AN INVESTIGATION INTO STOCK MARKET REACTION TO COVID-19 PANDEMIC: A CASE OF SHARES LISTED AT THE NAIROBI SECURITIES EXCHANGE

BY

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DECLARATION

I declare that this research proposal is my original work and has not been submitted to any other institution of higher learning for academic award

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LIST OF ABBREVIATIONS

COVID-19	Coronavirus Disease 2019
SARS	Severe Acute Respiratory Syndrome
UK	United Kingdom
NSE	Nairobi Securities Exchange
WHO	World Health Organisation
GDP	Gross Domestic Product
CARs	Cumulative Abnormal Returns
ECN	Electronic Communication Network
US	United States
USD	United States Dollar
MERS	Middle East Respiratory Syndrome
USA	United States of America
DJTA	Dow Jones Transportation Average
DJIA	Dow Jones Industrial Average
EMH	Efficient Market Hypothesis
BSE	Bombay Securities Exchange
ARCH	Autoregressive Conditional Heteroskedasticity
TGARCH	Threshold Autoregressive Conditional Heteroscedastic
WAEMU	West African Economic and Monetary Union's
CMA	Capital Market Authority
VIF	Variance Inflation Factor
ADF	Augmented Dickey–Fuller
ANOVA	Analysis of variance

ABSTRACT

COVID-19 began as a health emergency and rapidly deteriorated into an economic, financial, and social crisis. It has impacted every sector of the economy and has harmed the majority of the population in various aspects. The purpose of this study was to ascertain the stock market reaction to COVID-19 by examining companies listed in the Nairobi securities exchange. To accomplish the research objectives, the research concentrated on price reaction through the use of daily stock returns. The research was based on the EMH hypothesis, which states that an efficient market quickly absorbs and reacts to new information, it also considers the behavioural finance theory in the human reaction. The research employed an event-based technique. The event period was 61 trade days, including the event day, from 29th January to 27th April 2020, with the event day being 12th March 2020, the day the first case of COVID-19 in Kenya was confirmed. The research used the NSE 20-share index as the market return benchmark. According to the study's findings, the market reaction was negative following the incident, but there were positive abnormal returns in the days preceding the disclosure. As indicated by the negative cumulative returns that are statistically significant, it was established that COVID-19 had a detrimental effect on stock returns. The CAAR has a p-value of (.000), which is less than the 5% level of significance. The greatest influence was detected during the event period, which lasted several days before and after COVID-19. According to the study's conclusion, COVID-19 are extremely relevant information events that are followed by big negative anomalous returns. According to the data, share prices suffered a significant decline. This rebuts the EMH's claim that markets are inefficient. In practice, the findings show that when investors make investment decisions, they should consider elements other than economics. An investor makes an investment decision based on the available information. The information flow in the capital market is affected by the state of the environment, whether economic or otherwise. While the non-economic environment is not inextricably linked to capital market processes, it cannot be separated from them. Stock prices are affected by a variety of market events. These phenomena manifest themselves in a variety of ways. Although the COVID-19 pandemic is a onetime event that does not occur annually, a pandemic can hit at any time, causing havoc on the stock market. It is advised that businesses, shareholders, regulatory bodies, and governments work cooperatively during times of crisis to expedite the market's recovery.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The unique coronavirus (COVID-19) outbreak has had devastating effects at the macro and microeconomic levels. Although it started as a health crisis, it quickly became a financial and economic crisis due to globalisation and interconnectedness enabled by technology. The pandemic spread worldwide like a bush fire, unlike some pandemics like Ebola, SARS and Swine flu which were limited to some regions. The COVID-19 has ravaged various countries, both developed, developing and third world countries. Even the most advanced countries like the UK, Italy and the USA with dynamic and vibrant healthcare systems were overwhelmed by direct human suffering from illness and tragic loss of life. The virus disrupted lives and brought panic; at large, people feared they would perish. Such events have a behavioural impact on investors' savings, deposits, and investment options and likely impact the stock market. The pandemic continues to unfold globally and in Kenya, coming in waves with different severity levels threatening lives and livelihoods. The deadly virus has impacted the economies of various countries in an unprecedented level. In the United Kingdom, the Coronavirus has made investors, the public, and decision-makers realise that external uncertainties can cause economic damage, and the results are of an unknown magnitude (Dertli & Eryüzlu, 2020).

In order to adapt to the new world order, governments and businesses have had to rethink the new ways to carry out their activities to remain afloat. Some companies had to downsize due to projected uncertainties in the market, while some allowed their staff to work from home to enforce social distancing and reduce the spread of the virus. Business had to go back to business continuity plans to sustain business operations. The government of Kenya determined to cap the spread of the virus and the devastating effects, introduced various measures to ensure social distancing and reduce the spread. Such measures have an influence company's financial

performance. Financial performance impacts the stock's performance in terms of volume and price, thus impacting NSE. Company-specific related activities like financial performance, change of strategy, and the release of financial reports and declaration of dividends trigger stock market participants' response.

The damage that was caused by the emergence of the virus has caused a global economic recession worse than the 1930 recession (Huayu et al., 2020). (Huayu et al., 2020) state that companies especially the publicly listed companies are core to the economy and contribute significantly to the GDP of a country. Public health emergences have devastating effect on all sectors and since the companies operate in the same economy, they will feel the impact. They therefore find it crucial to evaluate the impact of such significant events on the impact on their performance.

Market reaction is reflected by the change in share prices, market indices, and the volume of traded securities. An occurrence will trigger investors to make a buy or sell decision, thus influencing trade volume. Information into the market classified as negative or positive depending on how the market reacts When the market receives favorable information, it responds by increasing stock prices, and vice versa (Zack et el., 2020) The research sought to determine the stock market reaction to COVID-19 of the firms listed in the NSE by use of stock returns.

1.1.1 COVID-19 in Kenya

COVID-19 emanated from Wuhan province a densely populated city in China. It was reported to the WHO office in China on 31/12/2019. The virus was highly contagious and spread very fast in various regions of China and to every corner of the world. The World Health Organization (WHO) classified the virus a public health emergency of worldwide concern on 30/01/2020, and a pandemic on 20/03/2020. The event day fir the study will be on 12/12/2020,

when the first case of the virus was diagnosed Nairobi, Kenya. The Kenyan government through Executive Order No. 2 of 2020 responded by establishing a central committee to coordinate and advise on the virus's emergence. the committee and the ministry of health resolved and directed Kenyans to take additional precautionary measures such as restricting the opening time of bars and restaurants, social distancing measures in public places, and corporations encouraged to allow employees to work from home and many more.

Companies and businesses reacted to the news of the COVID-19 by coming up with strategies to cab the spread the of the virus in the organisations and protect their human resource and come up with strategies to stay afloat due to expected decline of demand for their goods and services. Some reacted by laying off some of their employees, others working from home, while others especially in the hospitality industry closed down due to strict measure that made it impossible to operate profitably. On 25/03/2020, in response to the expected economic shocks, the president came up with various incentives to minimise the devastation. Some of the measures include adjustment on the PAYE graduated scale, an adjustment on the corporate tax from by five percent and two percent reduction on VAT.

The world bank report number 154560, published 21/11/2020, titled Kenya economic update navigating the pandemic indicates that the economy was severely affected by the various actions announced by the government that were aimed at curbing the spread of the virus and its devastating effects. The report noted that restriction of movement reduced economic activities while measures such as the close of bars and restaurants caused a shutdown of the hotel industry leading to loss of jobs and income. On the other hand, restricted international travel affected the tourism industry, which is a key foreign earner. The report further states the country’s (GDP) contracted by 0.4% in the first half of 2020 in comparison with 5.4% growth per cent in the first half of the year in 2019. A decline in the country's GDP can be attributed

to the decline in the performance of various sectors in which these companies operate. In this line, the research focused on the response of the NSE market to COVID-19.

1.1.2 Stock Market Reaction to Information

A stock market is a medium that brings together investors and businesses seeking funding for their operations. Stockbrokers sell these various securities with any aim of making a commission (Njanike et al., 2009). It provides an opportunity for corporations and governments to sell shares and fixed income securities. Investors purchase shares with an expectation of yield in dividends and as well as capital gains by selling their shares when the rise in value. Markets are a product of information affecting the companies and the economy. Investors buy stocks in the stock exchange to maximise their wealth through higher returns. The main aim of the managers is to maximise the shareholders wealth. However, from time to time the objective of the business is threatened by external factors such as COVID-19 which causes stock volatility.

Financial volatility can be driven by change in economic factors, institutional concerns, and market uncertainty (Hartwell, 2018). Financial turmoil is also caused by disclosures about macroeconomic difficulties (Agrawal et al., 2010). Stock prices are affected by a range of information, including company performance, declaration of dividends, the gross domestic product of the country they operate in, foreign exchange rates, lending rates and money supply, and employment rates (Kurihara, 2006). The price of stocks and market indexes will vary as a result of the information being absorbed. Stock prices, according to (Vincent & Bamiro, 2013), represent all available information, and the faster they absorb new information, the more efficient the stock market is at allocating resources. (Vincent & Bamiro, 2013) agree that variations cause stock price uncertainty and make stock price forecast difficult.

External events that are not market-related can disrupt economic trends and impact the stock market. For example, In Kenya, during the 2007 elections leading to 2007/2008 post-election violence, which significantly impacted the economy, the NSE main index share dropped by 35 per cent. The mean performance of abnormal returns was lowest in the 2007 elections compared to the 2013 and 2002 elections (Menge, 2013). (Menge, 2013) noted that actual returns exhibit a low return of actual stocks in 2007 and a relatively high performance in 2013, This is because in 2007 the country experienced a prolonged post-election violence illustrating that uncertainties result in low stock market performance while good news leads to better results. Stock markets reacted more quickly and strongly in countries hit by the 2003 SARS outbreak, whereas (Gerding et al., 2020) observed that stock price fluctuations were sharper in countries with a higher debt-to-GDP ratio.

