



COVID-19 Pandemic and the Performance of Listed Securities: Evidence from the Nairobi Securities Exchange in Kenya

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The Novel Covid-19 disease led to panic that resulted to volatility of stock prices across the securities exchange in the world. This saw foreign investors liquidating their positions for fear of a market crash in Nairobi Securities exchange (NSE). The specific objective of this research was to find out whether Covid-19 pandemic had an effect on the performance of listed securities at the NSE in Kenya. Daily data for 5 months, 154 days since the period 13th March 2020 to 14 August 2020 was utilized. The study applied linear regression analysis model to find out the effect of Covid-19 daily cases on the performance of listed securities at the NSE in Kenya. The study findings revealed that Covid-19 daily cases and weather changes had a negative and statistically significant effect on the performance of listed securities at the NSE. The results inferred that Covid-19 daily cases affected the performance of listed stocks at the NSE since the announcement of the first Coronavirus cases in Kenya. The findings from this study are useful for policy implications as it provides guidance to policy makers to institute applicable policy reactions in line with the course of current coronavirus pandemic or during future pandemics of similar nature.

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1. INTRODUCTION

The announcement of Coronavirus Pandemic caught the world's attention in January 2020. The increasing numbers of confirmed cases and the very rapid spread of the virus triggered swift reactions from the Chinese government. The lockdown of the entire city of Wuhan that was effected on 23rd January 2020 surprised the entire world but later proved to be an effective policy intervention by China. On 30th January 2020, the World Health Organization declared the Corona virus outbreak in China to be a public health emergency of international concern. During that period, the cumulative numbers of confirmed cases were approximately 7,800, while 18 countries outside the People's Republic of China had confirmed 83 cases. South Korea became the second country to experience a major outbreak of COVID-19, the third country following was Iran. South Korea's cases spiked from 31 cases to over 1,000 cases within a week while within a period of 12 days, Iran cases moved from zero to over 1000 cases. China and South Korea were majorly under control in March when the epicentre of the pandemic moved to Europe and USA; Italy leading with the highest fatality rate, USA has been leading with reported total cases. The reported cases globally as at 16th August 2020 indicated that COVID-19 had killed at least 761,779 people and infected at least 21.29 million since the outbreak emerged in China last year in December 2019 [1]. The Coronavirus pandemic had affected all securities markets globally especially the trend of security prices had fallen drastically and endlessly. The Dow Jones and S&P had witnessed a drop of approximately 20% of their share prices causing a fall out that weakens the financial markets. On the same note, the impact of COVID-19 on the financial markets was experienced by Nikkei which trades with Tokyo securities exchange. Nikkei experienced share price volatility and a falling trend over time ever since the outbreak of the COVID-19. The pandemic made financial markets to opt out of varied trading guidelines, which ultimately influenced the global economy [2].

As by August 2020, the Coronavirus pandemic had spread in all African countries and it escalated and worsened intensively. The interference of the global economy via

implementation of social and travel restrains, the sudden fall in fiscal revenues and prices of commodities and distractions of international value chains in the African Continent were among the core reasons for the negative growth. International trade in the African Continent was anticipated to decrease by approximately 35% from previous level that was recorded in 2019. Therefore, the value was predicted to plummet to an approximate value exceeding 270 billion US dollars. The fight against the spread of the virus and medical treatment was projected to escalate public financial spending in Africa to an expected value of at least 130 billion [3].

During the WHO's certified declaration of COVID-19 as a global pandemic, financial markets all over the world had started to fall. A good instance is the S & P 500 that recorded its highest point of 3386.15 on 19th February 2020, then again dropped to 2237.40 on 23rd March 2020, which amounted to 30 percent shrinkage within a period of one month. The financial markets in Africa have been drastically affected by COVID-19. The Johannesburg securities exchange top 40 index in South Africa slumped by 3.7% on the 24th of February 2020 following the announcement of coronavirus cases. Investors in Africa considered short-selling options following a decline of Top 40 index share prices. All shares index nose-dived in Morocco in reaction to the announcement of confirmed coronavirus cases, leading to loss of value in equity investments in the stock exchange. In Kenya, security prices continued to dive after the first case of coronavirus pandemic had been announced forcing the Nairobi Securities Exchange to adjourn trading for the NSE 20 index on 13th March 2020 in line with its equity trading rules that necessitated trading deferment if there is a drop of more than 5% [4].

