ANALYSIS OF COVID-19 DISCHARGED CASES AND EQUITY TURNOVER IN THE NIGERIAN CAPITAL MARKET: AN EVENT STUDY APPROACH

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ABSTRACT

Purpose — *This study investigates the effect of cumulative and new discharged cases of COVID-19 on equity turnover value in the Nigerian Stock Exchange (NSE) between March 2, 2020, and September 25, 2020.*

Design/methodology/approach — *Correlation test and Vector Autoregressive (VAR) model were used to analyze the daily time series data sourced from the Nigerian Stock Exchange and the Nigeria Centre for Disease Control (NCDC) websites.*

Findings — *The study found evidence of a weak negative correlation between measures of COVID-19 recovery and equity turnover value in Nigeria. Furthermore, the VAR model results indicate that cumulative and new discharged cases of COVID-19 have a negative but non-significant impact on equity turnover value in Nigeria over the study period.*

Practical implications — *This implies that COVID-19 recovery cases still have the potential to shrink equity turnover value in the Nigerian capital market, though its influence may not be significant. There is, therefore, the need to speed up the vaccine development/commercial launch pace and other measures to curb the pandemic and ensure quicker recovery of those infected persons. These will help to reduce the potential long-run threat of COVID-19 on the Nigerian capital market.*

Originality/value — *This paper provides empirical evidence on the nexus between COVID-19 discharged cases and equity turnover in a developing economy; this is Nigeria. It is expected that this case will help the investment community, particularly the capital market investors, on the potential influence of COVID-19 on market transactions in terms of turnover. The prolongation of the coronavirus pandemic constitutes an important source of financial volatility in the country's capital market.*

Keywords — *Coronavirus; COVID-19; Discharge cases; Recovery rate; Equity turnover value; Nigerian Stock Exchange; Vector Autoregressive (VAR).*

Paper type — *Research Paper*

INTRODUCTION

Stock markets are driven by information, whether exogenously or endogenously generated. Information such as the news of price hikes, dividend announcements, the rumour of war, pandemics, health crisis, corporate failures etc., are believed to impact capital market activities in general and equity trading volume and value specifically.

Equity turnover, which indicates market activity, marketability and liquidity, refers to units of ordinary shares that exchange hands between buyers and sellers in a stock market. The turnover could be expressed nominally in units or monetarily in a currency such as the Nigerian Naira.

Coronavirus disease 2019 (COVID-19) is a respiratory virus that spreads via droplets of coughs, sneezes, saliva, or discharge from an infected person's nose. According to Kajo et al. (2020), the disease is transmitted from human to human either close contact through airborne coughing, sneezing, kissing and smooching. The authors note further that the virus can also transmit through contact with affected animals such as dogs, cats, pigs, cows, turkeys. COVID - 19 pandemics are believed to be a worry of the investment community since its first outbreak in China, the central hub of foreign investment in Asia. It was therefore declared a global pandemic by the World Health Organisation on March 11, 2020. Thus, panic-laden news, such as the COVID-19, has been found to contribute to increased volatility in the equity markets (Haroon & Rizvi, 2020). Measures applied to curb the virus include social distancing, which led to close financial markets, corporate offices, businesses, and events. This eventually tells on financial markets such as the stock market. Asides from the health effect of the pandemic, the stock market has felt the impact of the COVID-19 in different dimensions ranging from the marker index, returns, volatility, volume of trade, the value of trading equity etc.

Since its first outbreak in Wuhan, Hubei Province, China, in December 2019 and the first confirmed case on February 27, 2020, in Nigeria, the Nigerian economy, particularly the financial markets (stock market), has not been left the same. Nigeria barely came out of the economic crisis of 2016; that novel coronavirus greeted the soil of Nigeria like a thief in the night. As reported by the Nigeria Centre for Disease Control [NCDC] (2020), as of September 25, 2020, the disease has spread to all the 36 states, and the Federal Capital Territory of Nigeria, with the country's total confirmed cases of 58,062 of which 213 is new for the day. Globally, 216 countries are affected by the pandemic; wherein there are 32,110,656 cases of the pandemic while the fatalities (deaths) stood at 980,031 persons. On the same date in Nigeria, there are 1103 deaths (only two fatalities for the day). Given the total males infected (36,933) and females infected cases (21,129) in Nigeria, it can be seen that the male gender (constituting 64% of the total confirmed cases) is more hit by the virus than the female gender (constituting 36% of the total confirmed cases) in Nigeria. With total discharges (recovers) of 49,606 (and 508 new discharges for the day), 85.44% of the total confirmed cases have recovered from the virus in Nigeria as of September 25, 2020. This also implies that 7353 (12.66% of total confirmed cases) are the total active cases (NCDC, 2020). It should be noted that 1.90% of the total confirmed cases belongs to the fatalities group, while 85.44% of the total confirmed cases have recovered from the virus as of September 25, 2020.