1.1.3 COVID-19 and Market Reaction

Several studies have been undertaken on the impact and reaction to external information on the stock market. The majority of the research has concentrated on macroeconomic indicators, technical aspects, and market attitudes. Despite the fact that COVID-19 is still relatively young, some studies have sought to examine market reaction to COVID-19. (Huo & Qiu, 2020) examine the market response to the COVID-19 outbreak and lockdown announcement during Chinese New Year. They concentrate on cumulative abnormal returns (CARs) in a variety of industries. According to their findings, 22 out of 28 industries had detrimental CARs during the COVID-19 pandemic. The tourism are travel sectors were the hardest hit. The pharmaceutical and biotechnology industries, on the other hand, have the most substantial positive CARs as a result of increasing demand for health-related items, notably those used to treat COVID-19.

USA was among the most hit countries with COVID-19 recording very high positive cases and the exponential number of deaths. It is observed that the virus negatively impacted their Stock market volatility and exacerbated more than any previous infectious disease outbreak since 1900, including the Spanish Flu (Baker et al., 2020). One of the most devastating financial crises was the 2008 global financial crisis. However, on levels of market devastation, the COVID-19 is observed to be the most catastrophic. High levels of market volatility are observed resulting from the severity and speed of the spread of the virus, ease of access to information due to technological advancement compared to previous years like the 1929 and 1987 market crashes. Similarly, (Baldwin, 2020) discovered that the virus's transmission and containment efforts had a substantial influence on supply chains and supply of labour, resulting in lower output and consumption, which, in turn, led to stock market instability due to low demand and reduced cashflows.

In the early phases of COVID-19, there was a dramatic drop in stock prices and the number of equities traded in the stock market. By March 23, the S&P 500 index had fallen by 66 per cent (Irish &Yi Wen). Manufacturing, energy, and financial institutions were determined to be the most seriously hit industries, while healthcare and consumer staples fared quite well. Overall, (Ramelli & Wagner, 2020) showed that although the pandemic was a health crisis it quickly transformed into an economic crisis resulting to financial distress of various economies and economic entities. They are particularly interested in the effects of social distancing policies on productivity and equity market indices. According to the findings, the implementation of lockdowns and a ban on international travel had a major influence on output levels and stock market prices; however, restriction on domestic travel and higher fiscal policy spending had a positive impact on productivity. The rise confirmed coronavirus infections, on the other hand, had no discernible effect on the level of productivity.

Yan et al. (2020) investigated the potential effects of COVID-19 on the stock market and proposed some strategies for profiting from a market impacted by the global virus outbreak. The authors investigated previous outbreaks and concluded that, while markets frequently react negatively to such incidents in the short term, the market will eventually correct itself in the long run. Based on their findings, the authors advised investors to buy and sell stocks in industries that will be directly affected by the virus within a short period of time.

1.1.4 Nairobi Securities Exchange

The NSE was established in 1953 when Kenya was still under colonial power. It was listed as a branch of the London Stock Exchange. It has undergone metamorphosis just like many businesses due to the ever-changing business landscape and technology. For example, in the 50s, prices were negotiated while presently the shares are traded on the electronic communication network (ECN). The settlement of the traded shares in the capital market was automated in 2004 when the central depository was commissioned. In 2011, it changed its name from Nairobi stock exchange to Nairobi securities exchange in order to expand into a comprehensive securities exchange that enables listing, debt instruments and handling derivatives. The primary role of the NSE is to provide an avenue for investors and entrepreneurs. These investors can buy ownership in firms by purchasing shares while business owners can raise cost-effective capital from the sale of shares. NSE is regulated by the Capital Markets Authority of Kenya. It has categorized the listed companies into thirteen industries.

Like any other sector, the stock market reacted to the news of the COVID-19. The virus impacted companies listed in the securities due to disruption of the economy and implementation of the containment measures. Close to 14 companies issued profit warnings by December 2020, which painted a gloomy picture of the businesses in the year 2020. COVID-19 led to high volatility of the country's stock market impacting the economy negatively. When the NSE 20 index fell more than five percent due to panic in the initial stages of the virus of

the virus in the country, trading was stopped. By the end of the trading session on 09/06/2020, the NSE exchange had fallen even more, with the NSE 20 share index losing more than 25 per cent year to date. Due to market instability, most investors preferred to sell the portfolio and invest in less risky ventures such as government bonds.

According to Irungu (2020), 90 per cent of the stocks listed on the NSE fell on March 13/03/2020, when the first incidence was announced in 12/03/2020 Kenya. East African Cables and Sanlam Insurance accounted for the highest drop that day at 10 per cent. She also discovers that as the stock market falls, the Kenya shilling falls in value versus the (US) dollar. As the domestic currency falls in value, investors, especially foreigners lose confidence, liquidate their holdings, and shift their investments elsewhere.

1.2 Research Problem

A stock price is an integral part of the valuation of companies. Normally share prices are driven by the market demand and supply at a given point in time. Fundamentally, the share price is driven by the company's earnings and due to the company's activities and profitability. Most investors look at various financial ratios before investing in the various shares. These ratios such as the dividend yield ratio incorporates share prices and end of period dividend. Quantitative analysis involves analysis of charts that depict the movement of share prices for specific period. On March 13th 2020, when the first case was reported in Kenya, there was a massive drop in the NSE 20 index. The huge impact in the stock exchange resulted from foreign investors who opted to dispose significant part of their investments in at the NSE due to the panic of market collapse (Karungu et al., 2020). Since the pandemic, most participants in the NSE have preferred to sell their portfolio with a preference to risk free markets such as mostly government securities due to turbulence of the stock market (Gladys et al. 2020).

An assessment carried by out by Deloitte firm on the economic effect of the Pandemic on East African countries indicates that were severally affected on their performance. It further indicates that hotel and tourism industry were the most hit as hospitality was affected by to restriction of movement locally and internationally. As a result, most hotels and travel and tours firms closed shop during COVID-19. The manufacturing industry had a mixed impact, with some receiving a boost due to manufacturing essential items such as masks, protective gear, and hospital beds. In contrast, some industries experienced a slump due to changes in preferences and a decline in demand, focusing on essentials. In addition, many companies have seen their share price deep due to the psychological effect of uncertainties on investors.

Several studies have been undertaken to assess the effect of the pandemic on the stock market in specific countries and regions. For example (Ashraf 2020 and Baker et al., 2020) In their studies, they all found out that stock prices were severely affected by the COVID-19. Shareholders suffered from losses resulting from falling stock prices. Most of these studies focused on the event day when the first case the virus was reported in their countries. However, some studies have used the first reported death case as the event day. The reaction and impact have been on price changes, and stock return. Some have also tried to compare the reaction of the prices and the volume traded especially studies looking at the performance and the impact.

In the US (Hui et al. 2021) establish that COVID-19 increased volatility of the price of S&P 500 and reduced the predictability of the returns. However, on the other hand high volatility and market inefficiency provided an opportunity for some investors to create profits. Emergency of COVID-19, saw U.S markets dip and almost led to a near market crash. Most investors disposed their portfolio including members of the senate. (Yousfi et al., 2021) Comparative examinations of the first and second waves of the pandemic and their implications on the US stock market reveal that the first wave had a higher negative impact compared to the second wave. The outbreak heightened stock market uncertainty leading to increased volatility.

Most research on COVID-19 shows that it had a negative influence on the stock market. Observations indicate a sharp fall in prices. However, it is interesting that some findings such as (Cookson et al., 2020.) differ from the assertion. The findings showed that the financial markets in China remained steady despite the effects of the pandemic compared to foreign markets. (Sansa, 2021) supported (Xin Hua 2020) that financial markets in China remained stable regardless of the COVID-19 pandemic. (McKibbin & Fernando 2020), who in the report indicate that the movement in the financial market index due to COVID-19 especially the stock market, showed that ability of the of the shareholder and not the general impact of the pandemic would affect a specific industry and not the stock market as a block It is apparent that there are conflicting conclusions on the stock market as a result of COVID-19. Therefore, this research sought to determine if the firms listed the NSE exhibited a reaction after the first case was reported using the daily stock returns calculated from the change in share prices.

Prior to COVID-19, there were a few pandemics that have been experienced. In the 20th century, two pandemics were experienced. The 21st century has been plagued with few pandemics such as MERS in Asia in 2012, Ebola in 2013 in central and west Africa, bird flu in 2009 and SARS in 2002 (Baldwin. & Mauro., 2020). However, these pandemics were not as widespread and severe as COVID-19. There has been little research into the influence of these pandemics on the stock market. While many studies on COVID-19 on the stock market have been carried out, most of them have been on USA and China a few countries in Europe. It is therefore important to research the reaction of the stock market in Kenya. This research will focus on the stock market reaction by studying shares prices, market index figures and volume of trade under the period of study and after reporting the first COVID-19 case in Kenya.

The pandemic spread all over the world and the devastations are evident. In one way or another it has affected all of us by being infected by the disease or affected by suffering of family and friends who lost their loved ones. Many people have fallen sick, leading the

to struggle with an influx of patients. Governments enforced social distancing measures and lockdowns to contain the rapid spread of the virus. Many companies reduced their activity levels due to reduced consumption and uptake of services while laid off their employees due to shrinkage of revenues. Due to uncertainties and surrounding the business environment, most companies had their budgets and adjust growth expectations.

COVID-19 triggered behavioural aspect due psychological effects on the investors. Because investors' risk aversion increases when an economic crisis occurs, health risk quickly transfers into economic and financial risk (Cohn et al. 2015). The US financial crisis of 2008 crashed several stock markets. Financial risks and economic crisis do impact the stock market negatively. Al-Awadhi et al., (2020) in their study proof that COVID-19 had a negative influence on the Chinese stock market performance. This research therefore sought to study the market reaction of the stock market using daily closing stock prices to calculate the daily stock returns and abnormal stock returns. The Cumulative abnormal returns and Cumulative average abnormal returns were tested using the t-statistical method will be to assess the value at a confidence interval of 95 percent.