Kenya has continued to experience enormous damage to the economy in terms of loss of employment and deterioration of GDP. The occurrence of COVID-19 has heightened the challenges facing the Kenyan economy that had been experienced before the virus. The disruptive effects of COVID-19 affected the performance of financial markets, caused depreciation of the Kenyan shilling, reversal of fiscal and monetary policies, decreased remittances to diaspora and interference of

global supply chains. Many foreign investors with massive investments in Nairobi securities exchange liquidated their positions in March 2020 when the first cases of COVID-19 were reported in Kenya. The fear by foreign investors of a collapse in the market led to an enormous decline in the securities prices that were traded at the Nairobi securities exchange. The NSE-all share index gradually diminished in value by approximately 300 basis points from Mid-March 2020 to end of May 2020; a trend that was reflected in the Kenyan economy performance [5].

1.1 Statement of the Problem

The performance of securities market is relevant in enhancing the economic growth of numerous countries. An announcement of any event tends to carry good or bad news which spills over to the securities market. The emergence of COVID-19 has overwhelmed the entire world causing panic in the securities market exchanges worldwide. The coronavirus pandemic has caused severe global market challenges hence increasing security market risk. The pandemic continued to accelerate external shocks in the securities market that wrecked the desired economic trend leading to unexpected shifts to market sentiments, (Gormsen & Koijen, 2020).

When the first case of COVID-19 was recorded in Kenya on March 13, 2020, it had an impact on the Kenyan securities market. The Nairobi Equities Exchange (NSE) stopped trading after the NSE 20 share index fell by an average of more than 5% following the announcement of the first COVID-19 case in the nation, with Safaricom and KCB securities falling by 5.4% and 7.0%, respectively. Due to the steep decline in the stock market's performance—the NSE 20 share index had plummeted by 26.05% on a year to date basis, forcing foreign investors to liquidate their positions in reaction to the spreading pandemic. Ever since the onset of the pandemic, a majority of investors have opted for a net selling position with a motive of investing in fixed income securities because of market uncertainties [5].

Despite the fact that the Coronavirus pandemic is still unfolding and mutating with intermittent effects on securities markets, it is appropriate to utilise the available confirmed medical cases and security market data to make recommendations that inform policy in relation to the reaction of the Nairobi Securities Exchange to COVID-19 pandemic.

2. LITERATURE REVIEW

2.1 Theoretical Review

The black swan theory: The theory was pioneered by Nassim Talib in 2007, Talib applied “the origination of the novel black swan to demonstrate impulsive unforeseen events that influence the securities market and business activities positively or negatively. The theory is made in reference to events that are extremely erratic of which the associated effects on the securities market, money markets and entire economy are very severe. Black swan theory is relevant to the current study given that the origin of COVID-19 in China shocked the whole World particularly its exceptional nature, which has resulted into high mortality rate and health challenges as well as global security market crisis. Given the extraordinary level of randomness of Black Swan events, financial specialists recommended diversification of investments to cushion against the severe effects of Black Swan events. This is why the diversification of investment portfolios have proliferated in the past years since the occurrence of numerous unpredicted events, which comprised inter alia, the subprime crises of 2007, the world financial crisis of 2008 to 2009, the internet bubble burst, the European public debt crises. The past pandemics such as Severe Acute Respiratory Syndrome (SARS), the 2009 swine flu disease and the 2014 Ebola disease are also examples of black swan events”. “The sudden emergence of COVID-19 without prior warning from the medical experts baffled and astounded the global health experts to the point that no vaccine has been discovered even after eight months of its development with snowballing rate of infection and deaths that has caused the World Health Organisation (WHO) to declare it a world pandemic. The simultaneous effect of COVID-19 has soared into diverse strikes in the global securities and money markets triggering doubt among investors. The closure of nationwide boundaries and limitations in movement has affected international supply chains, which has also triggered the stock markets into impulsive precariousness” [6].

2.2 Empirical Review

COVID-19 and the performance of Nairobi securities exchange: Using a simple regression model, Nuhu [2] examined “the effects of the COVID-19 on the financial markets in China and the USA from March 1 through March 25, 2020.

The study used COVID - 19 Statistics Reports and Trading Economics for China and the USA. The Shanghai Stock Exchange was used as a sample for China in the study, and the New York Dow Jones was used as a sample for the USA. The study's independent variables in China and the United States, respectively, were the number of COVID-19 confirmed cases while Shanghai Stock Exchange and New York Dow Jones were independent variables of the study in China and USA respectively. The results of the study showed a substantial positive correlation between the COVID - 19 and confirmed cases”.

