

# Dynamics of Stock Returns Amidst COVID-19 Lockdown: A Descriptive Analysis of Global Stock Markets

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**Abstract:** This study investigates the dynamics of global stock returns amidst COVID-19 lockdown. Daily returns of eight global stock exchange markets; namely, New York Stock Exchange, Nasdaq Stock Exchange, Tokyo Stock Exchange, Shanghai Stock Exchange, Euronext, London Stock Exchange, Toronto Stock Exchange and Bombay Stock Exchange were analyzed and compared. The study period was divided into three sub-periods, namely; pre-lockdown (trading days between 1<sup>st</sup> January, 2020 to 10<sup>th</sup> March, 2020), during lockdown (trading days between 11<sup>th</sup> March, 2020 to 31<sup>st</sup> May, 2020) and post lockdown (trading days between 1<sup>st</sup> June, 2020 to 30<sup>th</sup> September, 2020). The descriptive analysis revealed that negative returns was recorded across the selected stock exchange markets before the lockdown was imposed across countries of the world. During the lockdown, the descriptive statistic indicated that the New York Exchange, Shanghai Exchange, Toronto Exchange and Bombay Exchange had more negative returns than the other stock exchange markets. After the lockdown, the sampled stock exchange markets witnessed more positive returns than negative returns as shown by their respective positive mean values. Consequently, the study concludes that the lockdown restrictions meant to contain the spread of coronavirus had caused heavy losses in the global stock exchange markets.

**Keywords:** Stock returns, stock exchange market, COVID-19, lockdown, descriptive statistic

## I. INTRODUCTION

In both developed and developing economies, the stock exchange market provides a platform for investments in diverse financial assets towards enhancing free flow of monetary resources for commercial purposes. Unfortunately, in the year 2020, the outbreak of an infectious disease known as “coronavirus” is seen to have undermined the effective and efficient functioning of the global stock markets [6]. The disease which was first reported on 31<sup>st</sup> of December 2019 when the China office of the World Health Organization (WHO) announced the existence of an unfamiliar virus in Wuhan City, Hubei Province of China was later confirmed by some Chinese health officials on 7<sup>th</sup> January 2020. As of 20<sup>th</sup> January 2020, over 280 cases of the novel coronavirus infectious disease were reported from China, Thailand, Japan and the Republic of Korea [19]. However, following the trajectory and scale of the outbreak, the WHO officially declared the disease a global health emergency on 30<sup>th</sup> January 2020. The viral disease which was later named “coronavirus disease 2019” and coded “COVID-19” came to a head on March 11<sup>th</sup> 2020 when it was declared a global pandemic by the WHO following its rapid spread from China to other Asian countries and across the world. Being a highly contagious disease, between January 2020 and October 2020, over 41,299,301 cases of COVID-19 had been

confirmed worldwide, including more than 1,132,500 deaths [19]. To contain this infectious disease, not less than 100 countries had undertaken diverse lockdown restrictions that led to a temporary shutdown of the global economy and economic recession in many countries [17]. Reports reveal that spread of the coronavirus has disrupted the global economy more than previously experienced high volatility events [20]. With the level of financial integration in today’s world, a global pandemic like the COVID-19 would hinder effective and efficient functioning of a country’s stock market due to the contagion effect of financial crisis induced by investors fear of such global pandemic, leading to financial market crash [12]. Notwithstanding the strict measures towards containing the pandemic, the viral disease continued to spread like a wildfire, eventually resulting in low investments as investors’ fear index increased with the loss of lives. As such, equity markets across the globe were made to endure sudden losses. The emergence of coronavirus from China had caused a decline in the global stock markets in January 2020, but the said decline did not last for long and losses were rapidly compensated [7]. According to [14] and [21], the fall in stock returns in January and February was more pronounced in the Asian markets, especially in China where the disease was at its peak. The neoteric plunge in global stock indices was deepened by the lockdown measures that followed the

declaration of COVID-19 a global pandemic. From March 2020 – April 2020, indices of global stock markets declined significantly as lockdown restrictions aimed at combating the spread of COVID-19 caused a standstill to economically productive activities. According to the International Monetary Funds (IMF), between January and March 2020, emerging stock markets had lost well over \$83 billion due to COVID-19 lockdown restrictions [9].

The COVID-19 infectious disease coupled with the lockdown restrictions represents a new market risk, stirring fearful investors behaviour. According to [15], the lockdown restrictions increased uncertainty and risk in the global stock market as short-selling was banned, preventing price formation and limiting stock markets' ability to serve the real economy as factories were shut down and output decelerated, business turnover fell and employment declined. In March 2020, the circuit breaker process was triggered four times within ten trading days in the United States' market [18]. As a result, stock indices in the global markets plunged significantly. Since many stock markets are integrated with those of the United States, the global financial system crashed and investors fear index increased further. The increase in investors' fear index measured by volatility index (VIX) indicates high level of risk or fear when making investment decisions. Following the disruptive effect of the COVID-19 crisis, the global economy plummeted much worse than that witnessed during the 2008–2009 financial crisis [20]. In fact, when compared to previously experienced high-risk events, COVID-19 pandemic is seen to have posed the highest fear to investors as shown in Table 1 below.