In Kenya, Mbithi, (2020) in his research to determine the impact of COVID-19 on the stock performance, he establishes that COVID-19 had a negative impact on the stock performance. He used a multiple regression approach in order to determine the performance for a period of 90 days after the first case was reported in Kenya. This research used an event methodology to determine the reaction. The event period was for 61 days, 30 trading days estimation period before the vent day on the event day 12/03/ 2021 being and 30 trading days after the event day the observation. Given the first case in Kenya was reported in much long after the COVID-19 had already ravaged most countries in the world meaning the information from outside the world had already been absorbed in the market. The 2007/08 post-election is the closest market and economic disrupter close to the COVID-19 panic. On the first day of trading in 2008, the

Nairobi Security Exchange reported a loss of USD 591 million. Menge, (2013) determines that the stock performance was lowest in 2007 in his study of the effect of elections on stock market returns at the NSE.

1.3 Research objectives

The objective of the study was to investigate the stock market reaction to COVID-19 in the NSE market

1.4 Value of the study

It is clear that the word had felt the impact of the health crisis of COVID-19. Various research conducted has also shown the stock market that too was affected by the ravages of the pandemic. The world has continued to be faced with pandemics such as the Spanish Flu in 1918, which killed an estimated 2 per cent of the world's population (Barro et al., 2020). In the last decade alone, we experienced Ebola in the central and west Africa. Others include Cholera in 2010 and Swine Flu in 2009. COVID-19 is the deadliest of them given the spread and impact and number of deaths. The investigation will provide an understanding to the stakeholders on the impact of COVID-19 on the stock market and possible future health crisis

Price volatility of shares affects the return of the market. A study on the price volatility during COVID-19 will benefit the various market participants as it will provide them with knowledge on price reaction due to information on the market. The research will educate them on how to take advantage of such moments and make money by buying and selling. Listed companies will also benefit from the research as it seeks to investigate the market's reaction to COVID-
19. The share price is an indicator of the financial performance of companies. It is used by investors when evaluating various investing options. Therefore, managers and the board will benefit from the investigation. It gives them an insight into the reaction of their listed stock on NSE. The board and management of the NSE will gain on the findings of the study.

COVID-19 has grabbed the interest of many academics, researchers and investors, and it continues to excite the interest of a diverse variety of scholars. This study adds to our understanding of COVID-19's impact on financial markets and pandemics in general. More importantly, the subject has gotten less attention in Africa. Understanding the influence of COVID-19 on financial markets can benefit finance students and lecturers. In order to have a better understanding of financial markets, researchers will refer to and even investigate similar concerns. It enables finance students to gain knowledge of the factors that drive financial markets. The research includes both theoretical and practical components.

The research contributes to existing theories such as EMH, which holds that the more accurate the information reaching the market, the more influence on the market (Zack et al., 2020). In particular, semi-strong for, that looks how publicly available information is fully reflected in the stock prices. the study also being an event study, will contribute to the study of various events and on their impact on the stock market. A better understanding on the EMH and how health crisis affects the market will be beneficial for future related incidents.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This part focused on previous research on the impact of COVID-19 and the financial markets response. It includes studies conducted in Kenya, Africa, and the rest of the world. It also covered literature assessment as well as existing theories on the stock market stock volatility and stock market response to information as well as factors known to cause stock volatility.

2.2 Theoretical Literature Review

The section concentrated on the existing theories that explain variability of the stock prices and performance. The study also investigates theories that explain investor psychology and the impact of information on the stock market. To fulfill the research aims, the study concentrated on Dow theory, Efficient Market Hypothesis and Behavioural Finance theory.

2.2.1 Dow Theory

Dow theory was developed by Charles Down 1900s. He had invested in various companies, a shareholder in having invested in multiple companies and a publisher of the wall street journal. It was then perfected by William Hamilton and conveyed by Robert Rhea. Dow came up with two trends Dow Jones Transportation Average (DJTA) and Dow Jones Industrial Average (DJIA), to explain the stock market prices trends. The Dow Theory is a tool of technical analysis to explain the bullish and bearish trend . Just like Behavioural finance, it is of the view that investors are irrational due to human emotions, and therefore, markets can become more predictable and follow given trends over time.

Dow explains that trends get influenced by trading volumes. In a bullish trend, volume rises as the price increases, while volume declines as the price falls. In a bearish trend, volume and price show a contrasting trend in which an increase in volume causes the price to fall and a drop in volume causes the stock price to rise. Dow Theory explains that asset

prices move in trends. A trend in the stock market is a consistent price change that leads to a general market direction over a prolonged period. In technical analysis, a successive rally or decline from a value surpasses or declines the previous value.

For this research, the Discounting of the averages tenet explains t hat daily price movements of the averages result from all information incorporated in the prices, be it the present information or future expected information, including the past digested information. Therefore, markets are a product of all information that affects the performance of companies in one way or another, the principle, however, excludes unforeseen information or otherwise referred to as "acts of God," such as natural calamities like earthquakes. Although markets cannot predict earthquakes and other natural calamities, they swiftly discount such happenings and absorb their impacts into price movement. This is the situation with COVID-19, which is an unexpected pandemic. However, the impact is reflected in stock prices, and the market quickly responded, as the health crisis developed into an economic and financial disaster.

2.2.2 Efficient Market Hypothesis (EMH)

Securities markets, according to the EMH, are highly accurate at reflecting information about individual firm stocks as well as the stock market. An efficient market reacts quickly to create a new market equilibrium that accurately represents the information supplied. The EMH theory further posits that all traders and investors are rational and have access to all information in all three forms. DeBondt & Thaler, (1995) contend that investors are prone to waves of optimism and pessimism, causing prices to vary persistently from their fundamental values and then demonstrate mean reversion

A market can be efficient in three forms depending on the information incorporated in the stock prices: According to Fama (1970) The EMH exists in three forms. An efficient market in the

weak form is concerned with on historical information of the stock price. The theory implies that past stock prices do not predict stock prices in the future. In the mid-strong form, the market reflects all relevant publicly available information, including profit warning and forecasting past stock prices, company fundamental data, audit reports, and change of management and directors. It includes all public information, such as COVID-19, fully reflected in the market price. This includes all public information reflected in the share that is relevant to the value of a share. Strong form pertains to access to privileged, commonly referred to as insider trading.

The COVID-19 has had an impact on many industries, beginning with the health sector and spreading to all various sectors in individual countries and globally. For this research, COVID-19 information is public information and thus lies in the semi-strong form category. Investors are expected to be aware of all information while making purchases or disposing off their portfolios in the stock market. The EMH anticipates that the market quickly absorbs all information and that the prices reflect all the information in the three forms. The news does not only cover financial events; it also covers political instability, and economic developments such as rate of unemployment. An efficient market considers how markets react to information as well as how asset prices are affected. As a result, it was in the best interests of the research to examine the market reaction to COVID-19.

2.2.3 Behavioural Finance Theory

Behavioural finance is a discipline that analyses the impact of human behaviour on decision making (Jaiswal & Kamil, 2012). The emphasis is on the impact of psychology on individual investor behaviour and its impact on financial markets. It explains and expands understanding of investors' reasoning patterns, including emotional processes when making financial decisions and how they influence the decision-making process (Ricciardi and Simon, 2000).

Most theories presume that market participants are rational and constantly seek to maximise return while minimising risk. Behavioural finance varies from this principle and explains that Individuals may not be concerned with rational elements like net present values, discounted future cash flows, or discounted risk, according to behavioural finance, which differs from this premise. According to studies, emotions, and prejudices obscure rational thinking, and this has an impact on the overall performance of one's investments. (Suresh, 2013)

Keynes dealt with financial instability, particularly in stock markets, in the 1930s due to the sociological and psychological forces that predominate in uncertain times. Keynes' psychological elements include an individual's incentive for consumption and savings, as well as the state of circumstances; either doom or hope affects the stock market. Keynes also noted sociological variables influencing investors, such as socially influenced customs that drive speculators to believe what others believe and do what others do in times of uncertainty. Baddeley, (2014) describe that investors are vulnerable to spectacular and unexpected information during a crisis (Dzielinski, 2011). An overabundance of inflow of information can impair logical decision-making (Agnew & Szykman, 2005).

Because the pandemic breakout constituted a health emergency, it created psychological pressure, which led to a drop-in stock values due to low demand since the future was uncertain. COVID-19, a highly transmissible and lethal disease, put a psychological strain on the global population. During a crisis, investor attitudes and opinions alter organically, emphasising return expectations to risk-aversion (Hoffmann et al., 2011). Naseem et al. (2021) analyses investor psychology and stock market behaviour during COVID-19. Their research employs principal component analysis to explore the Shanghai, Nikkei 225, and Dow Jones stock markets from 20/01/2020 to 27/04/2020. The findings lend support to behavioral finance theory. According to the findings, investor psychology is adversely related to stock market performance during times of psychological resilience and pandemic panic. Many deaths,

patients, and illnesses elicited dreadful sensations and a sense of impending doom; as a result, stock market gains were eroded due to decreased trading.

2.3 Factors Affecting Stock Volatility

The fluctuation of stock prices is expected and it signals market efficiency in stock markets. The problem arises when its effect on financial market efficiency is destructive due to excess volatility resulting in crashes and crises in financial markets. Various market factors, either economic factors or non-economic, do impact the stock market and the economy. Economic triggers and their responses affect stocks because companies listed in the stock market are core to the economy. To achieve the study's objective, consider factors that have influenced the market prices in the past, including economic factors, uncertain political conditions, financial performance, and the arrival of bad news in the market.

