maximize} \quad E_t = \frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}} \qquad\qquad 2$$

Subject to:

$$\frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{i=1}^{m} v_i x_{ij}} < 1 \qquad\qquad 3$$

Where $j = 1,2,...,n$; $u_r, v_i > 0$; $r = 1,2,...,s$; $i = 1,2,...,m$;

y_{rj}, x_{ij} (all positive) are the known outputs (stock returns and stock prices) and inputs (Covid-19 cases and deaths, stringency index, stock market capitalization) attached to each jth Decision Making Unit (DMU) and $u_r, v_i > 0$ are the variable weights to be determined by the solution of this problem.

2.2 Model specification of impact analysis of Covid-19: Autoregressive Distributed Lag Mixed Data Sampling [ADL-MIDAS Regression]

For the impact analysis, we highlight the impact of the Covid-19 pandemic on stock market performance following some extant studies (*see* Salisu & Ndako, 2018; Dong & Yoon, 2019; Phan & Narayan, 2020), and examine whether the Covid-19 pandemic influences stock market (stock prices, returns, efficiency, and volatility) in Nigeria. We specify the model for the Covid-19 pandemic (cases and deaths) and government response stringency as a determinant of stock market performance (stock prices, returns, and volatility) in Equation 4 based on the statistical properties of the series as follows:

$$smkp_t^M = \alpha + \rho smkp_{t-1} + \beta Covid_t^D + V_t \qquad 4$$

where $smkp_t^M$ represents the stock market performance (stock prices, returns, efficiency and volatility) observed in monthly frequency (M); $Covid_t^D$ represents the Covid-19 pandemic cases and deaths in daily frequency (D) for Nigerian economy considered individually, RSI_t^D is the government response stringency index in daily frequency (D) for the period. α is the constant, ρ is the autoregressive parameter expected to be less than one for convergence (i.e. we exclude $\rho \geq 1$), V_t is the residual at time t. The Mixed Data Sampling (MIDAS) approach assumes some weighting scheme to average the high (daily) frequency data to the date structure for the monthly frequency data. We adopt the exponential Almon lag polynomial based on He & Lin (2018) and Salisu & Ogbonna (2019) and specify the ADL-MIDAS regression model as follows:

$$smkp_{t+1}^M = \alpha + \sum_{i=0}^{P_{smkp}^M - 1} \rho smkp_{t-1}^M + \beta \sum_{i=0}^{q_{covid}^D - 1} * \sum_{j=0}^{N_D - 1} w_{i+j*N_D}(\phi^D) Covid_{N_D - j, t-i}^D + \varsigma_{t+1} \qquad 5$$

There is only 1 lag of the dependent (monthly frequency) variable on the right-hand side, while q_{Covid}^D is the lag of the Covid-19 pandemic series, N_D represent the number of days in a month given the mixture of daily and monthly frequencies.

3. Data Issues, Sources and Preliminary Analyses

We at first, collect data on all share index (a proxy for stock prices) and stock market capitalization on monthly basis. The stock returns series was generated as the log difference of stock price while the stock volatility series was generated by estimating a simple ARCH (1) model. These data were available on monthly bases for the pre-Covid-19 era (2018M02 to 2020M01) and Covid-19 era (2020M02 to 2022M01) from the Central Bank of Nigeria Statistical Bulletin, 2022. The sample periods for the pre-Covid-19 era and the Covid-19 era were carefully selected to have equal lengths of periods for both eras.

Data on the number of daily new confirmed cases (New cases and deaths) of the Covid-19 pandemic was sourced from Our World in Data (OWID) on the website https://ourworldindata.org/grapher/daily-cases-covid-19. We also obtain the government response stringency index (GRSI) from the same website. The government response stringency index (RSI) is a comprehensive measure that is based on specific policy and response categories. The value represents the intensity of the government response and ranges from 0 to 100; if the value equals 100, then the government response is the strictest. To consider the peculiar problem, we divide the dataset into two samples (Pre-Covid-19 and Covid-19 era) that include 24 periods respectively. The monthly data on stock market performance is from February 2018 to January 2022 while daily data on Covid-19 cases and deaths and the government response stringency index (strindex) are from February 28, 2020, to February 9, 2022. All the data are transformed into natural logarithms.

