



An Event Study Approach to Evaluating the Impact of Coronavirus Information Spread on Commercial Banks' Stock Returns in Nigeria

*¹Efanga, Udeme Okon, ²Etim, Raphael S., ³Zwingina, Christy Twaliwi

¹Department of Banking and Finance, University of Calabar, Nigeria

²Department of Accounting, University of Uyo, Nigeria

³Department of Management, Bingham University, Karu, Nasarawa State, Nigeria

*Corresponding Author
Efanga, Udeme Okon

Article History

Received: 14.12.2020

Accepted: 27.12.2020

Published: 02.01.2021

Abstract: The cardinal objective of this study is to empirically analyse the impact of coronavirus information spread on commercial banks' stock return in the Nigerian Banking System. The study adopted event study approach which suits the research because of its descriptive nature. The daily data of closing share prices of the selected banks listed in Nigerian Stock Exchange (NSE) was collected from NSE website for a period of 146 days. Using 124 days estimation window, the result shows that the Intercept (C) and Market Returns (MKTR) has a coefficient of -0.00125 and -0.00848 respectively. Analyzing the stock of commercial banks in the Nigerian stock exchange during the first 100 days of COVID-19 contagious infectious disease outbreak in Nigeria, we find that the pandemic disease interacts positively with stock returns which is against the expectation. Specifically, banking firms' abnormal returns on the corona virus information spread at 100th day are positive but insignificant. We therefore conclude that COVID-19 information into the Nigerian banking sector triggers positive investment in the sector with desirable abnormal returns. We therefore call the relevant authorities to adequately consider policy responses implemented in the sector, and to further analyze information about the COVID-19.

Keywords: Nigerian Stock Exchange (NSE), COVID-19, Market Returns (MKTR) and Abnormal Returns.

Copyright © 2021 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Background to the Study

Nigeria as an open economy was particularly affected by information relating to global financial and economic crisis. Domestically, access to cheap credit and inadequate government oversight of the financial sector led to stock returns bubble. The country in 2008 witnessed internal banking collapse traceable to the global financial crisis [1]. In response, private bank debt was effectively converted into sovereign debt following the bank guarantee scheme enforced by the central bank [2]. The financial sector plays a critical role in mitigating this macroeconomic shock. As liquidity challenges give way to solvency problems, defaults on debt will rise and the pressure on the banking system will grow. Overall, the country banking

system is on a much stronger footing sequel to the implementation of recent financial regulatory reforms [3]. Nevertheless, given the unprecedented nature of the corona virus disease (COVID-19) crisis, financial regulators and supervisors face challenges to maintain financial stability, preserve the well-functioning core markets, and ensure the flow of credit to the real economy.

Nigeria, in the recent past has witnessed health related severe outbreaks such as ebola, bird flu, and other similar respiratory infectious diseases, with serious challenge of the associated risks. Over the decades, there is a growing number of such previously unknown disease agents. Simultaneously, well-known pathogens like tuberculosis (TB), cholera, and malaria have re-emerged [4, 2]. This is

largely attributed to factors such as increased global human mobility and migration, population growth, urbanisation, global trade and travel, advancement in agricultural practices, and ecological disorder [5, 6], but information, and stories about health crises spread faster to a wider audience due to new global communication technologies [3]. Such information into the financial market is expected to affect trading activities and stock returns.

In March 2020, the World Health Organization (WHO) declared COVID-19a world pandemic. Cases of the virus has continued to increase in different parts of the world as nations endeavor to put in places measures to contain it by taking medical treatment and checking for vaccines. Numerous finance experts warn of growing risks of infectious disease outbreaks on trade and financial market activities, especially with accelerated anti-microbial resistances and increasing non-compliance with vaccination policies [7]. This does not only pose a severe risk to human health and well-being, but also affects societal, economic, and investment prospects. One aspect of the issue is the effect that infectious disease outbreaks can have on stock returns stability. Yet, there is growing awareness that the news of severe outbreaks of infectious diseases may also negatively affect activities of banks in afflicted countries. Banking supervisors are faced with an unprecedented set of circumstances, and are pursuing unprecedented regulatory measures to mitigate the impact of the outbreak. The financial sectors including banks is expected to be significantly affected because of the devastating effects of the COVID-19 outbreak on income, spending and investment [1].