This study focuses on determining the reaction of equity turnover value to both cumulative and new discharged cases of COVID-19 using Nigerian data set in a daily

form, spanning 208 days, from March 2, 2020, to September 25, 2020. Therefore, the main aim of this study is to examine the reaction of equity turnover value to coronavirus discharged cases in Nigeria. However, this study's specific objectives are:

1. To determine the relationship between COVID-19 discharge cases and equity turnover value in the Nigerian capital market.

2. To examine the effect of COVID-19 discharge cases on equity turnover value in the Nigerian capital market.

The two hypotheses of the study are stated thus:

H_01: There is no significant relationship between COVID-19 discharge cases and the Nigerian capital market equity turnover value.

H_02: COVID-19 discharge cases do not significantly affect equity turnover value in the Nigerian capital market.

The remaining parts of this paper include a literature review which focuses on a review of the related theoretical and empirical literature on health pandemics and the stock market. At the same time, the following section describes the method applied in carrying out the study. This is followed by the results of data analyses as well as their discussions. Finally, this paper closed with a conclusion and recommendations.

REVIEW OF LITERATURE

Theoretically, according to the Efficient Market Hypothesis (EMH), stock prices impound the information in an economy, whether past, currently publicly available or insider information depending on the level of efficiency of the said market. EMH also emphasizes the role of information in shaping market activities. It can be offered that information on coronavirus disease is poised to influence capital market activities such as the volume and value securities traded.

Furthermore, Taleb's theory of black swan refers to unexpected events of large magnitude and consequence and their dominant role in history, science, finance, and technology. Black swan events are events that rare, highly and outrageously impactful, and retrospective in nature. They are high profile, hard-to-predict, and rare events. To Taleb, the coronavirus disease has the features of black swan (has a significant effect) except that it is compatible with statistical properties; therefore, he called it a white swan. Whether black or white, these events cause shock, fear and panic among local and international investors and result in sharp panic-selling responses. Thus according to Taleb (2010), rarity or abnormality (outlier), great in impact and consequence, abnormal in occurrence, significant in impact and rationalizable by hindsight are the main features of black swan events.

Empirically, the nexus between the stock market and coronavirus have been examined by some scholars in developed and developing countries. For instance, in an international study by Ahmed (2020), the author employed data of COVID-19 related

positive cases, fatalities, recovers and the closing prices of the Pakistani stock exchange (PSX 100 index) of the first half of 2020. The study found that only COVID-19 recoveries influence the index's performance, and the daily positive cases and fatalities are insignificantly related to the performance. In another study, Sansa (2020) applied a simple regression model to investigate the impact of the COVID - 19 on the financial markets from March 1 2020, to March 25 2020, in China and the USA. The study revealed a significant positive relationship between the COVID - 19 confirmed cases and the stock markets in both countries. Chaouachi and Chaouachi (2020) employed ARDL and Toda-Yamamoto causality techniques to analyze the impact of covid-19 on the Saudi stock market. Their findings indicate a negative impact of COVID-19 on the stock market only in the long run, with a unidirectional causality flowing from the former to the latter. Ngwakwe (2020) presents a current analysis of the effect of the coronavirus pandemic on select global stock indexes (in China, Europe, United States of America). The study indicates that the COVID-19 pandemic has different effects on the stock markets. Specifically, the study reveals that Dow Jones Industrial Average showed a significant reduction in mean stock value during the coronavirus period; Chinese Stock Exchange Composite Index experienced a significant increase in mean stock values during the epidemic higher than before the epidemic. On the contrary, the S&P 500 and the Euronext 100 indexes show a non-significant difference in mean stock price.