Table 1: Past High Volatility Events

Date	Event	VIX
11/3/2020	COVID-19	57.74
12/24/2018	US/China trade war	36.07
8/8/2011	US debt	48.00
5/7/2010	European debt	40.95
9/29/2008	Global financial crisis	46.72
8/31/1998	Russian default	44.28

Table 1 above mirrors the fact that the COVID-19 pandemic has triggered a global financial risk that surpassed the global financial meltdown of 2008. This ushered in one of the worst global recession [9]. Though, the International Monetary Funds (IMF) and the World Bank were swift to grant debt relief and increase loans to help member countries, the global economy is still clouded with enormous uncertainties as the world continues to struggle with the pandemic that has upended people's lives. Hence, global financial stability has been undermined by this health crisis due to the magnitude of economic downturn arising from the lockdown restrictions. To further salvage the situation and extend lifelines to people and businesses, governments funded additional health services; and where the budget gave room, the freefall of global growth was stopped with extraordinary

fiscal and monetary aid [21]. As such, countries across the globe were faced with urgent financing needs that created demand for funds which the global stock markets already caught in the snare of COVID-19 were unable to provide.

From the foregoing, it is seen that there has been rising uncertainties in the global markets due to the COVID-19 pandemic lockdown restrictions. Particularly, this study covers the trend of stock returns amidst lockdown restrictions for at least three reasons. First, it is evident that earlier studies on the subject mainly focused on the immediate impact of COVID-19 related information on global stock returns. Therefore, it is needful to further explore and compare how different stock exchange markets behaved before, during and after the lockdown restrictions. Second, the global stock markets have varying characteristics which imply that their respective returns could behave differently amidst the COVID-19 lockdown restrictions. For instance, Asian markets are largely dominated by local investors, hence it might not react much to events outside their location unlike those in Europe and America that are largely opened to foreigners [10]. The third reason is that the COVID-19 crisis peaked at different periods across the world; for instance, reported cases of coronavirus peaked in China and some other Asian countries between January and February, 2020 while its peak in Europe and America was in March and in the later part of 2020 [14].

The remaining sections of the paper are partitioned as follows. Section 2 presents the related work while the methodological approach was explained in section 3. The results arising from the data analysis were presented in section 4 while section 5 captures the conclusions and policy implications.

## II. RELATED WORK

Recent literature has proven that unexpected events like natural disasters, attacks arising from acts of terrorism, political upheavals, etc. would exert strong impacts on stock markets [18], [25], [26], [27]. Meanwhile, findings from the diverse studies are summarized in two theoretical frameworks; Viz, the information diffusion theory and price pressure theory. Information diffusion theory holds that outbreak of fundamental information causes persistence price changes in financial assets. On the other hand, the price pressure theory asserts that negative or positive only leads to temporary or short selling or buying pressure and the fluctuations in prices will return to its fundamental value. The ongoing COVID-19 crisis creates a unique setting of assessing the effects of infectious disease on stock returns. Particularly, the event on 11 March 2020 as a global negative shock to stock markets and examine whether influence on returns behaviour is driven by information diffusion or price pressure theory. Due to the lockdown restrictions and prevailing uncertainty among people, economic activities declined which automatically disrupted financial flows and stock market performance as shown in Figure 1 below:

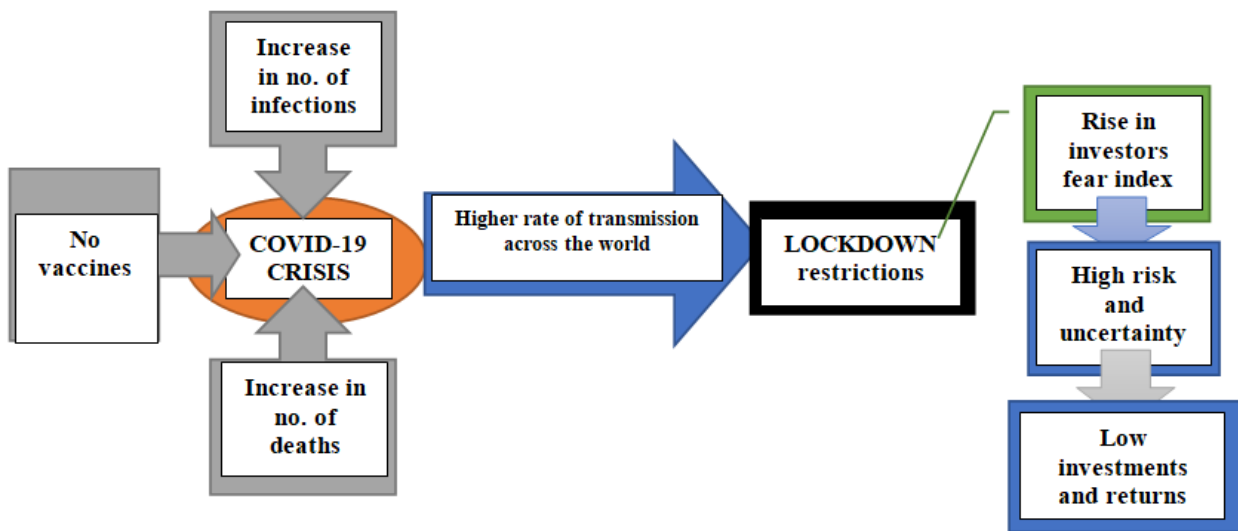


Figure 1: Conceptual Framework

With emphasis on two groups of stocks, [22] investigated the difference between stock returns during the stay-at-home order and go-outside periods in China. The results showed a significant negative average return for the go-outside period while a non-significant negative return was observed during the stay-at-home periods.

Likewise, [23] explored the influence of COVID lockdown on returns in Vietnam's stock market. Panel data and regression technique was used to estimate the impact of daily COVID-19 new cases on stock returns of 723 quoted companies between 30<sup>th</sup> January to 30<sup>th</sup> May 2020. The study confirmed the adverse impact of the daily increasing new cases on stock returns in Vietnam. Also, the study disclosed that before and during the lockdown, the Vietnam market performed in opposing ways but more significant negative returns was recorded during the nationwide lockdown restrictions.

Similarly, [24] assessed the impact of social distancing measures to curb COVID-19 on forty-five stock indices. The findings showed evidence of negative spillover effects, especially during the lockdown restrictions. In a study, [27] analyzed the economic effect of COVID-19 in Nigeria. Findings from the study showed that economic downturn in Nigeria was spurred by both declining oil price and COVID-19 spillovers.

A study credited to [8] explored the effect of Covid-19 transmission on stock markets of Italy, People's Republic of China, France, South Korea, Germany, Spain, Japan and the US. Applying the conventional t-tests and nonparametric Mann-Whitney tests, it was revealed that, within a short period, Covid-19 pandemic exerted a negative influence on all the stock markets.

Similarly, [2] investigated the effects of Covid-19 on stock markets of the worst six affected countries and found that stock market returns of all six countries was sensitive to

new Covid-19 cases. Besides, the most affected countries were China, France, Germany and Spain.

Again, [3] used a panel data technique to examine the impact factor of COVID-19 cases on stock returns after the systematic risk arising from global factors and country specific characteristics were controlled. The results showed that stock markets reacted negatively to rising confirmed cases and deaths, but only stock markets reaction to daily new cases was statistically significant.

In another study, [11] evaluated the short-term impact of the coronavirus pandemic on stock indices of the USA, UK, Japan, Korea, Singapore, Germany and Italy and showed that the aforementioned stock markets plummeted after the virus outbreak, especially the Asian markets.

Also, [4] investigated the impact of COVID-19 on daily stock returns in the Gulf Cooperation Council (GCC) countries from April 1, 2020 to June 26, 2020 and revealed that stock exchange markets in the GCC countries reacted negatively and significantly to new and cumulative COVID-19 confirmed deaths, while reactions to the number of new cases was not statistically significant.

Again, [13] investigated influence of Covid-19 on Chinese and American markets from 1<sup>st</sup> March, 2020 to 25<sup>th</sup> March, 2020 using both regression technique and event study methodology. Findings from the analysis revealed there was positive and significant influence of Covid-19 cases on stock market indices of the Chinese and America within the period of study.

In another study, [1] looked at the effect of infectious disease on performance of Chinese stock market. Results from the study revealed that new cases and deaths caused diminishing effects on stock returns.

With emphasis on COVID-19 hotspots, [5] investigated impact of coronavirus related information on stock market returns in the UK, UK, France, Germany, Italy and Spain using a panel quantile regression over the period from February 3, 2020 to April 17, 2020 and revealed that COVID-19 news influenced the stock markets negatively.

The current study contributes to this rapid growing literature by analyzing behaviour of stock returns amidst the COVID-19 lockdown. This study attempts to compare dynamics of stock returns in the stock exchange markets of United States, Japan, China, Europe, United Kingdom, Canada and India which happens to be among the top ten in the world as of 2020. It can be seen that the studies reviewed mostly analyzed how COVID-19 related information affected stock returns without considering the different periods of the global health crisis. Consequently, this study compared trend of returns in the aforementioned markets before, during and after the COVID-19 lockdown.