Sequel to the pandemic, it might become too cumbersome or difficult for banks to determine the extent and adequacy of collaterals available with them and the subsequent provisioning. There may be additional disclosures required in the financial statements and the computation of capital adequacy for COVID-19. Banks would therefore be required to maintain robust risk management functions and track their borrowers individually to determine and segregate the permanent impact from the temporary impact and make appropriate provisions. COVID-19 pandemic has connecting impact on the global financial markets, including Nigeria, and it may have accounting and reporting implications for many firms. As COVID-19 continues to spread now counting over 100 days, and more information emanates, there is a need to consider the impact of the pandemic on Nigerian Banking sector stock returns within this period. The study therefore focuses to assess the impact of COVID-19 100th day information on firms' stock returns using Nigerian banking sector.

LITERATURE REVIEW

Conceptual Review

Potential Impact of COVID-19 on Banking Sector Operational Risk

The continuous spread of COVID-19 information has caused disruptions in various work processes. This challenge calls for banking institutions to make flexible and agile adjustments. The spread of the diseases has led to some branches closing temporarily with staff working remotely. The added operational cost incurred in procuring logistics to enable the staff work remotely is expected to impact revenue. There might also be delays in orders for working tools such as laptops, servers and networking equipment which may further impact productivity. Since the outbreak COVID-19, there has been a global increase in internet fraud incidents. This is due to the huge influx of cyber security attack launched under the guise of COVID-19 [8]. Software and applications such as Zoom and other productivity tools supporting remote working staff and virtual meeting have also experienced security breaches during this pandemic. This requires timely intervention banks to strengthen the cyber security and protect sensitive data [8].

Market Risk

The banking sector is faced with the risk of decline in value of many financial asset classes due to the increased market risk. The book value of such assets could be significantly different from their real value [6]. The uncertainty caused by the pandemic could be the reason for the increased pressure on the local currency resulting in higher foreign exchange risk. In such situation banks will adopt Value at Risk (VaR) estimates to measure the maximum potential loss at a given level of confidence. Estimate of reduction in interest rate impact sensitive assets and liabilities should also be done and the subsequent implication on profitability. Persistence of the outbreak could further dampen investor risk appetite thereby impacting the stock and market returns [6].

Credit Risk

According to Samej [2] there's an increased rate of credit default as a result of the pandemic across the globe. In nations, it is estimated that spread of COVID-19 will negatively affect many firms, through disruptions in manufacturing supply chains, local consumption, tourism and exports. This will alternatively affect the capacity of such firms to fulfill their credit obligations with banks possibly leading to an increased level of credit default rate. Many nations in a strategy granted few months moratorium of principal repayments to firms in the airline and hospitality industries which is expected

to help provide support to affected entities. Despite the flexibility offered by banks in loan provisioning, the lockdown in many parts of countries and closure of many businesses may exacerbate defaults in credits [8].

Liquidity Risk

COVID-19 information spread necessitated strategic liquidity risk management among banks in nations. Forcing them to reassess liquidity risk, capital positions and any associated weakness in funding sources. Some banks may already be experiencing increased liquidity tightening as a result of stimulated withdrawals and higher counterparty default correlation within affected sectors potentially leading to reduced net inflows in banks. For the banking sector to be adequately prepared for the pandemic turmoil and capability on liquidity risk, banks are expected to integrate stress testing into their management process, and conduct regular stress tests [1].

EMPIRICAL REVIEW

Some organizations and finance scholars have presented empirical evidences on the interrelationship between corona virus information spread and financial institutions.

Nuhu [6] on a study to investigate the impact of COVID-19 on the Financial Markets from the period dated 1st March 2020 to 25th March 2020 in China and USA. The study applied a Simple regression model to investigate the impact of the COVID-19 on the Financial Markets during the period from dated 1st March 2020 to 25th March 2020 in China and USA. Time series data from China COVID-19 Statistics Reports and Trading Economics from 1st March 2020 to 25th March 2020 for China and USA were employed by the study. The study utilized the Shanghai Stock Exchange as a sample for China and the New York Dow Jones as a sample for the USA. On the process of investigating the impact of the COVID - 19 on the financial markets the study assumes the COVID-19 confirmed cases to be the independent variable while Shanghai Stock Exchange and New York Dow Jones to be dependent variables of the study in China and USA. The study found a positive significant relationship between the COVID-19 confirmed cases and all the financial markets (Shanghai stock exchange and New York Dow Jones) from 1st March 2020 to 25th March 2020 in China and USA, Pointing that COVID-19 had significant impact on the financial markets from 1st March 2020 to 25th March 2020 in China and USA.