The Shanghai Composite Stock Index (for China), the Euronext 100 (for the EU), the Dow Jones Industrial Average, and the S&P 500 were the four stock indexes that Ngwakwe [6] used differential analysis to evaluate the impact of the COVID-19 Pandemic. A fifty-day period before and during the COVID-19 epidemic saw the collection of stock market index data for these four stock indices. The analysis's results showed a substantial impact of the COVID-19 pandemic on the Shanghai Composite Index and the Dow Jones Industrial Average when using the t-test of difference in mean stock values. With a notable increase in stock prices over the first fifty days of the epidemic, the Shanghai Composite Index demonstrated resistance to the COVID-19 pandemic. Contrarily, the COVID-19 pandemic had a negative influence on the Dow Jones Industrial Average, which saw a sizable decline in the index's stock market value during the first fifty days of the epidemic. Even though there was no statistically significant difference in stock prices between the Euronext 100 and the S&P 500 during the COVID-19 pandemic, their respective mean stock index values showed a fall in value over the sample period of the first fifty days of the epidemic. Additionally, Ngwakwe's research revealed that the stock value volatility during the period from 2007 to 2009 was higher for all four stock market indices.

By offering a straightforward yet creative statistical study of the COVID-19 pandemic's impact on stock market risk, Dayong, Min, and Qiang [7] investigated financial markets in the context of the global COVID-19 pandemic. The virus had a huge impact on thousands of lives and presented many difficulties for nations around the world. The financial markets have experienced unprecedentedly extreme activity. Dayong et al. [7] found that as a result of the pandemic, the risks associated with the global financial markets have significantly increased.

The magnitude of the eruption in each country was clearly correlated with different responses on the securities markets. The pandemic's high level of uncertainty and the resulting economic losses have made markets very volatile and unpredictable. They placed a focus on the need for policy responses to contain the virus and stabilize the stock markets, but they also made note that unconventional policy responses, like the US's unlimited QE, would increase uncertainty and have long-term consequences. As markets in the country group that was analyzed reacted differentially to national-level measures and the overall progression of the epidemic, their findings further suggested that countries were not cooperating to address the issues. In the end, the virus is less of a threat than the potential for the global community to fall apart.

Using daily average temperature (hourly data), daily new confirmed cases of COVID-19 in Wuhan, and RMB (Chinese currency) exchange rate to represent the weather, COVID-19 outbreak, and the Chinese economy, respectively, Najaf, Zeeshan, Farrukh, Xin, Umer, and Ma [8] documented the relationship between weather, COVID-19 outbreak in Wuhan, and the Chinese economy. The daily data gathered from 21 January 2020 to 31 March 2020 was analyzed using the Wavelet Transform Coherence (WTC), Partial Wavelet Coherence (PWC), and Multiple Wavelet Coherence (MWC) methodologies. The outcomes showed a sizable degree of coherence between the series recorded at various time-frequency combinations. The overall findings indicated that raising the temperature will not significantly stop or slow down the spread of new COVID-19 infections. A negative but contained impact of the COVID-19 outbreak in Wuhan on the Chinese export sector was indicated by the RMB exchange rate and the COVID-19 showing an out of phase coherence at specified time-frequency points. The findings of Najaf et al. [8] were at odds with the findings of other earlier research that indicated that temperature played a key impact in reducing the spread of COVID-19. Their findings have significant policy ramifications for controlling the spread of COVID-19 and macroeconomic management of weather-related changes.

Indrajit, Atul, and Rupam [9] used secondary data over a 48-day period to examine the impact of the novel coronavirus 2019 and the disease it causes, COVID-19, on India's stock market

performance and foreign exchange rates. By attempting to account for any potential temporal variations using Vector Auto Regressive (VAR) models, the study investigated whether the causal relationships and directions among the growth rate of confirmed cases, exchange rate, and SENSEX value were the same across different pre and post-lockdown phases. The growth rate of confirmed instances was shown to be positively correlated with the growth rate of the exchange rate and negatively correlated with the growth rate of the SENSEX value. The results of applying a VAR model showed that the values of the exchange rate and SENSEX index did not significantly alter as the number of confirmed COVID-19 instances increased. When study was divided into different time periods, such as before lockdown, the initial phase of lockdown, and the extension of lockdown, the outcome changed. The numeric results showed considerable changes over time in the relationship between the variables of interest, according to thorough and useful explanations. The policy makers and investors in India may benefit from having extensive knowledge of the various patterns of reliance as they construct their strategies for dealing with the problem.