2.3.2 Macroeconomic Variables

The country's macroeconomic factors such as foreign exchange rates, lending rates, employment rates and the supply of money have a direct correlation between stock return and stock market volatility (Abugri, 2002). Stock markets operate in the economy thus economic performance affects the performance of the market. Companies listed in the NSE are core to economic performance due to their contribution taxes, employment and corporate social responsibilities variables such as CPI, lending rates, rate of inflation, foreign direct investment, and currency exchange are all indications of country's economic health. Companies listed in the NSE have a big influence on economic performance, that sometimes, stock prices are an indicator of economic performance. For example, inflation reduces consumer spending and savings due to increased prices of commodities, which reduces corporate performance and reduced profits due to reduced spending power Empirical studies and economic theories see stock prices and market indices as among the best indicators of changes in economic activity.

According to Musilek (1997), investors should be aware of macroeconomic aspects that influence the stock market.

According to Nishat (2004), CPI and foreign exchange rates are correlated with stock prices. Damani and Damani (2020) also find that numerous variables have a substantial correlation with the P 500 of the BSE. Atje and Jonanovic (1993) contended that stock market development, namely trading volume, is related to economic growth. Khan et al, (2012) in their evaluation concluding that interest rates and inflation rates have a significant impact on stock returns on the Karachi stock market.

2.3.4 Uncertain Political Conditions

Election cycles are usually a significant concern to most investors. Markets are sensitive to both global and local political events. They are turbulent and disruptive to various sections of the economy. Examining FDI, (Desbordes & Vicard 2009) contend that in the US the midterm elections in various states have a substantial impact on foreign investment. Ismail and Suhardjo, (2001) suggest that political event is a significant factor that affects financial markets. When compared to a chaotic and uncertain society, a tranquil and politically stable country improves its economic performance and attracts investment (Ismail & Suhardjo, 2001). In Kenya during the election year, there is usually reduced activity from direct foreign investments and reduced tourism activity, both domestic and international, which impact economic growth. During the 2007/2008 post-election, violence in Kenya that disrupted various sectors such as tourism, financial, and agricultural sectors negatively impacted the stock market. When the markets opened in January 2008, the Nairobi Stock Exchange plummeted by 277 points, representing a 5 per cent loss in value which was approximately USD 629M of total stock capital USD12 B at that point in time, indicating investor skepticism. Political risk, according to Beaulieu, Cosset, and Essaddam (2005), is crucial in making investment decisions. It resulted in the suspension of the twenty-share index which had been adversely affected. Political stability is

critical for long-term economic development, corporate financial performance, and the health of financial markets.

Political news is detrimental to the stock market in two ways. First, it inhibits company activity, which has a negative influence on cash flow and, as a result, devalues the share price. Secondly, because of the uncertainties, it has a detrimental impact on investor psychology, causing a loss of trust in the market process and thus drop in share prices (Paramin 2013). Local politics play a significant role in influencing stock price movements and building a portfolio, developing markets. Political events generate an opportunity set for earning an extra return, producing efficiency gains in the stock market, and diversifying one's portfolio.

2.3.3 Company's Financial Performance

Financial performance is a measure of a company's overall financial health over time. It is essentially how the corporation has utilised its resources to create profit for its owners. We measure financial performance using generally accepted accounting principles and international financial reporting standards. The company's utilization of resources to achieve its goals can affect share prices. Investors are always concerned about the financial performance of companies because of its effect on stock price growth and fall. This concept is supported by some research carried by Bourke et al., (2020) who showed that the company's financial performance has an impact of stock prices on the Indonesian stock exchange manufacturing companies.

In their study to determine the relationship between stock returns and firms' financial performance on the Bombay Stock Exchange, Natarajan, Sivakavitha, and Vasani (2020) established a connection between stock returns and financial performance. They did, however, discover a negligible positive association between stock performance and dividend payout ratio. According to the study, there is a clear relationship between stock returns and financial

performance; thus, an improvement in the financial performance of enterprises listed on the BSE raises stock returns. The study also reveals that stock prices and dividend payout have a positive relationship with stock returns, an increase in stock prices and dividend payout boosts stock returns of listed enterprises. Similarly, a company's dividend yield influences the stock market. According to Kay and Putten (2007), stock price volatility is tied to firm performance, which is reflected as a dividend payment.

Ross et al (2010) explored stock returns can be affected by information that is already reflected in the stock prices, this being past, present or future information. It depends on the level of awareness to the information that impacts the market; this is classified as the normal return. We also have the risk-return that arises from unexpected information revealed within the year for example, profit warning announcements and unforeseen activities that directly or indirectly influence the performance of companies.

2.3.5 Bad News

Financial markets operate within the economy, they are influenced by local and global events, especially if the information is negative. According to Aggarwal et al., (1999), both local and global events cause market swings. They find that the level of volatility is determined by the magnitude of the event and how the response of the market. If the information is devastating, markets can crash an example of the Mexican peso crisis, which was fueled by the decision of the government to devalue their currency against the dollar.

Goudarzi et al. (2011) use asymmetric ARCH models to analyze the global impact of the 2008-2009 US financial, which in this case was categorized as bad news. They investigate asymmetric volatility in the Indian stock market by employing the BSE500 stock index as a variable. It was revealed that the BSE500 returns series reacts differentially to good and bad news. Because stock prices and returns are inversely related, negative news has a greater influence on volatility than favourable news. They also point out that the US financial crisis,

which is considered bad news, resulted in a 60 per cent decrease in the index and a wipeout of about USD 1.3 trillion in market capitalization. The dip was ascribed to foreign investors selling portfolios worth USD 12 billion in two months, as well as psychological constraints on market participants (Kumar, 2009).

Ahmad et al. (2011) and Mahmood et al. (2014) investigated the influence of positive and negative information in financial markets. They add to the growing body of evidence that negative information has a significant impact on market volatility. Negative information includes political disturbances to the economy, such as political violence, particularly on the African continent, as well as financial crises and currency depreciation. Depending on the degree and state of the economy, these factors have various effects on stock market volatility.

2.4 Empirical Review

Various studies have been conducted on the market reaction of COVID-19, including one conducted in Indonesia by Zack et al., (2020) using customer goods sector companies listed on the Indonesian stock exchange that deals with essential goods. Their independent variable is the volume of daily stock prices, shares, and indices traded in the Indonesian stock market ninety days before COVID-19 was announced. During the earlier phases, when the fever was high, there was a lot of turbulence. The announcement regarding the COVID-19 sparked widespread panic, causing customers to sell their stakes while others attempted to buy. Despite the fact that COVID-19 is non-financial information, it has an impact on stock prices and trading volume. Customer goods sector companies were a good example because they produce goods that are necessary for human survival.

In China, Zhang et al. (2020), they use the TGARCH model to examine market volatility caused by the epidemic in China, the Netherlands, Sweden, the United Kingdom, and the United States. Their forecast period begins in 2015, and the event window runs from December

2019 through April 2020. Their goal was to determine the impact of COVID-19 news on the China Stock Exchange from other nations, as well as the impact of COVID-19 news on the stock as well as the news China on the of other countries. They remark that the stock market in China remained relatively stable in comparison to news from advanced countries; yet they observe that the spike in China influences volatility in the stock markets of Sweden, Switzerland, the Netherlands, and the United Kingdom. The impact of COVID-19 news from the Chinese stock market on the US stock market was minimal.

Using panel data, Awadhi et al. (2020) analyze if an outbreak affects stock market results. They discovered that in the Chinese stock market, the number of confirmed infections of the virus and COVID-19 mortality has a negative impact on stock returns. According to the findings of the studies on the influence on various sectors, stock returns of companies in the technology domain and those in manufacturing outperform market returns. Sectors hit hard by COVID-19 such as aviation industry, transport and tourism industry performed poorly. In a similar study but on the global scope, Chatjuthamard et al. (2020) investigate the effect of COVID-19 on the global stock market. They find that an increase in reported cases increases volatility, jumps and co-jumps for 43 stock indices while reducing return. It is also observed that COVID-19 has a severe impact compared other market determinants such financial crisis, economic slump and government policies.

Closer to home, some research has been done on African countries, for example, Takyi and Ennin (2021), to analyze the short-term impact of COVID-19 on stock market performance in a few selected African countries. They track stock prices from October 2019 through June 2020. Then, using a Bayesian structural time series technique, they examine stock prices from October 2019 to June 2020 to determine the relative effects of the COVID-19 pandemic on stock market performance. It was observed that stock market performance was dismal since the emergence of COVID-19. Their studies indicate that Mauritius was the most brutally hit of

the thirteen countries, with a 21 per cent loss. This is attributed to the high levels of offshore investments in Mauritius. Foreign Direct Investment, as demonstrated in numerous markets, has an influence impact on the success of various markets. Because of the COVID-19 panic, most foreigners sold their portfolios, resulting in poor returns. Botswana had the lowest negative performance of 2.7 per cent, while Uganda and South Africa were minimally affected. In their analysis, Kenya was found to have a 15percent negative performance, whereas our neighbour Tanzania had an 11 per cent negative performance.

In West Africa, (Zoungrana et al., 2020) employ the GARCH model to assess the impact of COVID-19 on firms listed on the West African Economic and Monetary Union's (WAEMU) stock exchange. They investigate two major event dates: the first, when the first case was reported in China on 23/01/2021, which the findings show had a low impact than the second, when the first instance of COVID-19 in the WAEMU generated substantial stock market volatility. They also conclude that the negative impact is substantial for the distribution sectors, with a negative impact of 34.16 percent. The study reveals that information about the number of deaths caused by COVID-19 has an influence on the market, whereas confirmed infection cases have no impact. Governance-related actions declared by the government and the obligation to maintain social distance have been found to have a favourable impact on stock returns. On the other hand, lockdowns in various cities and movement restrictions add to a drop in stock prices.