In a related study Samej [2] assessed the influence of COVID-19 on the credit exposure of a bank, and noted that conventional risk management of bank set its business intelligence dashboard to

monitor credit exposure and make vital decisions based on it. But sequel to COVID-19 pandemic uncertainties, those conceptions fail to convey the effect of an epidemic on the business of a bank and create a gap, which in turn hurts the institution inability to make accurate and strategic decisions. Armed with that notion, the study adopted a statistical technique - Multivariate analysis of variance to choose and find out risk metrics for a bank which has a significant impact because of COVID-19 and developed a COVID-19 risk indicator parameter, which is the integrated measure of both COVID-19 data and credit risk metrics. The analysis utilized a business intelligence tool, Tableau, to visualize geographically effect for a bank as a selected risk metrics and also displays industry-wise effect by integrated results of COVID-19 data, which extracts summarize version of highest or lowest impacted counties and most or least impacted industries concerning bank exposure because of COVID-19. The study concluded that the strategy this will help banks make decisions like industry-wise relaxation on the credit products, before an asset becomes sub-standard take proactive measures such as debt restructuring, by looking at most impacted industries and banks credit exposure, appraise the provisioning factor and many more critical decisions.

However, Estrada, Evangelos, and Minso [9] formulated an analytical framework to understand the spatiotemporal patterns of epidemic disease occurrence, its relevance, and implications to financial markets activity. The paper suggests a paradigm shift, a new multidimensional geometric approach to capture all symmetrical and asymmetrical strategic graphical movement. Furthermore, the concept of stagpression is introduced, a new economic phenomenon to explain the uncharted territory for the world economies and financial markets are getting into. The Massive Pandemic Contagious Diseases Damage on Stock Markets Simulator (φ -Simulator) to evaluate the determinants of capital markets behavior in the presence of an infectious disease outbreak.

From an earlier study, Yunusa, Irinoye, Suberu, Garba, Timothy, Dalhatu, & Ahmed 2004 reviewed relevant literatures related to public health care financing in Nigeria which were published by journals within and outside the country. An overview of the literatures showed that public health care services in Nigeria is financed through; out-of-pocket payments, tax revenue, donor funding and through health insurance. Trends from the study reveal that the bulk of public health care is financed by unit households through out-of-pocket payments with government contributing as low as 25% of the total health expenditure. The

major challenges of health care financing includes, poor funding by government, high out of pocket payment, inadequate implementation of health care financing policy and corruption. The study recommend that there should be an increased health financing by government in funding of public health care, adequate implementation of health care policies, proper supervision of fund utilization, encouraging local production of drugs and other medical equipment, finally discourage government sponsorship for treatment of personnel abroad.

Focusing on international market, Nurul, Shahiduzzaman, Arafat, Mithila, and Tanzina [8] explored the impact of the corona virus (COVID-19) on the international financial market. The study reviewed recent works considering the effects of the corona virus on the International Money Market worldwide. The paper finds that passages will flop as various countries are taking practically identical exercises to contain the disease. There are extraordinary arrangement associations, families, governments and money related investigators who never regard the financial consequence of the continuous spread. Governments and relevant authorities are at the cutting edges of the current crisis. The securities exchange has experienced vast gyrations in the course of recent weeks. The finding indicates that authorities like the IMF and the World Bank scrambled to provide a mutual proclamation declaring their significance support during the period. The study recommend that national banks must assist solicitation and assurance by hindering a fixing of budgetary conditions, cutting down on gaining costs for families and firms and ensuring market liquidity.

With focus on private banking system in Ethiopia, Tesfaye [10] explore the impacts of the COVID-19 pandemic on Ethiopia's Private Banking System and inform interventions and policy responses, the study employed the input-output framework. It utilized ten years historical data from 2010 to 2019 of the aggregate private commercial banks in order to explore trends and examine the effect of pandemic on the past critical success factors. The result shows that the pandemic has effect on both balance sheet and income statement of banks. The effect is shadowed during the current year due to good performance record all through pre COVID period. Nevertheless, it won't take much time to feel the effect of the pandemic in the private banking system as well. Therefore, the notion of considering banks less vulnerable to the crisis should be swotted. The study identified immediate liquidity need of around Birr 17 billion to private banks so that they can comfortably meet the NBE's liquidity requirement. This in fact will be challenged by less resource mobilization and reduced loan

collection of Birr 10 billion per quarter. Early measures to improve the liquidity (infusing injection), capital position (setting dividend payout limit), asset quality (setting minimum provision level), earning (avoiding price pressure) and cost (controlling exchange losses) profile of banks will have paramount importance for sustainable soundness of the private banking system. In addition, the shock absorbing capability of each bank in the sector should be separately looked at for an effective remedial action.