In another study, Liu et al. (2020) evaluate the short-term impact of the coronavirus outbreak on 21 leading stock market indices in major affected countries, including Japan, Korea, Singapore, the USA, Germany, Italy, and the UK. Using an event study method, their results indicate that the COVID-19 outbreak significantly negatively affects stock market returns across all affected countries and areas. Those in Asia suffer a more significant decrease in terms of abnormal returns. In another study, Lee et al. (2020) investigate the impacts of COVID-19 disease on the Malaysian stock market for the sample period covering December 31 2019, to April 18 2020. The findings show that higher numbers of COVID-19 cases in Malaysia tended to adversely affect the performance of the KLCI index and all sectoral indices, except for the Real Estate Investment Fund index. Waheed et al. (2020) examined the impact of COVID-19 on the Pakistani stock market using the quantile on quantile approach (QQR) from February 26 to April 17, 2020. The study concludes that the KSE-100 index has confirmed a positive increment in stock returns.

He et al. (2020) explore the direct effects and spill-overs of COVID-19 on stock markets in China, Italy, South Korea, France, Spain, Germany, Japan and the USA via t-tests and Mann–Whitney tests. The study shows evidence that COVID-19 has a negative but short-term impact on stock markets of affected countries with bidirectional spill-over effects between Asian countries and European and American countries. Moreover, Kotishwar (2020) investigates the impact of the covid-19 virus spread on selected stock markets. The study has considered the positive cases growth of six countries (USA, Spain, France,

Italy, China and India). From the VECM analysis, the study shows that the Covid-19 pandemic has a negative relationship with the selected countries' stock markets.

In Nigeria, Alade et al. (2020), based on the Vector regression model (VAR), investigate the connection between COVID-19 confirmed cases and Nigerian stock market capitalization from March 1 to May 31 2020. The study submits that though the confirmed cases of COVID-19 have the potential could bring sudden shock on the stock market due to specific restrictions of investment activities or lack of investment opportunities during the crisis, it does not possess a significant toll on the Nigerian stock market performance.

The existing literature regarding the stock market and COVID-19 is limited mainly in developing countries like Nigeria. There is scarcely any study in Nigeria that have examined the impact of COVD-19 recovery on equity turnover value in Nigeria. Therefore, this study contributes to the stock market reaction to COVID-19 empirics by focusing on the nexus between COVD-19 discharged cases and equity turnover value in Nigeria.

METHOD

The event study method is used to identify the impact of specific events such as the pandemic on stock market performance (Liu et al., 2020). In line with previous studies, this study combines ex-post facto design (Alade et al., 2020) with the event study method by using past daily time series on COVID-19 new discharge cases (CNNDC). Cumulative discharge cases (CNCDC) obtained from the NCDC website and also daily equity trading value (ETVN) sourced from the Nigerian Stock Exchange (NSE) website covering the period from March 2, 2020, to September 25, 2020.

After descriptive statistical tests, testing of unit root properties of the variables, and correlation analysis, Vector autoregressive (VAR) estimation was carried out. The Augmented Dickey-Fuller(ADF) unit root test was adopted, and it is based on the decision rule of rejecting the null hypothesis of the existence of unit root in the variable when the test statistic exceeds the critical value at any of the three critical levels of 1%, 5% and 10%; or when the probability value of the test statistic does not exceed the level of significance. In other words, a variable is adjudged stationary when the null hypothesis of a unit root is rejected.

In modelling the functional relationship between COVID-19 discharged cases and equity trading value, the latter variable is expressed as the former function. Thus the mathematical equation of this relationship is stated in equation (1), while equation (2) is the econometric form of the functional relationship, wherein the variables are expressed in their natural logarithmic form.

$$ETVN = CNNDC + CNCDC \tag{1}$$

$$\text{Log}(ETVN)_t = \beta_0 + \beta_1 \text{Log}(CNNDC)_t + \beta_2 \text{Log}(CNCDC)_t + \mu_t \qquad (2)$$

A Vector Autoregressive model represents a multivariate system of equations where all variables are endogenous; there is no dichotomy between endogenous and exogenous variables. Thus, the VAR model for this study is as expressed in equation (3) below.