3.1 Preliminary Analyses

Table 2. Descriptive Analysis Showing the Statistical Features of the Variables

	SMC	Stock_pri	Stock_ret	Stock_vol	EFF	preEFF	New_cas	Deaths	STRIN-DEX
Mean	33354.6	35094.3	24.3	4690777.0	0.8	0.51	356.1	1633.3	54.1
Median	37651.6	38547.1	24.3	3523782.0	0.8	0.46	195.0	1803.0	50.9
Maximum	49377.0	45616.2	35.7	11294724.0	1.0	1.00	6158.0	3139.0	85.7
Minimum	19303.8	21300.5	1.0	3061970.0	0.7	0.07	0.0	0.0	11.1
Std. Dev.	8493.8	7859.4	7.4	2370891.0	0.1	0.28	454.1	958.7	16.0
Skewness	-0.6	-0.5	-1.1	1.9	0.9	0.22	4.2	-0.1	0.1
Kurtosis	2.3	1.7	5.7	5.5	3.6	1.94	41.4	1.9	3.4
Jarque-Bera	1.8	2.6	11.3	19.7	3.5	1.32	45832.2	36.3	5.0
Probability	0.4	0.3	0.0	0.0	0.2	0.52	0.0	0.0	0.1
Observations	24	24	24	23	24	24	713	713	713

Note: SMC, Stock_pri, stock_ret, stock_vol, EFF, New_cas, Deaths and Strindex represent stock market capitalization, stock prices, stock returns, stock volatility, stock market efficiency, new cases of Covid-19 discovery, deaths from Covid-19 pandemic and government response stringency index respectively.

It is always important to conduct some preliminary analyses such as the descriptive analysis and the unit root tests of the variables employed in the study to understand the normality, distribution, and stationarity of the data. We present the statistical features of our data in Table 2, especially the mean, median, standard deviation, kurtosis, and Jarque-Bera of the variables considered under the country-specific basis. Following the results presented in Table 2, the averages of the variables are between the minimum and maximum values, indicating the consistency of the data series. In terms of variability, stock market volatility was portrayed as the most volatile among the variables over the sample period with a standard deviation of 23,70891 while stock market efficiency data has the least variability with a standard deviation of 0.1. This indicated that stock market volatility swayed at a higher magnitude over the period of study and that stock market efficiency was relatively close to the mean value. The implication is that the distribution of stock market efficiency during the covid-19 pandemic is rightly skewed.

Table 3. Phillips-Peron (PP) and Augmented Dickey-Fuller (ADF) Unit Root Tests

	SMC	Stock_pri	Stock_ret	Stock_vol	EFF	New_Cas	Deaths	Strindex
Phillips-Peron (PP) UNIT ROOT TEST With Constant & Trend								
At Level								
t-Stat.	-1.5713	-0.4955	-3.0793**	-3.2057**	-2.4852	-2.8358*	-0.1954	-3.3879**
Prob.	0.4806	0.8752	0.0424	0.0327	0.1323	0.0689	0.9262	0.0222
At First Difference								
t-Stat.	-5.653***	-3.9997***			-9.2955***	-5.1272***	-3.727**	
Prob.	0.0001	0.0060			0.0000	0.0005	0.0110	
Augmented Dickey-Fuller (ADF) UNIT ROOT TEST With Constant & Trend								
At Level								
t-Stat.	-1.4	-2.3037	-5.066**	-3.3233*	-3.3088*	-3.7484**	-4.364**	-8.559***
Prob.	0.8334	0.4149	0.0027	0.0874	0.0921	0.0401	0.0130	0.0000
At First Difference								
t-Stat.	-5.9201***	-2.778**		-5.7304***	-5.7535***			
Prob.	0.0005	0.0294		0.0007	0.0008			

Notes: (*), (**) and (***) indicate significant at the 10%, 5% and 1% respectively. SMC, Stock_pri, stock_ret, stock_vol, EFF, New_cas, Deaths and Strindex represent stock market capitalization, stock prices, stock returns, stock volatility, stock market efficiency, new cases of Covid-19 discovery, deaths from Covid-19 pandemic and government response stringency index respectively. *MacKinnon (1996) one-sided p-values.