METHODOLOGY

Based on the objective construct, the study focuses to empirically assess the impact of corona virus information spread on the stock returns of banks in Nigeria especially in the first 100 days. Secondary data of the daily share prices of Nigerian quoted banks have been collected covering a period of 146 days from Nigeria Stock Exchange (NSE) website.

Assessment of corona virus information's impact requires a measure of the abnormal returns. The abnormal returns in the banking sector is the actual daily average returns on the banks' stock during event window minus the daily average expected returns of the banks over the event window. The abnormal returns is stated thus:

$$AR_{it} = R_{it} - E(R_{it}|C19_t) \dots\dots\dots (1)$$

Where

AR_{it} , R_{it} , and $E(R_{it}|C19_t)$ are the abnormal, actual, and expected returns respectively for time period t. $C19_t$ is COVID-19 at 100th day conditioning information.

For calculating R_{it} , the following model was adopted;

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it} \dots\dots\dots (2)$$

$$E(\epsilon_{it} = 0) \text{ var}(\epsilon_{it}) = \sigma^2_{\epsilon_i}$$

Where R_{it} and R_{mt} are the period-t returns on security i and the market returns, respectively, and ϵ_{it} is the zero mean disturbance term. α_i , β_i , and $\sigma^2_{\epsilon_i}$ are the parameters of the market model.

The data analysis was done using the following statistical steps:

- First, the natural logarithmic daily returns have been found over the previous day's closing value during the entire period.
- Second, the cumulative average daily returns for stocks included in the study were calculated.
- Third, the intercept, slope and R-squared were calculated to estimate the expected cumulative average daily returns for stocks.
- After this, the Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR) were estimated.

- T-test was also calculated to determine the significance of the returns.

DATA ANALYSIS

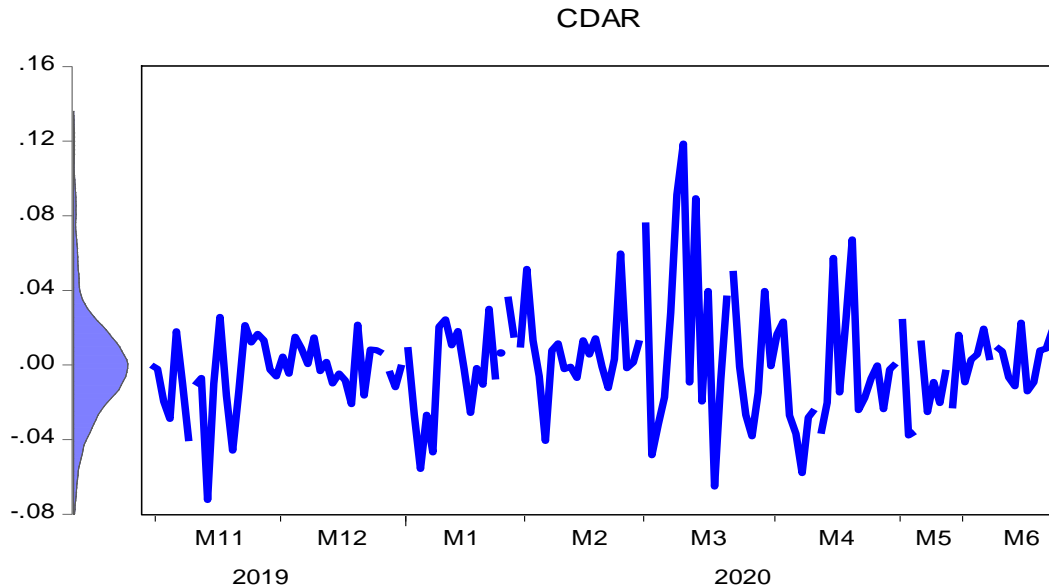


Fig-1: Cumulative Daily Average Returns.
 Source: Author’s analysis using E-views 9

The Figure-1 shows the cumulative daily average returns for the bank stocks included in our study. The figure suggests that returns in the

banking sector experienced continuous volatility over the period of study.