$$\text{Log}(ETVN)_t = \beta_0 + \beta_1 \text{Log}(ETVN)_{t-1} + \beta_2 \text{Log}(CNNDC)_t + \beta_3 \text{Log}(CNCDC)_t + \mu_t \qquad (3)$$

In the models above (in equations (2) and (3)), CNNDC indicates the daily new number of discharged COVID-19 cases; CNDC denotes the cumulative daily number of discharged COVID-19 cases; ETVN represents equity trading/turnover value. Furthermore, whereas β_0 is the constant, β_1, β_2, and β_3 are the model parameters. Subscript t in the model signifies the time in days from 02:03:2020 to 25:09:2020.

It is expected that COVID-19 discharged cases measured as COVID-19 new discharge cases (CNNDC) and COVID-19 cumulative discharge cases (CNCDC) should be positively or negatively signed with equity trading value, depending on the extent to which the COVID-19 recovery rate increase and how it clears the market pessimism.

FINDINGS AND DISCUSSION
Descriptive Statistics
The descriptive statistics in Table 1 show that the average daily COVID-19 new discharged cases (CNNCDC) in Nigeria between March 2, 2020, and September 25, 2020, stands at 186, while minimum and maximum values are 0 and 3442, respectively. In the same vein, the average daily COVID-19 cumulative discharged cases (CNCDC) in Nigeria over the study period is 13875, with an associated minimum and maximum values of 0 and 49606, respectively.

Furthermore, the Nigerian stock market's average daily equity turnover value (ETVN) is ₦3.06billion and ranges between a minimum of ₦899million and a maximum of ₦17.6billion. With a very high range, COVID-19 new discharged cases (CNNCDC) improve the recovery rate in absolute terms over the study period. COVID-19 new discharged cases (CNNCDC) is, however, widely dispersed because their standard deviation value (297.2533) exceeds its mean value (186.0817). The other two variables, COVID-19 cumulative discharged cases (CNCDC) and equity turnover value (ETVN) in the Nigerian stock market, also exhibit wide dispersion because their standard deviation value exceeds their mean value. None of the three variables passes the normality test based on Jarque-Bera, whose respective p-value is less than 1%. All three variables are positively skewed, which implies that their values are not symmetrical around their averages. Except for the cumulative discharged cases (CNCDC), which is

platykurtic(kurtosis<3), the other two variables are leptokurtic, each having their kurtosis exceeding 3. This further buttress the non-normality of the three series.

Table 1: Descriptive Statistics

	Mean	Min.	Max.	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	P-value	N
ETVN	3.06E+09	8.99E+08	1.76E+10	2.05E+09	2.944315	16.94531	1985.947	0.0000	208
CNC	186.0817	0.0000	3442.000	297.2533	7.135368	73.47401	44808.74	0.0000	208
NCDC	13875.18	0.0000	49606.00	16794.97	0.929930	2.269199	34.44090	0.0000	208

Source: Author's computation,2020.

Correlation Analysis

Pearson correlation analysis was employed to determine the relationship between coronavirus discharged cases and equity trading value in the Nigerian stock market. The correlation coefficients presented in Table 2 reveal that the coefficients of -0.2110 and -0.2795 are for COVID-19 new discharged cases (CNNCDC) and COVID-19 cumulative discharged cases (CNCDC), respectively. This implies a weak and negative relationship between the two variables (representing COVID-19 recovery rate) and equity turnover value (ETVN) in the Nigerian stock market. These relationships are significant at 1%. Furthermore, evidence of a positive but also weak and statistically significant relationship exists between COVID-19 new discharged cases (CNNCDC) and COVID-19 cumulative discharged cases (CNCDC), considering the correlation coefficient and p-value of 0.408668 and 0.0000, respectively. The correlation analysis showing coefficients ranging from a minimum of -0.211030 to a maximum of 0.408668 (less than 0.80) reveals no element of multicollinearity among the variables.

Table 2: Correlation Analysis

	ETVN	CNC	NCDC
ETVN	1.0000		
	[-----]		
CNC	-0.2110	1.0000	
	[0.0023] *	[-----]	
NCDC	-0.2795	0.4086	1.0000
	[0.0000]*	[0.0000] *	[-----]

Source: Author's computation, 2020. Note: [] probability value, * statistically significant at 1%.