We present the results of unit root analyses on the variable of interest in Table 3. We employed the Augmented Dickey-Fuller and Phillips-Perron approaches which are based on the null hypothesis that the series of interest is nonstationary and contains a unit root in the form expressed. Mathematically, the ADF test statistic is expected to be negative since the null is

tested against zero (it would have been expected to be less than one in the case of the Dickey-Fuller where the null is greater than one). The statistical significance of the ADF and PP tests statistic indicates the rejection of the null hypothesis of unit root, otherwise, the series is nonstationary at the specified form. The results in Table 3 show that stock returns, stock volatility, new cases of covid-19, and stringency index are stationary at the level in both ADF and PP tests, while stock market efficiency, capitalization, stock prices, and deaths due to covid-19 pandemic are stationary after passing through the first differencing process.

4. Estimation and Empirical Analysis

4.1 Efficiency of Stock Market in the pre-Covid-19 and during Covid-19 Pandemic

We compared the efficiency of the stock market during the Covid-19 pandemic to pre Covid-19 era in Nigeria by estimating the efficiency via Data Envelopment Analysis (DEA). As stated earlier, the DEA has a unique ability to measure the efficiency of multiple-input and multiple-output of DMUs without assigning prior weights to the input and output and it does not impose too many restrictive assumptions as parametric statistical inference (Ahmed, 2015; Asmare & Begashaw, 2018). To employ the DEA, the input parameters are taken as stock market capitalization, stock prices, new cases of Covid-19, total deaths of Covid-19, and stringency index while the output parameters are divided into good and bad categories (*see* Mohanta, Sharanappa & Aggarwal, 2021) such as the stock returns are taken as good output, and the stock market volatility is taken as bad outputs to obtain stock market efficiency during Covid-19 pandemic. The efficiency value of the DMUs measured by the DEA technique ranges from 0 and 1. A DMU is said to be efficient if its efficiency value is 1; otherwise, it is inefficient. The details of the variables employed are shown in Table 4 while the result is depicted in Table 5 and Figures 3, 4, and 5:

Table 4. Variables Employed to Estimating Efficiency via DEA

Variable	Role	Details	Source
SMC	Input	stock market capitalization	CBN Bulletin, 2021
Stock_pri	Input	stock prices (all share index)	CBN Bulletin, 2021
New_cases	Input	new cases of Covid-19	OWID website
Total_deaths	Input	total deaths of Covid-19	OWID website
Strindex	Input	Government response stringency index	OWID website
Stock_ret	Good output	stock returns	Generated by authors
Stock_vol	Bad output	stock market volatility	Generated by authors

Sources: Authors' compilation, 2022

Table 5 shows the efficiency score of the different DMUs. Here, the DMUs are the different periods under consideration and also show both the efficient (fully & weakly) and inefficient

periods. According to Table 5, it was found that 100% efficiency was recorded in period 1 (February 2020), period 3 (April 2020), period 4 (May 2020), and period 9 (October 2020) while slightly weak efficiency was recorded in other periods during Covid-19 pandemic era. This is also depicted clearly in Fig. 3 where 58.02% is the weakest efficiency (or inefficiency) of the stock market recorded in period 13 (February 2021). The stock market efficiency scores of periods of the Covid-19 pandemic in Nigeria were found to be efficient as efficiency generally varied between zeros to one. Moreover, Table 5 and Fig. 4 show that the 100% efficiency of the stock market was only recorded in period 16 (May 2019) and period 24 (January 2020) in the pre-Covid-19 era. Fig. 4 shows that the stock market was mostly inefficient before the Covid-19 outbreak in Nigeria. This may be due to weakened investors' confidence and a high level of volatility in the market during the periods considered. The weakest efficiency scores (inefficiency) were recorded in period 4 (May 2018) and period 18 (July 2019) with 6.87% and 8.46% respectively.