DATA ANALYSIS

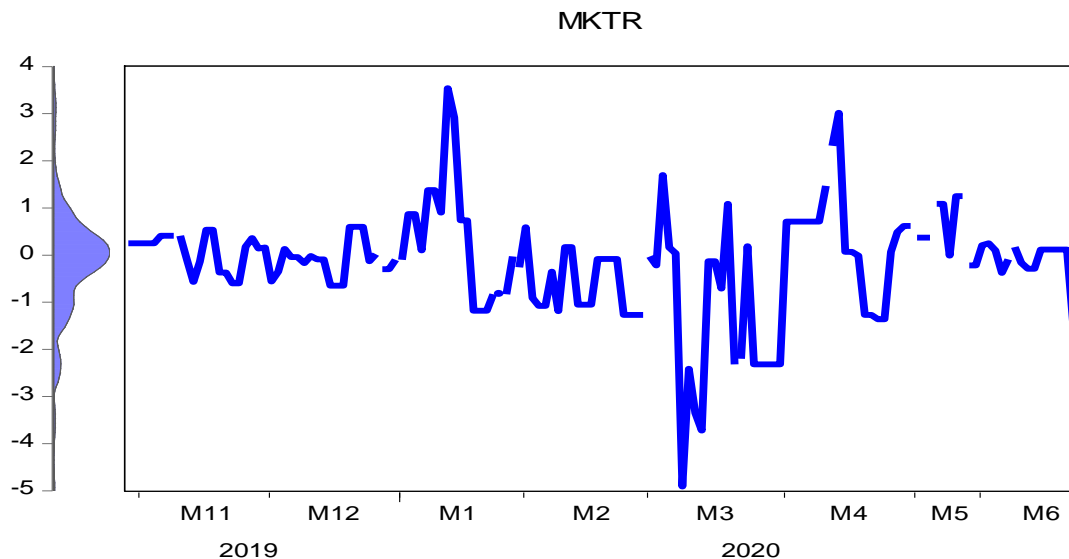


Fig-2: Market Returns
 Source: Author’s analysis using E-views 9

The Figure-2 shows the market returns for the bank stocks included in our study. The figure suggests that returns in the market return also

shows a level of continuous volatility over the period of study.

Normality Test

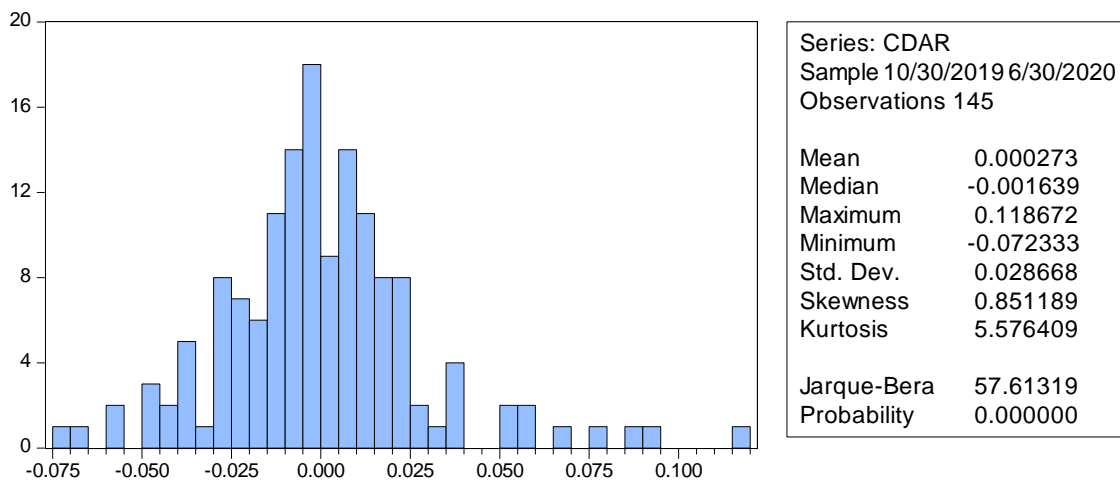


Fig-3: Normality test for Cumulative Daily Average Returns (CDAR)
 Source: Author’s analysis using e-views 9

This test is conducted to ensure normal distribution of the data used for analysis. The Figure-3 above reveals that the Jarque-Bera value of

57.613 and its corresponding p-value of 0.0000 which is lower than 5% significant level confirms that the data is normally distributed.