Unit Root Test

The unit root properties of the variables in log form as determined via the ADF test (reported in Table 3) reveals that equity turnover value (ETVN), COVID-19 cumulative discharged cases (CNCDC) and COVID-19 new discharged cases (CNNCDC) are stationary in level at 1%, given that the probability value of the ADF test of each variable is less than 0.01 respectively.

Table 3: Augmented Dickey-Fuller Test Results

Variables(log form)	t-Statistic	Prob.*
LOGIN	-6.094255	0.0000
LOGCNCDC	-3.582301	0.0070
LOGCNNCDC	-3.524745	0.0085

Source: Author's computation,2020.

Vector Autoregressive (VAR) Model Estimation

The Vector Autoregressive (AR) model results of the impact of COVID-19 discharged cases on equity turnover value in the Nigerian stock market is reported in Table 4. The results show that though both COVID-19 cumulative and new discharged cases (CNCDC) and CNNCDC) are negatively signed, their influences are not statistically significant. This finding agrees with the evidence of a weak negative correlation between COVID-19 discharged cases and equity turnover value in the Nigerian stock market in the investigation period. This implies that the COVID-19 recovery rate still has a negative role in shrinking equity trading value in the Nigerian stock market. Both 1-year and 2-year lag values of equity turnover value are positively signed, but 1-year lag is statistically significant (at 1%). This implies that–year lag has a positive and significant role in expanding equity trading volume in the Nigerian stock market. The coefficient of determination (0.4686) means only 47% of the variation in the dependent variable is explained by independent variables.

Table 4: Vector Autoregressive (VAR) Model Results

Variable	Coefficient	Prob.
LOGETVN(-1)	0.5007	0.0000
LOGETVN(-2)	0.1122	0.1458
LOGCNCDC	-0.0085	0.7426
LOGCNNDC	-0.0273	0.5068
Constant	8.5522	0.0000
II: Statistical and Diagnostic Statistics		
R-squared	0.4386	
Adjusted R-squared	0.4256	

Durbin-Watson	1.9717	
F-statistic	33.6058	0.0000
Jarque-Bera	0.2038	0.9031
Breusch-Godfrey Serial Correlation LM	0.5982	0.5509
Breusch-Pagan-Godfrey Heteroscedasticity	0.8648	0.4863
Ramsey RESET	1.2402	0.2670

Source: Author's computation, 2020.

The diagnostic properties of the model, as shown above in Table 4 (Panel II), shows that the model is of a good fit, free of serial correlation, free of heteroscedasticity and does not suffer misspecification error. The CUSUM stability graph depicted in Figure 2 attests to the stability of the model's parameter over the study period. This is because the graph plots within the 5% critical boundary level. The Durbin-Watson statistic (1.9717) of roughly 2.00 shows an absence of serial correlation in residuals of the model. This is also corroborated by the Breusch-Godfrey Serial Correlation LM statistic (0.5982), whose p-value (0.5509) exceeds none of the ideal p-values (1%, 5% and 10%). Thus, the non-rejection of the serial correlation hypothesis signifies that the model's residuals are not serially correlated.
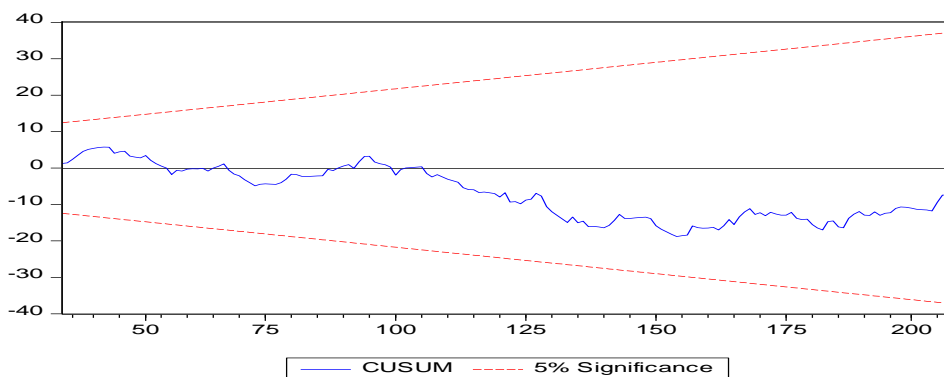

Figure 2: CUSUM Stability Test.