Table 5. Result of the Efficiency Score via DEA (Both periods)

	Covid-19 Pandemic era				Pre-Covid-19 Pandemic era		
Period	score	period	score	Period	score	period	score
1	1.000000	13	0.580219	1	0.440035	13	0.905998
2	0.794293	14	0.737299	2	0.312439	14	0.471576
3	1.000000	15	0.750763	3	0.569834	15	0.188715
4	1.000000	16	0.749781	4	0.068730	16	1.000000
5	0.891153	17	0.743416	5	0.657150	17	0.360738
6	0.899411	18	0.746752	6	0.397531	18	0.084564
7	0.909062	19	0.745455	7	0.210427	19	0.597644
8	0.824407	20	0.778046	8	0.204619	20	0.671161
9	1.000000	21	0.815302	9	0.594135	21	0.316999
10	0.993942	22	0.828962	10	0.295458	22	0.829856
11	0.947942	23	0.853326	11	0.817642	23	0.873031
12	0.789153	24	0.885193	12	0.453001	24	1.000000

Source: Authors' Estimation via DEA, 2022.

The stock market efficiency scores in both eras were compared in Fig. 5. It is shown in Fig. 5 that the stock market was more efficient during the Covid-19 pandemic and less efficient (inefficient) during the pre-Covid-19 era. Our finding is in line with extant studies that stock market efficiency is unaffected across all time horizons in US and Brazil stock markets (*See* Okorie & Lin, 2021) and in other developed countries (*see* Ozkan, 2021). The result of more efficiency during the Covid-19 pandemic periods may be connected to the fact that the stock market remained the only active market in the economy during the period after the imposition of strict restrictions and total lockdown all over the world. This coincides with the periods when all other financial institutions and businesses are put on hold in the process of Covid-19 pandemic management. We concluded in support of Dong, Song & Yoon (2021) that the stock

markets are most influenced by economic factors during the Covid-19 outbreak which result in a high level of efficiency in the case of Nigeria. However, this finding negates the conclusion of some other studies that the stock markets hit the circuit breaker mechanism severally in March 2020 in the U.S. and that the global stock markets have experienced a major decline during the Covid-19 pandemic (Zhang et al., 2020; Narayan, 2020; Singh et al., 2021; Wei, Chen & Chang, 2021).
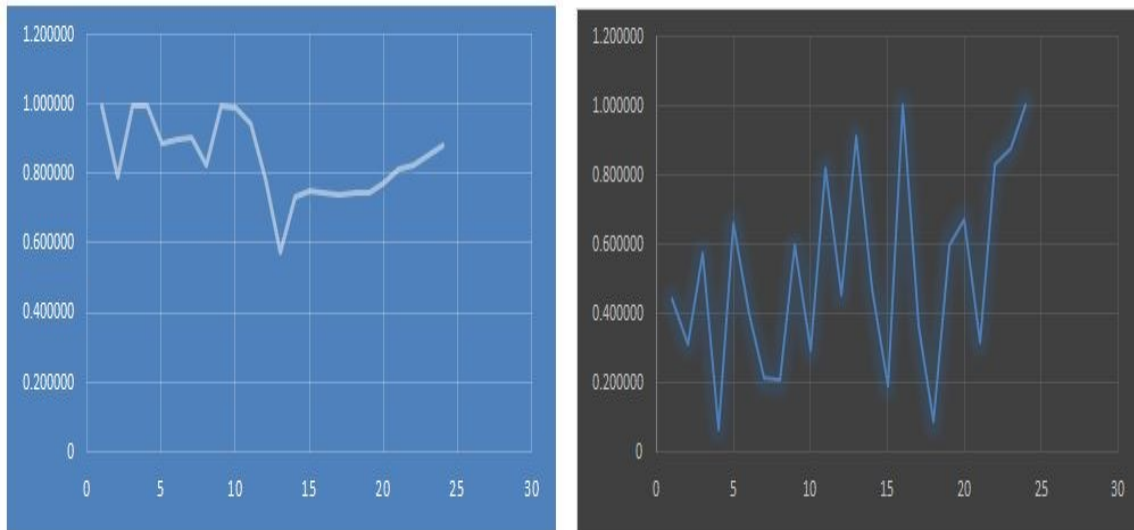
Left panel: Stock market efficiency during Covid-19 pandemic   Right panel: Stock market efficiency before Covid-19 pandemic