Individuals typically respond to information, causing stock markets to move in accordance with investor behaviour in their investment decisions (Irene et al., 2019). Their research looked at the impact of investor behavior on the stock market performance of Kenyan companies listed in the NSE. Some of the biases they looked at are herd behaviour and mental accounting that are observed during the period of the COVID-19 pandemic. Their findings (Irene et al., 2019) observe that herd behaviour had no meaningful effect on stock market reaction. However, loss

aversion, mental accounting, and overconfidence substantially impacted the Kenyan stock market reaction

2.5 Summary of Literature Review

Although COVID-19 is a relatively new issue, various studies have been conducted to understand the stock market reaction to the pandemic. However, much study has concentrated on developed countries such as China and the US. Among the studies are (Awadhi et al. 2020) and (Zhang et al. 2020), which discover a link between COVID-19 and stock market performance. Surprisingly, certain research in China, such as (Cookson et al., 2020), discovered that the stock market remained stable and healthy despite the devastating consequences on the economy. Some study also identifies mixed reactions to stock market performance in various industries (Awadhi et al. 2020). Companies that provide services, such as tourism, were significantly impacted, and their stock prices suffered as a result. Sector wise most companies providing essential services are observed to have positive results while companies that are in the transport industry had a sharp decline on the performance. One key element that is seen to influence the stock prices and the volume traded is the withdrawal by the foreign investors.

In Africa however it was the last continent to feel the full impact of the pandemic studies have shown that its economy and the stock markets were affected. However, Mbithi (2020) finds that COVID-19 had a negative impact on the NSE. This is further supported by, (Takyi & Ennin 2021), who found that the NSE market had a negative impact of 15%. In overall the studied African countries a negative with the highest being 21% while the lowest had 2.7% while a few of the countries did not have any impact. This research will focus on daily shared prices market indices and the trade volume.

2.5 Conceptual Framework

This section of the study gives a pictorial representation of the dependent and independent variables. The dependent variable is stock market reaction to COVID-19 while independent variables are daily closing share prices, market index figures and trade volume. Logs of trade volume was used as control variable. The research used the share prices during the estimation period to calculate the stock returns which were used in the estimation of the market model. The reaction was observed 30 days after the 1st case was reported in Kenya.

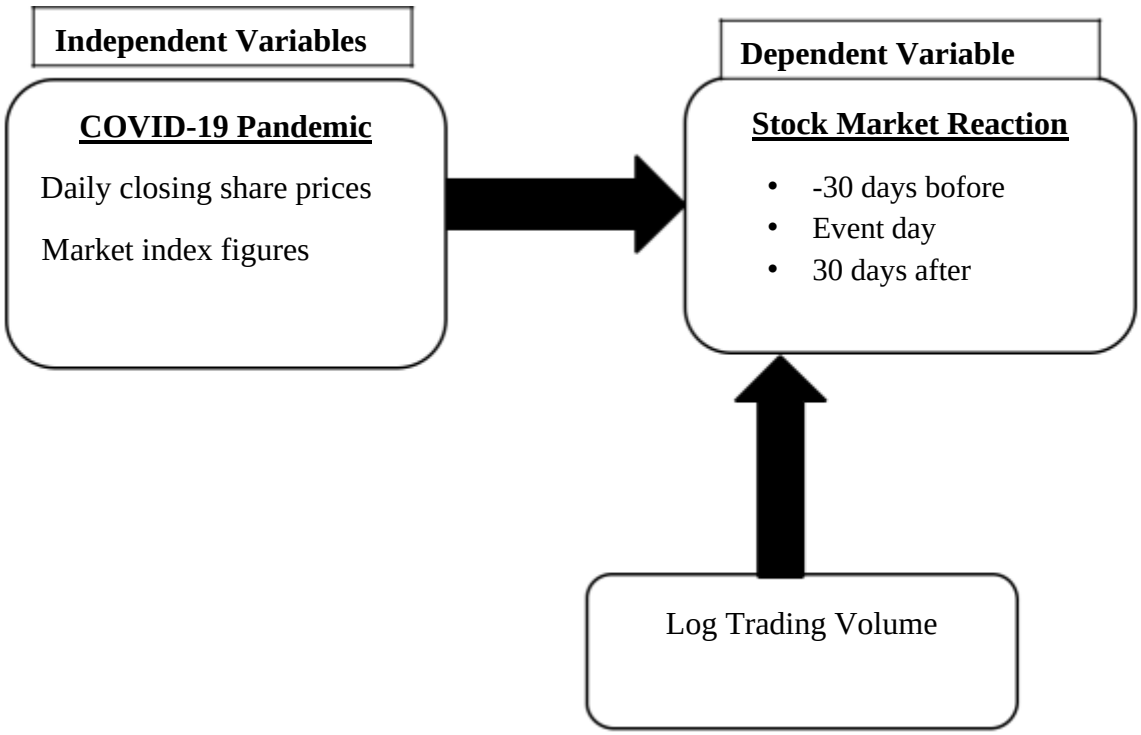


Figure 1: Conceptual Model

Source: Data, 2021

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methods and procedures that that were followed to attain the set objectives. It entails the design to be employed to conduct the research and the target population used. The section also discloses data collection methods and diagnostic tests to be adopted to achieve the reliability of the study. The chapter provides data analysis techniques to that were used and how significance levels was assessed.

3.2 Research Design

Research designs entail the plan and framework to which research is conducted. It is a blueprint used by researchers to solve research questions objectively and accurately with minimum costs as possible (Flick, 2018). The research design aim to establish the aptitude of the investigation by hypothesizing an operative strategy in order to be able to disseminate on the various techniques available and required tasks for completing a research while at the same time ensuring that the procedures used are satisfactory acquire objective, accurate and detailed responses to the variables of the study (Honghui, 2017). This study will adopt event methodology to determine how stock market reacted to COVID-19 pandemic (Dolley, 1993; Fama, 1969). The study was grounded on Efficient Market Hypothesis. Investigation regarding the effect of stock returns, majorly assess the impact of COVID-19 on stock market reaction. The announcement of COVID-19 endemic is classified as an event hence event methodology is appropriate. The financial markets are required and projected to use available information to predict the results of a certain event (Mackinlay, 1977). In assessing the impact COVID-19 endemic to reaction of the stock market, the event study majorly examines variations in stock prices, trade volumes in days prior to the event and in days after the event.

The event window is the announcement period of the occurring event. The event window is combined with the announcement day and the days before and after the announcements. The estimation time for the variables is an estimation window. Abnormal returns, which are given by return during the event window minus normal returns, usually show whether the market has anticipated data about the pandemic. The event date can be expressed as T_0. The event window was 30 days before and after announcements. This can be expressed as -30 to +30. The estimation period was the period before the occurrence of the even while the observation period was days after the event day. Therefore, the approach clearly indicates the impact of COVID-19 on reaction of stock market.

3.3 Population

The study population entail an entire set of elements from which the research intends to draw an inference (King et al, 2018). On the other hand, Miller (2014) described population as a sum of units of elements from which the study intends to draw a conclusion. It entails a set of objects or individuals with similar observable characteristics (Mugenda and Mugenda, 2013). The study will target all 65 listed firms at Nairobi Securities Exchange (NSE). This will include the 12 segment Nairobi Securities Exchange (NSE) sector categorization that is manufacturing, real estate investment trust, investment, allied, telecommunication and technology, construction and allied, agriculture, banking, commercial and services, automobile and accessories, insurance, investment services. The study used a census approach where all the 65 firms were covered (Mutua, 2019).

3.4 Data Collection

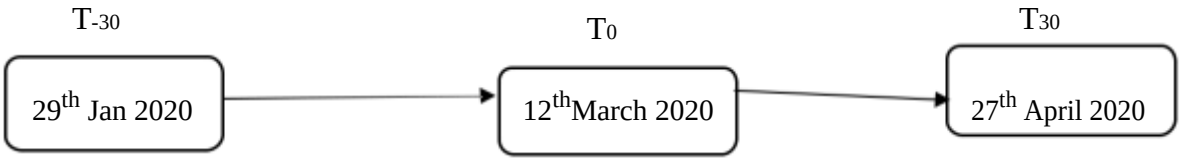
Secondary sources of information were be adopted. All the firms listed at NSE are required by the law of Kenya to publish their reports with the Capital Markets Authority (CMA). The data to be captured will include announcement date of COVID-19 pandemic in Kenya, market index

figures, daily closing share prices for 61day period; 30 days preceding event window, the announcement period, that is 13th December 2019 and 90-day post announcement of COVID-19 pandemic 12th March 2020, the observation period for the reaction will be 30 trading days after the event day to 27th April 2020. The daily share prices and trade volume were obtained from the NSE. For the purpose of the market model and accuracy of the coefficients the data for estimation was collected for actual 90 days before the event day.

3.5 Data Analysis

According to Tully (2014), data analysis encompasses statistical procedures conducted to demonstrate and indicate linkages in various variables under investigation. It comprises the procedures in which conclusions are generated in a logical and objective way from the gathered data. The study adopted event methodology to draw its inferences. The Event Study Standard Model will be used to accomplish the goal of this study. This study used 61 days as the event window. The statistical procedures were conducted to compute the abnormal reaction of the stock market. Daily data on stock market reaction was collected and analyzed to calculate the cumulative abnormal returns.