3. METHODOLOGY

Time series secondary data for the reported number of infected cases for COVID-19, weather changes and stock index was collected from our World in Data, CBK weekly statistical bulletin and AccuWeather Inc. respectively. Daily data for 5 months; 154 days since the period 13th March 2020 to 14 August 2020 was utilized. Weather changes in Kenya as measured by average temperatures in degrees centigrade are taken as control variable influencing both the dependent and independent variable. A linear regression analysis estimation model was employed to analyse data. The following econometric model was employed:

$$SI_t = \beta_0 + \beta_1 COV_t + \beta_2 WTC_t + \varepsilon_t$$

Where:

SI_t = NASI/ Nairobi all share index
 β_0 = Intercept
 COV_t = COVID-19 daily new cases
 WTC_t = Weather changes as measured by Temperature in degrees Centigrades
 ε_t = Error term
 β_1, β_2 = Beta coefficients

4. RESULTS

4.1 Descriptive Statistics

According to Table 1's descriptive statistics, the average for NASI, Covid-19 daily cases, and weather fluctuations were 135.778, 186.71 and 19.66 respectively. The variations from the mean are also moderate as illustrated by the standard deviation of 4.86, 234.38 and 1.5975 for NASI, Covid-19 daily cases and weather changes respectively.

4.2 Correlations

Covid-19 daily cases and weather variations exhibited a statistically significant link with Nairobi All Share Index (NASI), according to the correlation data shown in Table 2 with P- values of 0.000 for Covid-19 daily cases while weather changes had a P- value of 0.004 which are less than 0.05 with coefficients of -0.329 and -0.216 respectively. The results implied that the performance of Nairobi Securities Exchange as measured by NASI decreases when the Covid-19 daily cases increases by one.

4.3 Model Summary Results

Table 3 results showed that Covid-19 daily cases and weather changes collectively explained the performance of Nairobi Securities Exchange as measured by NASI as exhibited by an R-squared of 32.0%. These findings revealed that other factors account for 68% of the performance of Nairobi Securities Exchange.

4.4 Analysis of Variance Results

The results in Table 4 of analysis of variance exhibited that there was a statistically significant difference between Covid-19 daily cases and NASI in Kenya as indicated by $(F(2, 151) = 35.449)$, with a P- value of 0.000 which is less than 0.05.

4.5 Multiple Regression Model Results

As shown by a P-value of 0.000, which is less than 0.05, the findings of the multiple regression model in Table 5 indicated that Covid-19 daily cases had had a negative and statistically significant impact on the performance of the Nairobi Securities Exchange as measured by NASI. The findings suggested that Covid-19 daily cases do have an impact on the Nairobi Securities Exchange Market's performance as evaluated by NASI in Kenya. A P-value of 0.000, which is less than 0.05, which indicated that weather changes affected the performance of Nairobi Securities Exchange.

Table 1. Descriptive statistics

	Mean	Std. deviation	N
NASI	135.7776	4.86783	154
Covid-19 daily cases	186.714	234.3795	154
Weather changes	19.662	1.5975	154

Table 2. Correlations

		NASI	Covid-19 daily cases	Weather changes
Pearson Correlation	NASI	1.000	-.329	-.216
	Covid-19 daily cases	-.329	1.000	-.530
	Weather changes	-.216	-.530	1.000
Sig. (1-tailed)	NASI	.	.000	.004
	Covid-19 daily cases	.000	.	.000
	Weather changes	.004	.000	.
N	NASI	154	154	154
	Covid-19 daily cases	154	154	154
	Weather changes	154	154	154

Table 3. Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate	Change statistics				
					R square change	F change	df1	df2	Sig. F change
1	.565 ^a	.320	.310	4.04207	.320	35.449	2	151	.000

a. Predictors: (Constant), Weather changes, Covid-19 daily cases

Table 4. ANOVA^a

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	1158.360	2	579.180	35.449	.000 ^b
	Residual	2467.092	151	16.338		
	Total	3625.452	153			

a. Dependent Variable: NASI

b. Predictors: (Constant), Weather changes, Covid-19 daily cases

Table 5. Coefficients^a of determination

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations
		B	Std. error	Beta			Lower bound	Upper bound	Zero-order
1	(Constant)	170.644	4.923		34.662	.000	160.917	180.371	
	Covid-19 daily cases	-.013	.002	-.616	-7.784	.000	-.016	-.010	-.329
	Weather changes	-1.652	.241	-.542	-6.848	.000	-2.128	-1.175	-.216