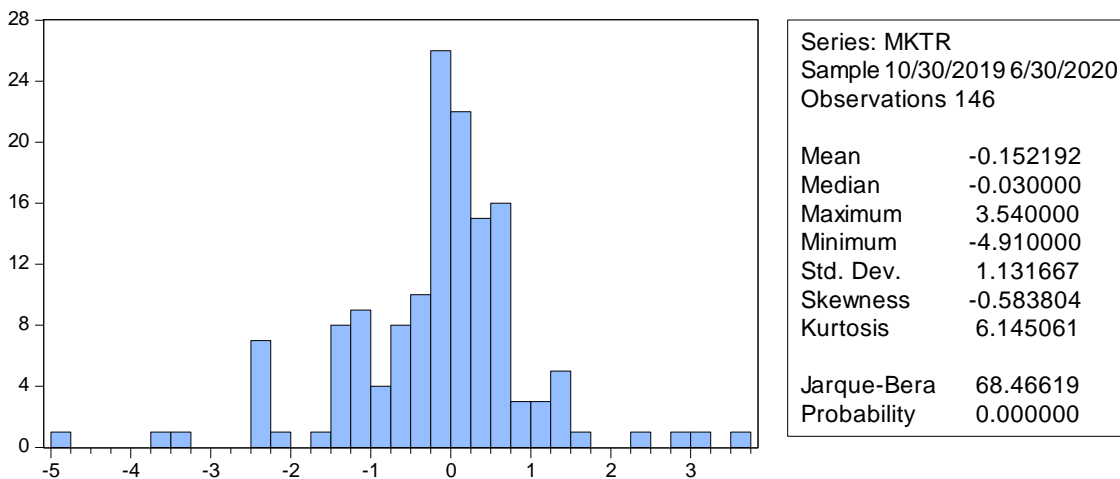


Fig-4: Normality test for Market Returns (MKTR)
 Source: Author’s analysis using e-views 9

This test is conducted to ensure normal distribution of the data used for analysis. The figure 4 above reveals that the Jarque-Bera value of 68.466

and its corresponding p-value of 0.0000 which is lower than 5% significant level confirms that the data is normally distributed.

Results of the Market Model

Table-1: Results of the Market Model

Dependent Variable: CDAR				
Included observations: 124				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001259	0.002625	-0.479634	0.6323
MKTR	-0.008488	0.002168	-3.914855	0.0001
R-squared	0.641604	Adjusted R-squared	0.514322	

Source: Author’s analysis using e-views 9

Table-1 presents the estimated result of the market model earlier stated. Using 124 days estimation window, the result shows that the Intercept (C) and Market Returns (MKTR) has a coefficient of -0.00125 and -0.00848 respectively. Market Returns has a probability value of 0.0001. From the table, R-squared has a value of 0.641, while adjusted R-squared has a value of 0.514 suggesting

that up to 51.4% variation in Cumulated Daily Average Returns (CDAR) of banks stock in Nigeria is caused by activities in the market while the other 48.6% is caused by other factors represented by the stochastic term. The market model intercept and slope enabled us to estimate the expected returns and other estimations necessary for our study. The relevant estimates are presented in Table-2 below.

Table-2: Impact of COVID-19 100th Day on Banks' Stock Returns

Event Window	Cumulative Daily Average Returns (R _i)	Market Returns (R _m)	Expected Returns(Er)	Abnormal Returns (AR)	Cumulative Abnormal Returns (CAR)	t-test
10	0.018740	-1.53	-0.00142	0.020142	0.020142	9.29062
9	0.008746	0.12	-0.00133	0.010079	0.030221	4.64913
8	0.007803	0.12	-0.00133	0.009128	0.039349	4.21021
7	-0.009370	0.12	-0.00118	-0.008190	0.031162	-3.77652
6	-0.014140	0.12	-0.00114	-0.013000	0.018165	-5.99470
5	0.022731	0.12	-0.00145	0.024183	0.042348	11.15442
4	-0.011480	-0.29	-0.00116	-0.010320	0.032025	-4.76129
3	-0.006710	-0.29	-0.00120	-0.005510	0.026514	-2.54203
2	0.007337	-0.16	-0.00132	0.008658	0.035172	3.99361
1	0.009831	0.17	-0.00134	0.011174	0.046346	5.15401
0	0.002568	-0.09	-0.00128	0.003849	0.050195	1.77529
-1	0.019509	-0.38	-0.00142	0.020933	0.071129	9.65561
-2	0.005710	0.1	-0.00131	0.007017	0.078146	3.23662
-3	0.002890	0.25	-0.00128	0.004173	0.082319	1.92483
-4	-0.009350	0.21	-0.00118	-0.008170	0.074148	-3.76870
-5	0.016196	-0.22	-0.00140	0.017592	0.091740	8.11453
-6	-0.023300	-0.22	-0.00106	-0.022240	0.069505	-10.25610
-7	-0.002630	1.25	-0.00124	-0.001390	0.068117	-0.64036
-8	-0.020470	1.25	-0.00109	-0.019390	0.048730	-8.94218
-9	-0.009030	-0.01	-0.00118	-0.007850	0.040881	-3.62035
-10	-0.025300	1.09	-0.00104	-0.024260	0.016621	-11.1902