27th April 2020



3.6.1 Analytical Model

According to Fama (1970), the appropriate model used for estimating normal reaction of stock is expressed as:

Step 1: Calculation of Stock Price's expected reaction

The sampled shares anticipated daily returns (Rit) are computed as:

$R_{i,t} = (P_{I,t} - P_{i,t-1}) / P_{i,t-1}$ ……..**Equation 3.1:**

Where: where

Pi,t, - Share price if stock on day t

Pi,t-1- Share price on previous trading day t

Step II: Normal reaction

The normal stock market reaction is computed using the standard market model as indicated below:

$R_{it} = a_i +, \beta_i Rm_t + u_{it}$……. **Equation 3.2**

Where:

Rit= the rate of returns in terms of security I in period t

Rmt= the rate of return in market index in period t

Ai=is the constant in the regression equation

Bi=is the slope of regression equation (beta value of security)

u_{it}= is the disturbance term

Step III: Abnormal reaction calculation:

The abnormal reaction of the stock market is determined by the using the method of constant mean return. Abnormal reaction is the difference for each share in the event window between actual returns and estimated normal reaction. This comprise of the unexpected components of the returns, which can be defined as error terms in the econometric model. Error terms denote

deviation in the dependent variable, which is unknown and not produced in the dependent variation. Abnormal reaction is computed as indicate below:

$AR_{it}=R_{it}-NR_{it}$……**Equation 3.3:**

Where:

AR_{it}=is the Abnormal Return of stock I in time t,

R_{it}=is the Actual Return of Stock i in time t,

NR_{it}=is the Normal Return of stock I in time t

Step IV: Average Abnormal Reaction t, AAR_t estimation

This is computed to determine the effect of the overall sample. The average abnormal reaction (AARs) are estimated as shown during the event period (-30 to +30):

$AAR_t=1/N\sum$ = …… **Equation 3.4**

Where:

AAR_t= is the Average abnormal reaction on stock at time t

AR_{it}= is the abnormal Reaction of stock i in time t,

N= is the Number of securities in the sample

Step V: Cumulative Abnormal Reaction (CAAR) Computation

The cumulative average abnormal reactions (CAAR) will be calculated for the event (COVID-19 pandemic). This will be attained first by calculating for each variable the cumulative abnormal yield (CAR) and then finding the average CARs for each day. The formula for CAR and CAAR for each variable is indicated below:

$CAR_t=Ari,t1-$……+Ari, $t2=\sum$ ……**Equation 3.5:**

CAARt= 1/N∑ $^{+}$ – = …… **Equation 3.6:**

Assuming that values, indices and their respective reactions are normally distributed during the event duration, the t-statistical method will be used to assess the value at a confidence interval of 95 percent, using the average cumulative abnormal return and standard deviation to establish the suitable empirical t-statistics. The test of significance of abnormal reaction will be conducted using the hypothesis:

H_0: $AR_{it}=0$

H_1:$AR_{it} \neq 0$

CHAPTER FOUR: DATA ANALYSIS, RESULTS, INTERPRATATIONS, AND DISCUSSION

4.0 Introduction

The chapter discuss in detail the analysis of data, discussion and interpretation of findings. The objective of the study was to determine the stock market reaction to Covid-19 using the all firms listed in the NSE. The research was a census, we managed to get the Daily share prices for 63 companies of the 65 listed companies listed in the NSE, since Mumias Sugar Co. Ltd was suspended on 25th September 2019 the research population was reduced to 62 companies representing 95% of the census. This event study period if for 61 days. The estimation period was from 29th Jan 2020 to 11th March 2020, the event day is 12th March 2020 when the first case if Covid-19 while the observation period is 13th March 2020 to 27th April 2020. For the purpose of demonstrating the trend and effect after the study will use -30 and + 30 actual trading days. The data analysis was carried out using Microsoft Excel (2013). T-tests were performed on the statistical analysis software, Statistical Package for Social Sciences (SPSS), to determine the significance of reaction by use of stock returns.

4.1 Stock Returns Reaction in Various Sectors of NSE

NSE has classified the firms listed into 16 categories. This section through graph presentation it shows the movement of stock returns in the all categories. The average daily returns were used for sectors that has more than one firms otherwise the actual returns were applies where the is only one listed firm in the sector. To the graph and summary descriptive statistics are shown for 61 actual trading days, being -30 before, event day 0 and +30 days after.

Daily Stock returns was obtained from the formula

$$R_{i,t} = \frac{(P_{I,t} - P_{i,t-1})}{P_{i,t-1}}$$

4.1.1 Agricultural Sector Returns

The agricultural sector has six companies listed in the NSE namely Eaagads Ltd**,** Kakuzi Plc**,** Kapchorua Tea Kenya Plc**,** The Limuru Tea Co. Plc, Sasini Plc, Williamson Tea Kenya Plc. The graph below depicts the movement of the average stock return in the agricultural industry over time. Prior to the event day, the returns are relatively stable and consistently in the positive territory. Following the announcement on day 1, there was a precipitous drop, as evidenced by the observation of the minimum return of -0.01989899 and a maximum return on day 13 of 0.018319306. Stocks in the agricultural sectors are volatile in the days following the event day, as illustrated in the graph below.

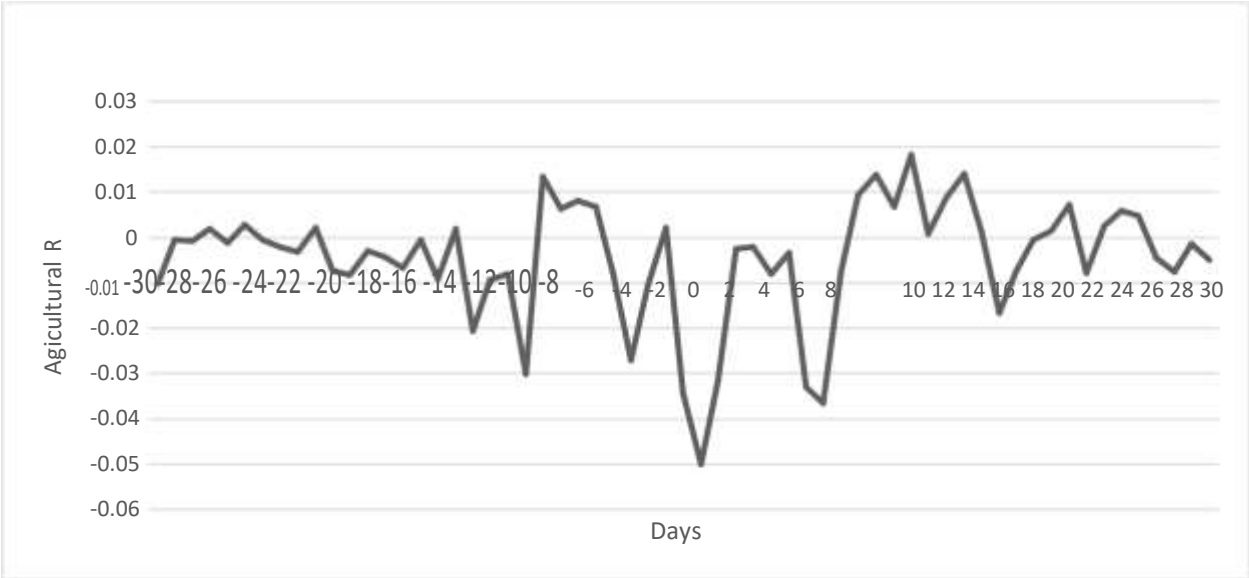


Figure 2: Agricultural Sector Returns

4.1.2 Automobiles & Accessories

The sector has two listed entities company being Car & General (K) Ltd and Sameer Africa Plc. From the collected data they don't experience high volatilities. For this sector it is observed that higher volatilities are experienced before compared to after the event day. The minimum return of – 0.05 is observed on day 4 while the maximum return is observed on day 26 of 0.084090909.

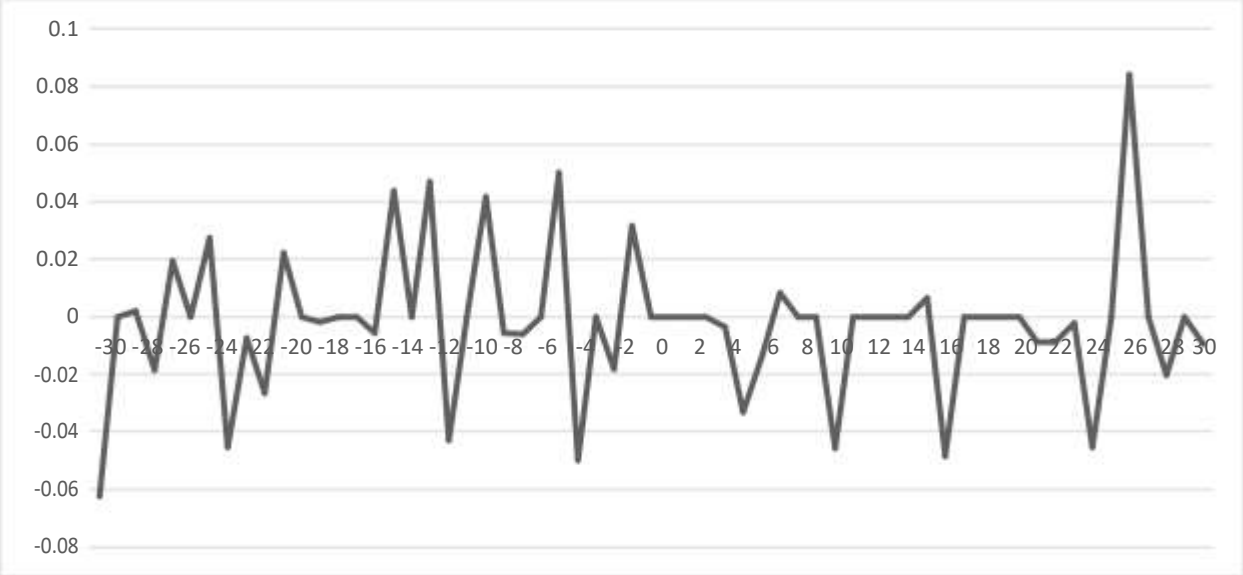


Figure 3: Automobiles & Accessories Returns

4.1.3 Financial Sector

The financial sector, particularly tier one banks, is one of the most actively traded sectors. The most actively traded banks are Equity bank, Co-operative bank, and KCB bank. It had the most listed enterprises per sector, with twelve. ABSA, BK Group Plc, BK Group Plc, Diamond Trust Bank Kenya Ltd, Equity Group Holdings Plc, HF Group Plc, &M Holdings Plc, KCB Group Plc, National Bank of Kenya Ltd, NCBA, Stanbic Holdings Plc Group Plc, Standard Chartered Bank Kenya Ltd, and Standard Chartered Bank Kenya Ltd.