a. Dependent Variable: NASI

5. DISCUSSION

According to the results of the multiple regression model in Table 5, the Covid-19 daily instances had a detrimental and statistically significant impact on the performance of the Nairobi Securities Exchange as determined by NASI. The findings back up Ngwakwe's study from 2020, which employed differential analysis to look at how the COVID-19 Pandemic affected a few major stock indices, including the Shanghai Composite Stock Index for China, the Euronext 100 for the EU, the Dow Jones Industrial Average, and the S&P 500 for the United States. A fifty-day period before and during the COVID-19 epidemic saw the collection of stock market index data for these four stock indices. The results of the analysis showed a substantial impact of COVID-19 pandemic on two stock prices when using the t-test of difference in mean stock values. With a notable increase in stock prices over the first fifty days of the epidemic, the Shanghai Composite Index demonstrated resistance to the COVID-19 pandemic. Contrarily, the COVID-19 pandemic had a negative influence on the Dow Jones Industrial Average, which saw a sizable decline in the index's stock market value during the first fifty days of the epidemic. Even though there was no statistically significant difference in stock prices between the Euronext 100 and the S&P 500 during the COVID-19 pandemic, their respective mean stock index values showed a fall in value over the sample period of the first fifty days of the epidemic. Additionally, Ngwakwe's research revealed that the stock value volatility during the period from 2007 to 2009 was higher for all four stock market indices.

The study's findings are likewise consistent with those of Nuhu [2], who used a straightforward regression model to evaluate the COVID-19's effects on the financial markets in China and the United States from March 1 through March 25, 2020. The study used time series data from the China COVID-19 Statistics Reports and Trading Economics for China and the USA. The Shanghai Stock Exchange was used as a sample for China in the study, and the New York Dow Jones was used as a sample for the USA. The study's findings indicated that there was a positive significant correlation between all of the financial markets (including the Shanghai Stock Exchange and the New York Dow Jones) from March 1 to March 25, 2020, in both China and the United States, indicating that COVID-19 had an effect on those markets during that time.

The performance of Nairobi Securities Market Exchange was negative and significantly affected by the outcomes of the weather variations. The results of this study are in line with those of Kang, Jiang, Lee, and Yoon's [10] investigation, which used a variety of weather variables to examine whether or not weather conditions had an impact on the returns on securities traded on the Shanghai Securities Market from January 1996 to December 2007. Exceptionally low temperature, excessive humidity, as well as extremely high and low sunshine all had a detrimental impact on stock returns for investors in the local securities market. Extremely high humidity, extreme low humidity and extreme high sunshine, extreme high temperature and extreme high humidity, and finally, extreme low humidity and extreme high sunshine all had a beneficial impact on the volatility of stock returns in respect to international investors. Their research revealed that various meteorological factors, which could affect securities returns and volatility, had an impact on investors. The findings from the study contradicted with the work of Wang, Shih & Jang [11] who studied the association between weather effects, investors' moods and stock market risk in Taiwan, Japan and Hong Kong. Three weather variables, namely temperature, humidity, and cloud cover were selected to test the influence of weather changes on returns and volatilities of the stock market [12]. Additionally, their study also investigated the market trends under weather effects. The empirical findings of the study indicated that the effect of the weather on the stock market was insignificant and could not be differentiated between market developments; nevertheless, the weather had an influence on the volatilities of the securities market.

6. CONCLUSION

Coronavirus pandemic epitomizes a terrifying and unusual risk, causing a pronounced challenge to investors, policy makers and individuals. The study is among the very few that have investigated the effect of Covid-19 daily cases on the performance of the securities exchange. The study applied linear regression analysis model to find out the effect of Covid-19 daily cases on the performance of securities exchange as measured by NASI. The study findings revealed that Covid-19 daily cases and weather changes had a negative and statistically significant effect on the performance of Nairobi securities exchange as measured by NASI. The results inferred that Covid-19 daily cases have

affected the performance of Nairobi Securities market since the announcement of the first Coronavirus case in Kenya.

The findings from this study are useful for policy implications as it provides guidance to policy makers to institute applicable policy reactions in line with the course of current coronavirus pandemic or during future pandemics of similar nature.

STUDY HIGHLIGHT

This study is one among the few that has looked into the novel effect of the COVID-19 pandemic on performance of listed securities in NSE.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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