Figure 3. Efficiency Performance of Nigeria's Stock Market

Source: Authors' estimation, 2022

Figure 4. Efficiency of Nigeria's Stock Market before and during Covid-19 Pandemic

Source: Authors' Estimation, 2022

4.2 Impact Analysis of Covid-19 Pandemic with ADL-MIDAS Regression

We further explored the impact analysis to see whether the Covid-19 pandemic influenced the stock market performance in Nigeria. This involves the use of the Autoregressive Mixed Data Sampling technique (ADL-MIDAS approach) that allows us to use all the available information by treating the variables in the model in their available data frequency (monthly and daily). The dependent variables (stock market performance- efficiency, prices, returns, and volatility) are in monthly frequency as obtained through DEA and from the CBN Statistical Bulletin respectively, whereas the repressors series (Covid-19 cases, deaths, and stringency index) are included in daily frequency as obtained from Our World in Data (OWID) in the website https://ourworldindata.org/grapher/daily-cases-covid-19. We, therefore, estimate the model with mixed data frequency with the ADL-MIDAS approach based on the Almon lag polynomial weighting scheme.

The impact analysis with ADL-MIDAS regression results is displayed in Table 6. The first regression where stock market efficiency (obtained via DEA) is used as a proxy for stock market performance (dependent variable), shows that stock market capitalization (SMC) has an insignificant negative impact on stock market efficiency during the period of Covid-19 pandemic. This evidence could not be unconnected to the fluctuation in the stock prices which affect the investors' confidence during the period. The result is in line with extant studies (*see* Rouatbi *et al.,* 2021; Singh *et al.*, 2021; Wei *et al.*, 2021; Dong, *et al.,* 2021) which conclude that the Covid-19 pandemic changes the structure of stock market capital significantly. In the second regression, stock market capitalization has a significant positive impact on stock prices. This shows that stock prices increase (or decrease) in line with the movement of stock market capitalization (increases or decreases). This finding is similar to what is obtainable in the third and fourth regression where stock returns and volatility are proxies for stock market performance, except that stock market capitalization does not have a significant impact on stock market returns and volatility. This finding buttressed Alade *et al.* (2020) with no evidence of the significant impact of the Covid-19 Pandemic on Nigerian stock market capitalization.

However, the government response stringency index (strindex) has a positive impact on stock market efficiency, prices, and returns. Its impact is more significant on stock market returns at a 1% significance level. The government's response to the COVID-19 pandemic includes school closures, workplace closures, cancellations of public events, restrictions on gatherings, the closing of public transport, public information campaigns, stay-at-home mandates, restrictions on domestic movement, and international travel controls has a positive impact on stock market performance by increasing the efficiency and returns of stock markets and reducing stock market volatility in Nigeria. This finding conforms to the conclusion of Wei *et al.*, (2021) that the government response stringency index has a significantly cointegrated relationship with stock prices for 18 enterprises from OECD countries and 3 enterprises from non-OECD countries from January 2, 2020, to March 8, 2021. Our finding is also in line with the conclusion of Rouatbi, *et al.* (2021) that COVID-19 vaccination and measures provided by the government (government response stringency index) assist in stabilizing the global equity markets by ensuring a reduction in the stock market volatility.