The graph below illustrates the average stock returns in the finance sector. It reveals that the COVID-19 announcement had a debilitating effect on financial sector enterprises' stock performance. On day one, there is a large negative decline, reaching a low of -0.053302056 shortly after the first instance is announced. In the agriculture industry, volatility is seen to be greater following the event day than prior to it.

Figure 4: Financial Sector Returns

4.1.4 Wholesale and Retail

Deacons (East Africa) Plc, Eveready East Africa Ltd, Nairobi Business Ventures Ltd, and Uchumi Supermarket Plc are the sector's four listed firms. Deacons' share prices remained stable during the period. These are generally quiet stocks. They had no volatility prior to or following the announcement of the first case. Uchumi Supermarket Plc is the sector's most active stock in the sector.

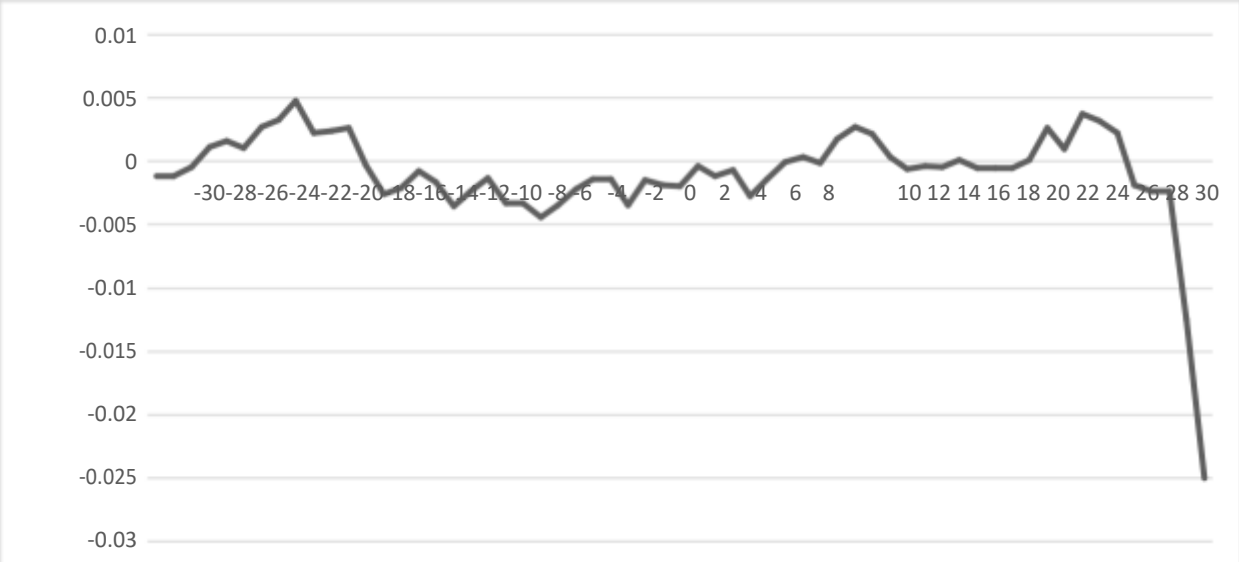


Figure 5: Wholesale and Retail

4.1.5 Commercial Sector

There is only one commercial enterprise listed in the NSE, Express Kenya ltd. Since the announcement of the first COVID-19 case, its stock price has remained extremely constant. There is far more activity prior to the announcement than following it. The share prices remain relatively stable after the announcement hence largely nil stock returns after the event day. The results are shown in the graph below.

Figure 6: Commercial Sector

4.1.6 Transport Sector

Only Kenya Airways is listed in the transport sector. The pattern of stock returns is comparable to the financial and agricultural industries. The lowest return seen on day 1 of the event window is -0.086419753, while the highest return observed on day 4 is 0.084415584. When the stock is active, both before and after the event, it exhibits high levels of volatility. More negative returns are experienced during the observation period.

Figure 7: Transport Sector Returns

4.1.7 Information, Communication and Technology Sector

This group had four companies Longhorn Publishers Plc, Nation Media Group Plc, Standard Group Plc and WPP Scangroup Plc. The share returns paint a picture of consistent behavior prior to and following the event. Volatility follows a similar pattern both during and before news events. On day -10, a return of -0.04277 is observed, while on day 11, a return of 0.042846 is observed. The pattern of stock returns is identical before and after the arrival of news, as illustrated by the pictorial representative.

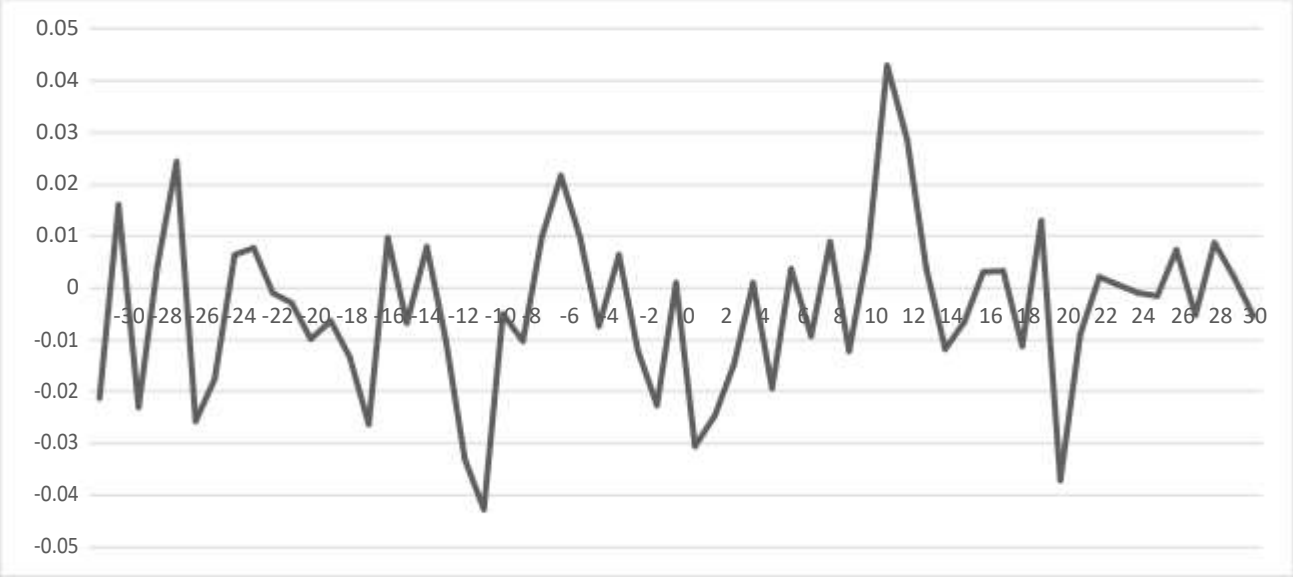


Figure 8: Information, Communication and Technology

4.1.8 Construction & Allied

The Construction & Allied group consists of five companies: ARM Cement Plc, Bamburi Cement Ltd, Crown Paints Kenya Plc, E.A.Cables Ltd, and E.A.Portland Cement Co. Ltd. Prior to and following the event day zero, the trading patterns are nearly identical. The period's first day sees a decline in share returns. On day -6, the minimum return is -0.0411; on day 16, the maximum return is 0.029605.

Figure 9: Construction & Allied sector returns

4.1.9 Energy and Petroleum

KenGen Co. Plc, Kenya Power & Lighting Co Ltd, Total Kenya Ltd, and Umeme Ltd are the four companies in the sector. The return patterns are similar before and after the event day. On day 22, the maximum return is 0.025951, while the minimum return is on day 1. This demonstrates that following the announcement of the COVID-19 case, there was an immediate reaction, resulting in a negative return.

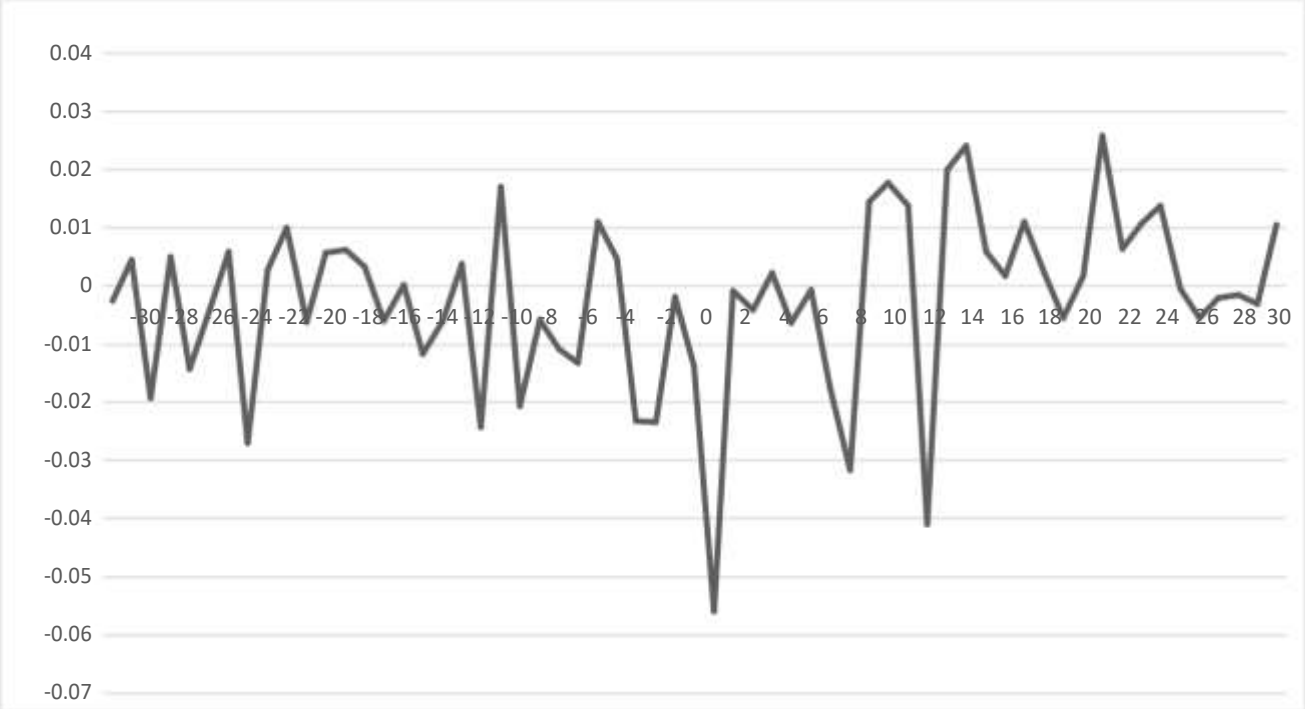


Figure 10: Energy and Petroleum

4.1.10 Insurance sector

The six insurance companies are Britam Holdings Plc, CIC Insurance Group Ltd, Jubilee Holdings Ltd, Kenya Re Insurance Corporation Ltd, and Sanlam Kenya Plc. After day zero, the sectors experienced high volatility when compared to the days preceding the event. The minimum return on day 22 is -0.04465. There is an immediate negative reaction to the news. The highest return was observed on day 14.