Source: Author's estimation, 2020.

Discussion of Results

This study uses Pearson correlation and Vector Autoregressive Techniques to examine the nexus between COVID-19 discharged cases and equity turnover in the Nigerian capital market. Findings from the correlation analysis revealed evidence of a weak, negative. Statistically, there is a significant correlation between COVID-19 discharged and equity turnover value in the Nigerian stock market in the investigation period. This implies that an increase in the daily number of new discharged cases will

decrease the value of equity turnover in the Nigerian stock market. In the same vein, COVID-19 cumulative discharged cases (CNCDC) have a negative correlation, which is statistically significant. This suggests that an increase in the daily cumulative discharged cases will decrease the value of equity turnover in the Nigerian stock market. This implies that COVID-19 recovery has a negative role in shrinking equity trading value in the Nigerian stock market. Based on the correlation analysis result, this study rejects the null hypothesis of no significant relationship between COVID-19 recovery and equity turnover value in Nigeria. Thus, the study can say that there is a significant positive relationship between COVID-19 discharged cases and equity turnover value in Nigeria in the period of study.

Furthermore, the results from the VAR analysis shows that COVID-19 cumulative discharged cases (CNCDC) have a negative but statistically insignificant effect on equity turnover value in Nigeria, such that a 1% increase in cumulative discharged cases will bring about a contraction of equity market size (equity turnover value) by 0.85%. This influence is only potential but not significant as the probability (0.7426) is higher than the ideal probabilities of 1%, 5% and 10%. Like the cumulative discharged cases, the impact of COVID-19 new discharged cases (CNNCDC) on equity turnover value in Nigeria is negative but statistically non-significant. With the coefficient of -0.0273 and an associated p-value of 0.5068, new discharged cases are said to influence the shrinking of equity market activity/size by 2.7%. However, the effect is potentially practical but not statistically impactful. Both 1-year and 2-year lag values of equity turnover value are positively signed, but 1-year lag is statistically significant. This implies that a one-year lag of equity turnover value has a positive and significant role in expanding equity trading volume in the Nigerian stock market. The diagnostic tests of the model indicate it is robust to diagnostic tests of normality, overall goodness fit, serial correlation, free of heteroscedasticity, and does not suffer misspecification error and parameter stability.

Generally, the VAR analysis shows that both new and cumulative cases of COVID-19 have negative but non-significant effects on equity turnover value in the Nigerian stock market over the study period. Hence, the study fails to reject the null hypothesis that COVID-19 discharge cases do not significantly affect equity turnover value in the Nigerian capital market. Thus, it can be asserted that COVID-19 discharge cases do not significantly affect equity turnover value in the Nigerian capital market.

CONCLUSION

In this paper, coronavirus recovery rate, that is, the number of discharges cases per day and the cumulative discharged cases, are investigated in terms of their effects and relationship with the monetary value of a number of equity shares traded in the Nigerian stock market. The study is underpinned by Black Swan theory which emphasizes the role of a very rare, highly impactful in consequence and retrospective in nature, in affecting stock market behaviour by inducing panic-inducing

divestment by investors, primarily international investors. War, distress, political unrest, pandemics such as the coronavirus disease fall within this category. The study was carried out between March 2 and September 25, 2020, based on the event study method and ex-post facto research design, while Pearson correlation analysis and VAR techniques constitute data analysis methods.

This study establishes empirical evidence of a weak negative correlation between COVID-19 discharged cases and equity turnover value in the Nigerian capital market. Moreover, both cumulative and new cases of COVID-19 have a negative but non-significant impact on equity turnover value in Nigeria in the period of study. This implies that the COVID-19 recovery rate still can run down equity turnover in the Nigerian capital market, though its influence is not statistically significant in the study period. Thus, prolonging the coronavirus pandemic is a vital source of financial volatility, especially in the capital market.

This study points to the need for the Government and the health community at the international scene to speed up the vaccine development/commercial launch pace and other measures to curb the pandemic and ensure quicker recovery of those infected persons. This will help to reduce the potential long-run threat of COVID-19 on the Nigerian capital market.

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