Source: Author's analysis using e-views 9

Table-1 presents the intercept, slope, R-squared, and Standard Error with values of 0.2016, 0.0015, 0.0122, and 0.01815 respectively. The values were computed using cumulative average

returns of the stocks and market returns from the estimation window of 124 days prior to the event window of COVID-19 100th day. Table-2 reports the result of our event within the COVID-19th 100th day.

Table-3: Descriptive Statistics

	CDAR	MKTR	EXPR	ABNR	CABR
Mean	-0.000464	0.082381	-0.001255	0.000791	0.048237
Median	0.002568	0.120000	-0.001281	0.003849	0.042348
Maximum	0.022731	1.250000	-0.001044	0.024183	0.091740
Minimum	-0.025304	-1.530000	-0.001452	-0.024260	0.016621
Std. Dev.	0.014289	0.598840	0.000121	0.014410	0.022783
Skewness	-0.106795	-0.060820	0.106795	-0.106795	0.371267
Kurtosis	1.979089	4.741077	1.979089	1.979089	1.905322
Jarque-Bera	0.951895	2.665376	0.951895	0.951895	1.530966
Probability	0.621296	0.263767	0.621296	0.621296	0.465109
Sum	-0.009735	1.730000	-0.026356	0.016621	1.012977
Sum Sq. Dev.	0.004084	7.172181	2.94E-07	0.004153	0.010382
Observations	21	21	21	21	21

Source: Author's analysis using e-views 9

The Table-3 above shows the descriptive statistics of 21 days event window. Cumulative Daily Average Returns (CDAR) has a mean value of -0.000464 for the period, and standard deviation of 0.014289. The minimum and maximum value of CDAR for the periods were -0.025304 and 0.022731 respectively. Also, Market Returns (MKTR) has a mean value of 0.082381 and standard deviation of 0.598840. The maximum and minimum value obtained for the periods were 1.250000 and -1.530000 respectively. Expected Returns (EXPR) has a mean of -0.001255, and a standard deviation of 0.000121. The minimum and maximum value obtained were -0.001452 and -0.001044 respectively. Abnormal Returns (ABNR) for the period has a mean 0.000791 and a standard deviation of 0.0144410. The minimum and maximum values obtained were -0.024260 and 0.024183 respectively. For Cumulative Abnormal Return (CABR), the mean value and standard deviation were 0.048237 and 0.022783 respectively. While the minimum and maximum value for the periods were 0.016621 and 0.091740 respectively.

DISCUSSION

Globally, evidences have emerged that COVID-19 pandemic has been severe and has far reaching effects across financial markets. However, effect on sectors varies from one country to another. From the result in Table-2 it could be observed that cumulative daily average returns during the event window has both positive and negative values. Expected return throughout the event period has negative values supporting the general perception that COVID-19 affected the banking firms harshly. At event day (COVID-19 100th day) abnormal return has a positive value of 0.003849. Furthermore, the market returns showed a negative figure, while cumulative abnormal return was positive. Within the event window cumulative daily average returns of banking firms' stock was positive. Abnormal return for the period as shown in Table 2 was mixed with both positive and negative values. Also, considering the Cumulative Abnormal Returns, COVID-19 100th day and across has positive abnormal return for the banking firms with all positive value.

Considering the significance of the returns, Table-2 shows a t-test value of 1.77 which is less than 1.96. This means that investors reacted positively to the information of COVID-19 100th day, but this positive reaction was insignificant.