### III. METHODOLOGY

To empirically investigate stock market dynamics amidst the COVID-19 lockdown, data on daily closing stock indices of the selected stock exchanges were collated from *finance.yahoo.com*. The study covered the trading days between 1<sup>st</sup> Jan., 2020 and 30<sup>th</sup> Sept., 2020. The study period was further divided into sub-periods, namely; pre, during and post COVID-19 lockdown. The pre-COVID-19 lockdown covers trading days before the lockdown restrictions (1<sup>st</sup> Jan., 2020 to 10<sup>th</sup> March, 2020); during lockdown restrictions covers trading days within which many countries imposed the lockdown order (11<sup>th</sup> March, 2020 to 31<sup>st</sup> May, 2020), and the post lockdown period (1<sup>st</sup> June, 2020 to 30<sup>th</sup> September, 2020). Pre-lockdown defines the periods when there were free movements though COVID-19 was being reported. During lockdown connotes the peak-period of COVID-19 when movements were restricted in many countries. After lockdown defines the period when the lockdown restrictions were relaxed even though cases of COVID-19 were being reported.

In accordance with [1] and [16], stock return series used for this study were computed using equation 1 below:

$$r_t = \log \frac{P_t}{P_{t-1}} * 100 \quad (1)$$

Where,

$r_t$  represent the daily returns on the stock market price index for time  $t$ ;  $P_t$  denote the closing index at time  $t$ , and;  $P_{t-1}$  shows the corresponding index at time  $t - 1$ .  
 $\log$  = logarithm of a specific stock market index

This study is based on descriptive analysis of top stock markets across the globe. The sample mean of the respective return series measures the average expected market return for each stock exchange as specified in equation (2) below:

$$\widehat{R}_t = \frac{1}{n} \sum_{t=1}^n R_t \quad (2)$$

The standard deviation measures the level of variability of actual returns from expected market returns as specified in equation (3) below:

$$\text{Std.Dev}(R_t) = \sqrt{\frac{1}{N} \sum_{t=1}^N (R_t - \widehat{R}_t)^2} \quad (3)$$

Asymmetry of the distribution was measured by the skewness. The flatness or peakedness of the distribution was measured with the Kurtosis. To calculate the skewness, equation 4 below was applied:

$$\text{Skewness}(R_t) = E \left[ \frac{R_t - \widehat{R}_t^3}{\sigma^3} \right] \quad (4)$$

A skewness of zero mirrors a normal distribution. Positive skewness indicates a distribution that has a long right tail while a negative skewness indicates a distribution with a long-left tail. On the other hand, the acceptable value of Kurtosis for a normal distribution is 3. A Kurtosis that is greater than 3 mirrors a peaked (leptokurtic) distribution; a Kurtosis of three is flat and said to mirror a platykurtic. Where,  $\sigma^4$  denote the fourth moment of the Std. Dev., Kurtosis is represented by equation (5) below:

$$\text{Kurtosis}(R_t) = E \left[ \frac{R_t - \widehat{R}_t^4}{\sigma^4} \right] \quad (5)$$

Jarque-Bera (JB) statistic is concerned with whether or not the series are normally distributed. In consonance with [15], the Jarque-Bera (JB) test for normal distribution is based on equation 6:

$$\text{JB} = n \left[ \frac{S^2}{6} + \frac{(k - 3)^2}{24} \right] \quad (6)$$

Where,  $n$  = sample size;  $S$  = coefficient of skewness; and,  $K$  = coefficient of Kurtosis. Decision @ 5% significance;  $H_0$ : series are normally distribution;  $H_1$ : series are not normally distribution.

### IV. RESULTS AND DISCUSSION

Table 2 summarizes the descriptive statistic for stock returns before the COVID-19 lockdown restrictions. The results indicate that the sample mean returns for all the stock exchange markets are negative, implying that the markets recorded more negative returns than positive returns before the lockdown. The minimum and maximum values of the sampled stock markets further show heavy decline in returns within the trading days before the lockdown restrictions. For instance, in absolute value, the

minimum returns are greater than the maximum returns of all the markets. In addition, the standard deviation reveals that the daily returns for the various stock markets varied overtime, with the NYSE and NDX being the most volatile market followed by TRTSE, LSE, SSE, ENXT, TKYSE and BSE. Returns of six (6) out of the sampled eight (8) markets are not normally distributed as indicated by the

skewness, kurtosis and Jarque-Bera (JB) test. The negative skewness observed across the markets implies that all the return series exhibit negative asymmetry. The Kurtosis values, which are all greater than 3 indicates that the series mirrors a non-normal skewness and leptokurtic which implies that the series of returns for all the stock exchanges have more higher values than their sample mean returns.