Table 6. Impact Analysis of Covid-19 Pandemic with ADL-MIDAS Regression

Variable	Stock Market Performance			
	Efficiency	Prices	Returns	Volatility
dep(-1)	0.5228*	0.4058**	0.0498	0.2746
	[0.0751]	[0.0348]	[0.7609]	[0.3438]
lsmc	-0.265	0.2945***	0.6622	0.1795
	[0.3390]	[0.0052]	[0.2783]	[0.7374]
lstrindex	0.1599	0.0613	2.7089***	-0.3173
	[0.1646]	[0.3816]	[0.0001]	[0.4560]
lstock_prices	0.2492	-	-	-
	[0.6525]			
lstock_vol	0.0399	-	-	-
	[0.6178]			
New_cases(-1)	-7.66E-05	-2.91E-05	-0.0004	0.00018
	[0.8108]	[0.8576]	[0.8081]	[0.8985]
New_cases(-2)	0.0001	0.0002	0.0003	0.00042
	[0.6544]	[0.2902]	[0.8058]	[0.7174]
New_cases(-3)	-3.63E-05	-4.41E-05	-0.0002	0.00015
	[0.5233]	[0.1132]	[0.5441]	[0.5017]
deaths(-1)	-0.0291	-0.0143	-0.0564	0.0473
	[0.4270]	[0.4278]	[0.2464]	[0.7504]
deaths(-2)	0.0358	0.0183	-0.0466	-0.0714
	[0.4602]	[0.4381]	[0.2783]	[0.7164]
deaths(-3)	-0.0091	-0.0048	-0.008	0.0204
	[0.4831]	[0.4476]	[0.3119]	[0.6974]
Constant	-1.2379	2.5504	-24.543***	11.8445*
	[0.6917]	[0.1358]	[0.0046]	[0.0801]
R-square	0.6548	0.9785	0.7681	0.4897
Adj. R-square	0.5532	0.9751	0.7315	0.4091
Durbin-Watson stat	1.5858	1.5947	2.0452	2.4870
Mean dep. Variable	0.838	10.4	3.0706	15.2746
S.D. dep. variable	0.108	0.245	0.702	0.3913

Note: The estimates are obtained from ADL-MIDAS regression models with intercepts. Statistical significance of the test values at 1%, 5%, and 10% are represented by ***, **, and * respectively. Estimates of the ADL-MIDAS regressions were obtained using the Normalized Exponential Almon lag polynomial (Nealmon) weighting scheme in the EVIEW10 package. The variables are expressed in logs to enable us to produce the estimates in elasticities, except for the stock efficiency and covid-19 cases and deaths.

The new cases of Covid-19 and deaths recorded have an insignificant impact on stock performance in terms of efficiency and prices, while their impacts were positive on stock

market volatility. The findings indicate that the Covid-19 pandemic has insignificant impact on stock market efficiency and prices. The results in Table 6 also indicated an insignificant negative impact of the Covid-19 pandemic on stock market returns. That is, confirmed cases and deaths of Covid-19 insignificantly affect stock returns in Nigeria. Our findings are in accord with those of the recent studies (such as Takyi & Ennin, 2020; Asma & Qaisar, 2021; Insaidoo *et al*., 2021; Burdekin & Harrison, 2021; Hasan, *et al.,* 2021) in terms of the insignificant impact of Covid-19 pandemic on stock markets. Also, Babarinde (2020) finds that the pandemic was not a significant determinant of movements in stock prices in Nigeria while our finding is contrary to Bahrini & Filfilan (2020) who concluded that confirmed deaths have a negative effect on stock markets in GCC Countries. Some other extant studies (*see* Adenomon *et al.*, 2020; Al-Awadhi *et al*., 2021; Bing & Ma, 2021; Hung *et al.,* 2021; Yong *et al*., 2021) also concluded that stock market returns persistently decrease during the pandemic.

On the impact of the Covid-19 pandemic on stock market volatility, the result shows an insignificant positive higher co-movement between Covid-19 cases and stock market volatility in Nigeria. The increase in new cases and deaths from Covid-19 insignificantly increases the level of uncertainty and volatility in Nigeria's stock market. Our findings support the conclusion of Yousfi *et al*. (2021) who reported higher co-movements between Covid-19 cases and stock market volatility in the US stock market, and some other extant studies (*See* Hong *et al.*, 2021; Mishra & Mishra, 2021) who concluded that the pandemic resulted in increased market uncertainties, raised volatilities and affected return predictability. In Nigeria, our finding is in accord with the study of Adenomon *et al.* (2020) that the pandemic insignificantly reduced stock returns and raised its volatilities in Nigeria.