In a global challenge such as COVID-19 adverse effect would be naturally expected on stock

returns across different sectors of economies. Based on the perceived assertion, our study considered impact of COVID-19 100th day information on banking firms' stock returns in Nigeria. The result although with negative expected return shows positive abnormal return and cumulative abnormal return on COVID-19 100th day. The positive abnormal return is in variance to Abdullah, Khaled, Ahmad, and Salah [11] findings that in a time of global infectious diseases the financial system of nations suffers due to feedback from low business activities and unexpected losses leading to increased business risk and credit defaults.

CONCLUSION

This paper assessed corona virus information spread and banks' stock returns in Nigeria. While the paper has pointed to the recent works in different areas of banking sectors that helps provide a more coherent conceptual framework for analyzing the impact of COVID -19 disease, it also makes apparent the need for much more detailed research on the key relationship between pandemic disease and investors behavioral choice. It is plausible to expect that the aftermath of COVID-19 has the potential to cause widespread financial market disruption.

As COVID-19 is now a pandemic, nations must endeavor to strategize in order to avoid future public health problems. The virus continuous to spread faster in many countries including Nigeria, worries of such pandemic and possible measures to contain the disease has contributed to financial market shock globally especially in the banking sector. To adjust, the banking segment and regulatory authorities as far as possible must synergize in various areas to provide instances capable of cushioning the effect of the pandemic.

Analyzing the stock of commercial banks in the Nigerian stock exchange during the first 100 days of COVID-19 contagious infectious disease outbreak in Nigeria, we find that the pandemic disease interacts positively with stock returns which is against the expectation. Specifically, banking firms' abnormal returns on COVID-19 100th day are positive but insignificant. We therefore conclude that COVID-19 information into the Nigerian banking sector triggers positive investment in the sector with desirable abnormal returns. We therefore call the relevant authorities to adequately consider policy responses implemented in the sector, and to further analyze information about the COVID-19.

REFERENCES

1. Hevia, C., & Neumeyer, A. (2020). A conceptual framework for analyzing the economic impact of covid-19 and its policy implications. *UNDP LAC COVID-19 Policy Documents Series, 1*, 29.
2. Wakode, S. (2020). Efficacious Scrutinizing of COVID-19 Impact on Banking Using Credit Risk Metrics. *International Journal of Finance and Banking Research, 6*(3), 51.
3. Ozili, P. K. (2020, January). Financial inclusion research around the world: A review. In *Forum for social economics* (pp. 1-23). Routledge.
4. Caporin, M., Pelizzon, L., Ravazzolo, F., & Rigobon, R. (2018). Measuring sovereign contagion in Europe. *Journal of Financial Stability, 34*, 150-181.
5. Ruiz Estrada, M. A., Koutronas, E., & Lee, M. (2020). Staggression: The economic and financial impact of Covid-19 Pandemic. Available at SSRN 3593144.
6. Çınar, Z. M., Abdussalam Nuhu, A., Zeeshan, Q., Korhan, O., Asmael, M., & Safaei, B. (2020). Machine Learning in Predictive Maintenance towards Sustainable Smart Manufacturing in Industry 4.0. *Sustainability, 12*(19), 8211.
7. Estrada, E. (2020). COVID-19 and SARS-CoV-2. Modeling the present, looking at the future. *Physics Reports*.
8. Frasiska, N., & Kusmayadi, A. (2020). Pemberian Air Isotonik Alami untuk Mengatasi Kondisi Heat Stress Terhadap Performan Produksi Burung Puyuh (*Cortunix cortunix japonica*). *TERNAK TROPIKA Journal of Tropical Animal Production, 21*(1), 63-68.
9. Ruiz Estrada, M. A., Koutronas, E., & Lee, M. (2020). Staggression: The economic and financial impact of Covid-19 Pandemic. Available at SSRN 3593144.
10. Yang, H., Sloan, G., Ye, Y., Wang, S., Duan, B., Tesfaye, S., & Gao, L. (2020). New perspective in diabetic neuropathy: from the periphery to the brain, a call for early detection, and precision medicine. *Frontiers in Endocrinology, 10*, 929.
11. Mohummed Alomari, K., Moh'd Mansour, A., Ali Almohtaseb, A., Salah, A. A., Ismail Alshaketheep, K., & Abdullah abu Jray, A. (2020). Lean six sigma in Jordanian organizations.