Table 2: Descriptive Analysis of Stock Returns Before the Covid-19 Lockdown

	New York Stock Exchange (NYSE)	Nasdaq Stock Exchange (NDX)	Tokyo Stock Exchange (TKYSE)	Shanghai Stock Exchange (SSE)	Euronext Stock Exchange (ENXT)	London Stock Exchange (LSE)	Toronto Stock Exchange (TRTSE)	Bombay Stock Exchange (BSE)
<b>Mean</b>	-0.372643	-0.177018	-0.637876	-0.057655	-0.503866	-0.214521	-0.292212	-0.320211
<b>Maximum</b>	4.195951	4.716659	2.320679	3.050456	1.672886	3.955371	2.967619	2.248307
<b>Minimum</b>	-9.325195	-7.860207	-5.335312	-8.371136	-8.798890	-5.769237	-11.44259	-5.448785
<b>Std. Dev.</b>	2.061790	2.154634	1.764890	1.868621	1.825821	1.875408	1.939519	1.305481
<b>Skewness</b>	-1.542614	-0.870034	-0.933561	-2.240370	-2.378438	-0.588346	-4.013155	-1.592399
<b>Kurtosis</b>	9.508041	5.802131	3.552859	10.63493	10.27135	4.060084	24.12672	7.302668
<b>Jarque-Bera</b>	101.5851	21.30624	3.949786	140.4115	154.1468	5.121286	1021.520	56.11778
<b>Prob.</b>	0.000000	0.000024	0.138776	0.000000	0.000000	0.077255	0.000000	0.000000
<b>Obs.</b>	47	47	25	43	49	49	48	47

From the Figure 2 below it can be seen that more negative returns were observed for the markets before the lockdown, especially towards the end of the pre-lockdown period. These negative returns could be attributed to fears arising from information on spike of COVID-19 cases in China in February and early March, 2020 as global investors had started reacting negatively to the statement

(on 20<sup>th</sup> January, 2020 which fell on the 13<sup>th</sup> trading day) by the National Health and Fitness Commission of China that the disease is transmissible coupled with the WHO declaration (on 30<sup>th</sup> January, 2020 which fell on the 20<sup>th</sup> trading day) of COVID-19 a global health emergency. Note that pre-COVID-19 lockdown period covers the trading days between 1<sup>st</sup> Jan., 2020 and 10<sup>th</sup> March, 2020.

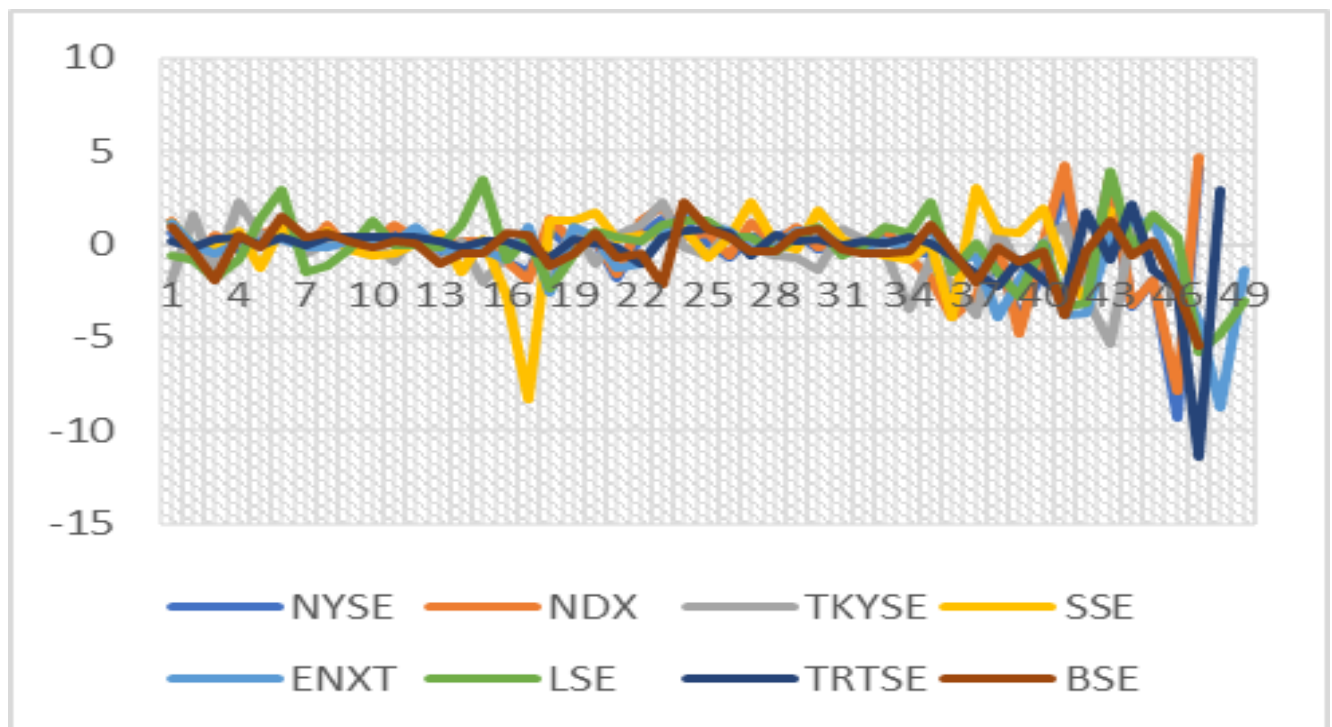


Figure 2: Stock returns before COVID-19 lockdown

Table 3 below presents the descriptive statistic of stock returns during the lockdown. As presented in Table 3, the mean returns of the various stock exchange markets were negative during the lockdown restrictions except for the NDX, TKYE, ENXT and LSE which recorded positive