5. Conclusion and Policy Implications

In this empirical study, we conducted a distinct analysis of the impact of the Covid-19 pandemic on several indicators of stock market performance at the global level which include stock market prices, stock market returns, stock market efficiency, and stock market volatility respectively. We explored four research objectives as follows: one, estimate the stock market efficiency during the Covid-19 pandemic era and the pre-Covid-19 pandemic era; two, compared stock market efficiency during the Covid-19 pandemic era with stock market efficiency before Covid-19 pandemic; three, conducted the impact analysis of Covid-19 pandemic on several indicators of stock market performance which include stock market prices, stock market returns, stock market efficiency and stock market volatility; and four, analyzed the impacts of the stringency measures taken by the Nigerian government to flatten the curve of Covid-19 cases and deaths on several indicators of stock market performance.

Data were collected on all share index (a proxy for stock prices) and stock market capitalization on monthly basis. Stock return was generated as the log difference of stock prices while the associated stock volatility was generated by estimating a simple ARCH (1) model. These data were available on monthly bases for the pre-Covid-19 era (2018M02 to 2020M01) and Covid-19 era (2020M02 to 2022M01) from the Central Bank of Nigeria Statistical Bulletin, 2022. The sample periods for the pre-Covid-19 era and the Covid-19 era were carefully selected to have

equal lengths of periods for both eras. For consistency, the study employed data on the numbers of daily new confirmed cases (New_case and deaths) as well as the government response stringency index (strindex) on the COVID-19 pandemic from Our World in Data (OWID) on their website. We leveraged numerous advantages of the Data Envelopment Analysis (DEA) to estimate stock market efficiency during the Covid-19 pandemic era and the pre-Covid-19 pandemic era. Also, we employed the Autoregressive Distributed Lag Mixed Data Sampling (ADL-MIDAS) approach based on the Almon lag polynomial weighting scheme to average the high (daily) frequency data to the date structure for the low (monthly) frequency data.

We reported significant findings that are instructive to policymaking and financial regulation. One, we showed that the stock market was more efficient during the Covid-19 pandemic than in the pre-Covid-19 era, since the only active and functioning market during the Covid-19 pandemic especially when restrictions and total lockdown were imposed was the stock market while other financial institutions and businesses were put on hold in the process of Covid-19 pandemic management. Two, we showed that the Covid-19 pandemic (new cases and deaths) has an insignificant impact on stock market performance in terms of the reduction in stock market efficiency, prices, and returns, and in terms of the increase in stock market volatility. In essence, the Covid-19 pandemic could not significantly disrupt stock market performance in Nigeria. Three, we showed that the government response stringency index which includes school closures, workplace closures, cancellations of public events, restrictions on gatherings, the closing of public transport, public information campaigns, stay-at-home mandates, restrictions on domestic movement, and international travel controls has a positive impact on stock market efficiency, prices, and returns while it reduces stock market volatility in Nigeria. These measures and controls improve stock market performance in Nigeria. Our findings revealed that, in terms of efficiency, the stock market was more efficient during the Covid-19 pandemic than in the pre-Covid-19 era, being the only active market among other financial markets, especially during the total lockdown and travel bans. However, in terms of returns and volatility, the Covid-19 pandemic has not significantly influenced the stock market performance in Nigeria. We concluded in line with Alade *et al*. (2020) that Covid-19 Pandemic had a less significant impact on the Nigerian stock market. However, the government stringency measures had a significant positive impact on the stock market in Nigeria, especially on the stock market returns.

The implication of our findings is twofold. It does not only contribute to the literature concerning the impact of the Covid-19 pandemic on stock market performance but also helps financial investors, regulators, and policymakers to better understand how the pandemic has impacted several stock market performance indicators. It also reveals the positive influence of various stringency measures of government on the financial sector, especially the stock market in Nigeria. The study encourages the investors to be more prudent in diversifying their investment in different stocks since the stock market remained efficient during the pandemic. Also, the policymakers should balance Covid-19 pandemic management with the provision of several preventive controls, palliatives, and stringency policies to enhance the stock market performance, and control other macroeconomic factors that could influence the stock market significantly asides from the Covid-19 pandemic special effects.

Acknowledgement

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