values. This implies that apart from the NDX, TKYSE, ENXT and LSE, all the other stock exchange recorded more negative returns during the lockdown. However, looking at the minimum and maximum returns, it can be seen that the markets recorded outrageous negative returns

that were greater than the maximum return during the COVID-19 lockdown. Also, these results show that during the peak of the COVID-19 pandemic that ushered in the lockdown restrictions in many countries as cases of COVID-19 rose in the US and Europe, returns of the top two Asian stock markets (TKYSE and SSE) did not decline as much as other stock markets because the number of coronavirus cases in China had reduced drastically and the economy was gradually returning to normalcy during this period, leading to less stringent implementation of the lockdown order in China and some parts of Asia [33]. Based on the standard deviation, it was observed that the variability of returns was more during the lockdown

compared to that of the pre-lockdown period probably due to high investor’s fear sentiment, but that of the SSE declined to 1.152915. From the skewness, it can be deduced that the stock returns exhibited negative asymmetry during the lockdown except for TKYSE. The Kurtosis values are greater than 3, implying that the distribution of the return series across the markets are platykurtic which means that the lockdown return series had higher values than the sampled mean. These findings clearly reveal that most of the stock markets experienced low returns and had underperformed during the lockdown restrictions.

Table 3: Descriptive Analysis of Stock Returns During the COVID-19 Lockdown

	New York Stock Exchange (NYSE)	Nasdaq Stock Exchange (NDX)	Tokyo Stock Exchange (TKYSE)	Shanghai Stock Exchange (SSE)	Euronext Stock Exchange (ENXT)	London Stock Exchange (LSE)	Toronto Stock Exchange (TRTSE)	Bombay Stock Exchange (BSE)
<b>Mean</b>	-0.071403	0.161508	0.148035	-0.097999	0.007312	0.195372	-0.046637	-0.258799
<b>Maximum</b>	9.121052	8.547179	7.440061	2.287217	7.558090	9.417554	10.68005	8.235755
<b>Minimum</b>	-13.42259	-14.05283	-6.474538	-3.519690	-13.60046	-10.69855	-14.08322	-15.14447
<b>Std. Dev.</b>	3.887605	3.757085	2.614027	1.152915	3.224694	3.536599	3.930078	4.019573
<b>Skewness</b>	-0.811901	-1.001479	0.166865	-0.441560	-1.349796	-0.296519	-0.862612	-1.087215
<b>Kurtosis</b>	5.289348	6.350536	3.864362	4.054217	7.442401	4.300370	6.304143	5.625733
<b>Jarque-Bera</b>	18.38164	35.55518	1.895851	4.255365	61.92706	4.595975	32.41877	25.18235
<b>Prob.</b>	0.000102	0.000000	0.387544	0.119113	0.000000	0.100461	0.000000	0.000003
<b>Obs.</b>	56	56	53	54	55	54	56	52

The trend of stock returns for the respective markets during the lockdown era has been plotted in Figure 3 below. The figure reveals that much of the negative returns recorded in the various stock markets were linked to the lockdown period, especially immediately after the COVID-19 pandemic announcement by the WHO on 11<sup>th</sup> March,

2020. However, the negative returns tend to reduce in late April and May as countries began to ease the lockdown restrictions gradually. During COVID-19 lockdown period covers the trading days between 11<sup>th</sup> March, 2020 and 31<sup>st</sup> May, 2020.

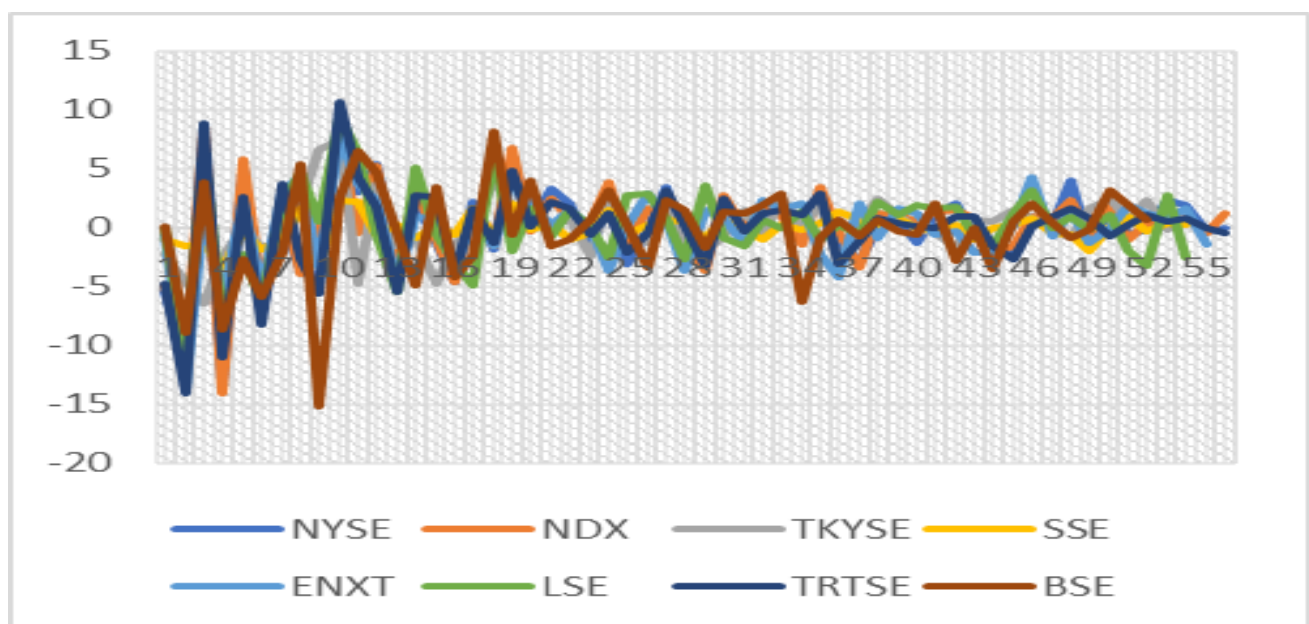


Figure 3: Stock returns during COVID-19 lockdown

Table 4 below presents the descriptive statistic for stock returns post-COVID-19 lockdown restrictions. Table 4

reveals that after the COVID-19 lockdown restrictions, all the sampled stock exchange markets recorded positive

returns on average as shown by the mean values which indicates that more of positive than negative returns were recorded after the lockdown. The negative returns recorded in some trading days after the lockdown might be due to fresh outbreaks of COVID-19 in Brazil, USA coupled with preparations towards the American elections. However, negative returns seen after the lockdown were less than those reported during the lockdown and pre-lockdown periods, respectively. Again, the minimum returns after the lockdown restrictions were reduced when compared to the pre and during lockdown restrictions. For instance, the difference between the minimum and maximum returns after the lockdown restrictions was lower than those obtained before and during the lockdown restrictions. Also,

it can be seen that the standard deviation for all the stock markets reduced after the lockdown restrictions compared to the period of lockdown, indicating that the variability of the returns was less than those observed during the lockdown restrictions even though more cases of COVID-19 were reported across the world, especially in the United States, Europe and India [33]. Apart from LSE, the Kurtosis values associated with the return series are greater than 3, indicating that the series are platykurtic, having higher values than their respective sample mean which further shows that returns increased after the lockdown restrictions. From the Jarque-Bera statistic, the returns after the lockdown restrictions are not normally distributed, except for ENXT, LSE and BSE.

Table 4: Descriptive Analysis of Stock Returns After COVID-19 Lockdown

	New York Stock Exchange (NYSE)	Nasdaq Stock Exchange (NDX)	Tokyo Stock Exchange (TKYSE)	Shanghai Stock Exchange (SSE)	Euronext Stock Exchange (ENXT)	London Stock Exchange (LSE)	Toronto Stock Exchange (TRTSE)	Bombay Stock Exchange (BSE)
<b>Mean</b>	0.094185	0.176973	0.062614	0.130918	0.026078	0.108835	0.065096	0.176209
<b>Maximum</b>	3.134921	2.637594	4.655265	5.402776	2.953975	3.777190	2.057507	2.640622
<b>Minimum</b>	-6.346179	-5.558139	-3.597293	-4.710286	-4.376779	-4.392310	-4.321332	-3.049823
<b>Std. Dev.</b>	1.326478	1.576705	1.213038	1.367263	1.311122	1.577245	0.975859	1.100472
<b>Skewness</b>	-1.377567	-1.423733	0.116209	-0.019474	-0.297637	-0.162843	-1.153020	-0.458265
<b>Kurtosis</b>	8.348949	5.523710	5.357167	6.519679	4.033049	2.900083	6.469506	3.106057
<b>Jarque-Bera</b>	129.7239	51.87654	19.40214	44.39628	5.212319	0.420697	61.46665	3.121339
<b>Prob.</b>	0.000000	0.000000	0.000061	0.000000	0.073817	0.810302	0.000000	0.209995
<b>Obs.</b>	86	86	83	86	88	87	85	88

To further show the behaviour of stock returns after the lockdown restrictions, returns of the sampled stock exchange markets was plotted. The plot of the return series after the lockdown restrictions have been captured by the Figure 4 below. The trend of the return series indicates that the stock returns fluctuated after the lockdown with more

positive values unlike the lockdown and pre-lockdown periods when returns were mostly negative in most of the sampled stock markets (see, Tables 3, 4 and 5 above). Post COVID-19 lockdown covers the trading days between 1<sup>st</sup> June, 2020 and 30<sup>th</sup> September, 2020.

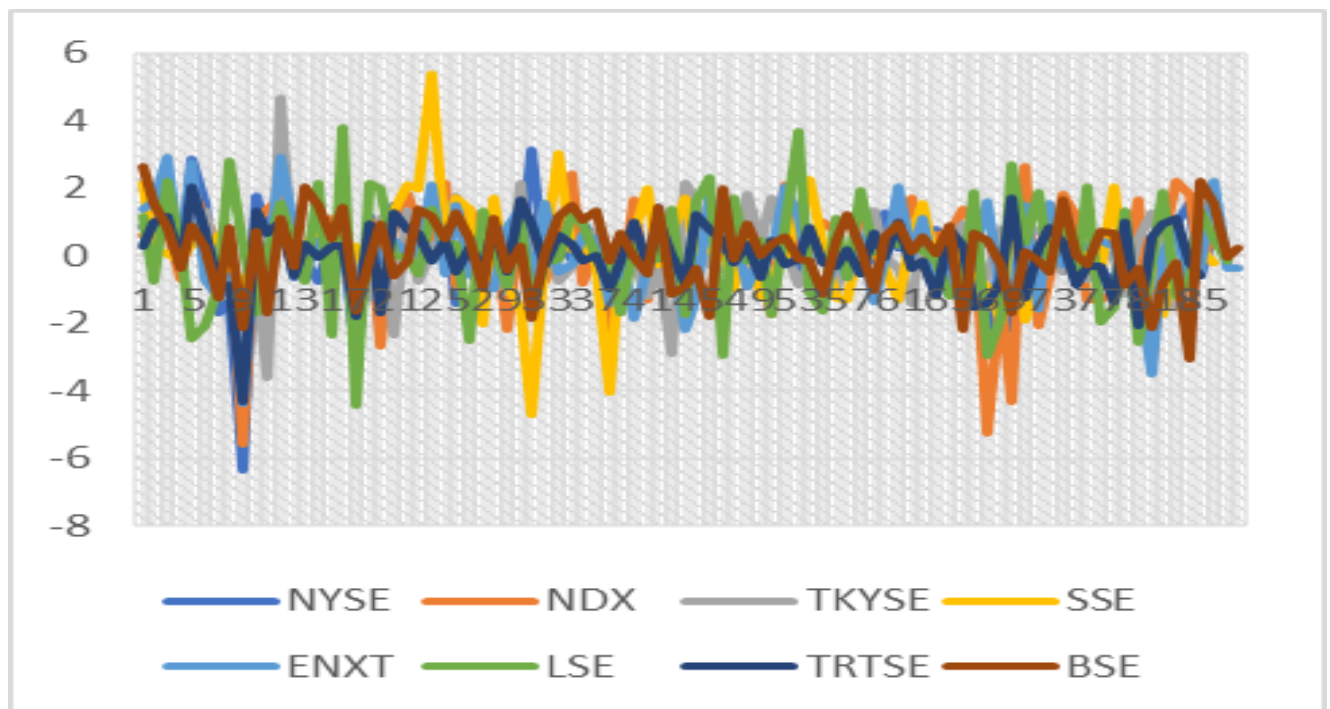


Figure 4: Stock returns after COVID-19 lockdown

## V. CONCLUSION AND FUTURE SCOPE

The consequences of the COVID-19 lockdown on global stock markets forms the basis of this study. An interesting feature of the results is that returns of the sampled stock exchange markets varied across the periods. For instance, prior to the lockdown, returns of TKYSE, ENXT, NYSE, BSE, and NDX had the highest average negative returns while the NYSE, NDX, TRTSE, LSE and SSE were the most volatile. During the lockdown, returns of the BSE, TRTSE, NYSE, NDX, LSE and ENXT exhibited the highest variability while the BSE and LSE had the highest negative returns. In agreement with [5] the negative average returns observed for the pre-pandemic period was due to rising investors fear index due to the news of potential spread of COVID-19 to other parts of the world. Analogously, NDX, TKYSE, ENXT and LSE that had positive average returns during the lockdown were among the most volatile probably due to the fact that some stock markets are more vulnerable to the influence of aggressive investors. After the lockdown restrictions were gradually lifted in many parts of the world, some stability was observed across the markets as less volatile positive returns were recorded. General speaking, the pre and during lockdown stock returns behaviour conforms to the information diffusion theory while the post lockdown returns behaviour followed the price pressure theory.

Finally, this study provides a useful insight to policymakers and investors in understanding the dynamics of stock market returns amidst government directives towards containing the COVID-19 crisis. First of these factors borders on the extent to which the outbreak will persist as the number of new cases and deaths has been on the increase. The second is when vaccines and drugs will be developed. The third factor is tied to the approach countries will employ to curb the spread of COVID-19. As such, policymakers and market participants need to source for reliable information in managing the impact of COVID-19 control measures on stock markets. In addition, further research efforts should be geared towards studying other channels through which policies aimed at controlling COVID-19 influence stock returns.

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