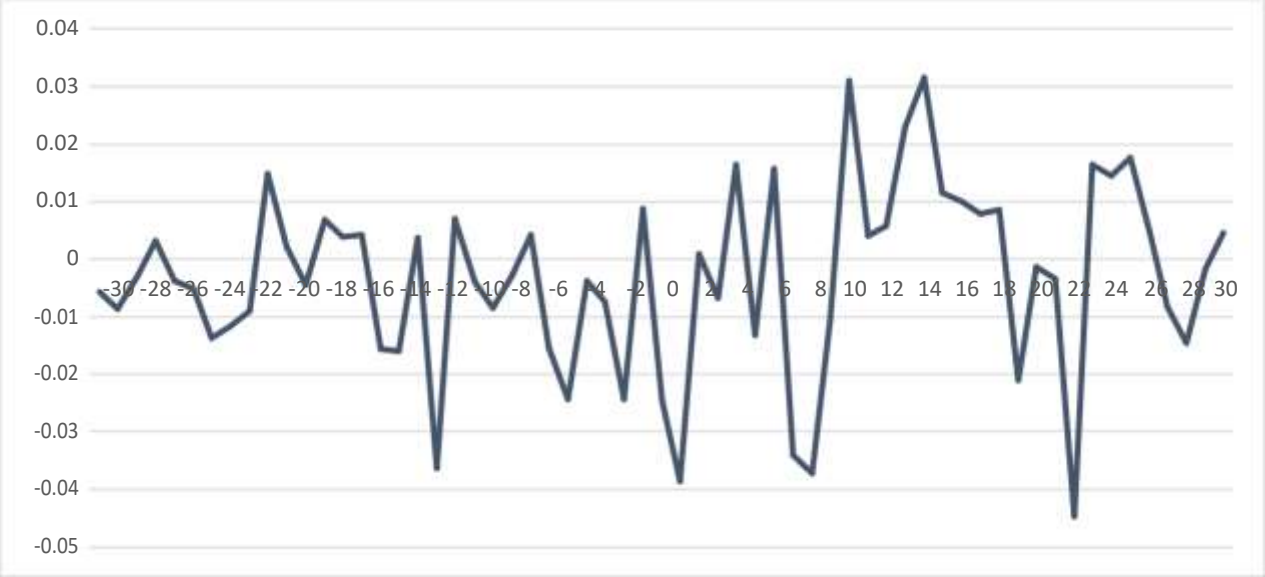


Figure 11: Insurance sector

4.1.11 Management of Companies and Enterprises

This sector has five listed firms, namely Centum Investment Company Plc, Kurwitu Ventures Ltd, Olympia Capital Holdings Ltd, Trans-Century Plc and Nairobi Securities Exchange Plc. On day 1, after the event, the sector experienced a minimum return of -0.044645105, while the maximum is observed on day 14 at 0.031567982, indicating the increased volatility after the news is received in the market.

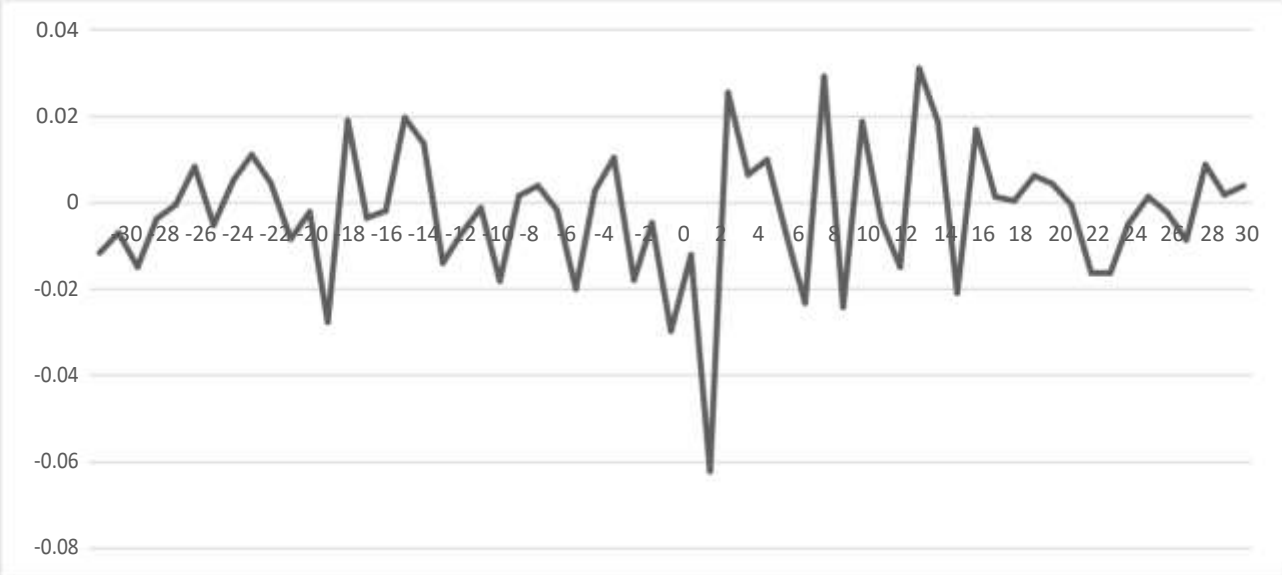


Figure 12:Management of Companies and Enterprises

4.1.12 Manufacturing & Allied

The sector has eight listed firms, but Mumias Sugar Co. Ltd was not listed, so we considered the remaining seven firms: British American Tobacco Kenya Plc, B.O.C Kenya Plc, Carbacid Investments Plc, East African Breweries Ltd, Flame Tree Group Holdings Ltd, Kenya Orchards Ltd, and Unga Group Ltd for the purposes of the research. The graph below shows that there is a negative reaction in the market immediately after the news is released. There has also been an increase in volatility following the news. The minimum return is -0.03032 on day 19 and the maximum return is 0.049549 on day 23, indicating high volatility during the observation period.

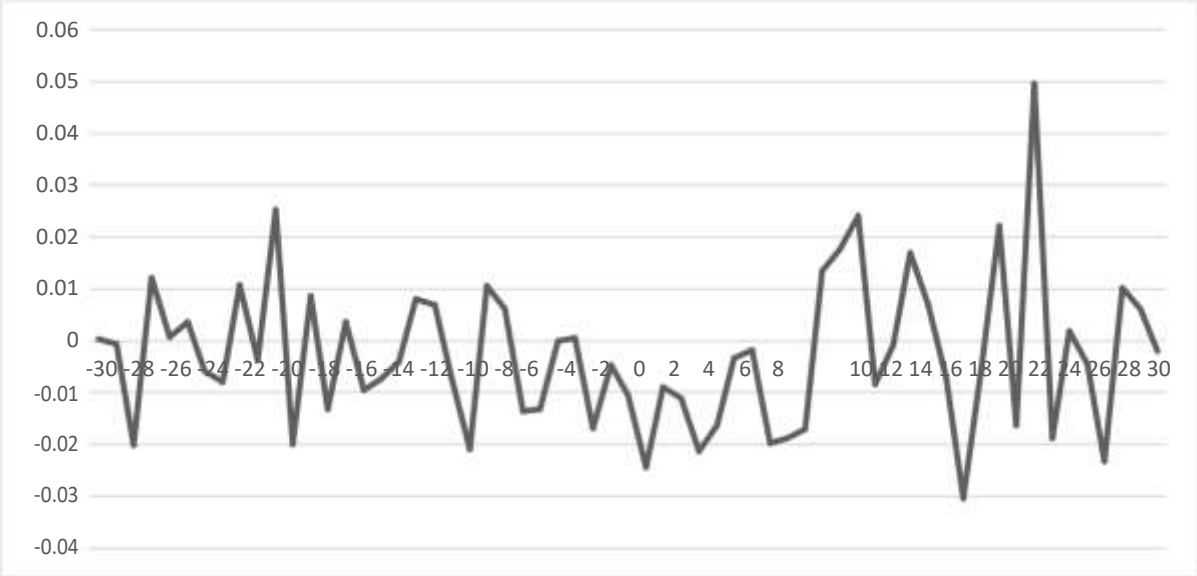


Figure 13: Manufacturing & Allied

4.1.13 Real Estate

Home Afrika Ltd and STANLIB FAHARI I-REIT are two firms in the real estate sector. The immediate reaction after day zero is minimal, but increased volatility is observed. The graph below depicts a similar pattern and after prior in stock returns. The minimum return is -0.082094376 on day 30, while the maximum is 0.047704082 on day -1, just before the arrival of the news.

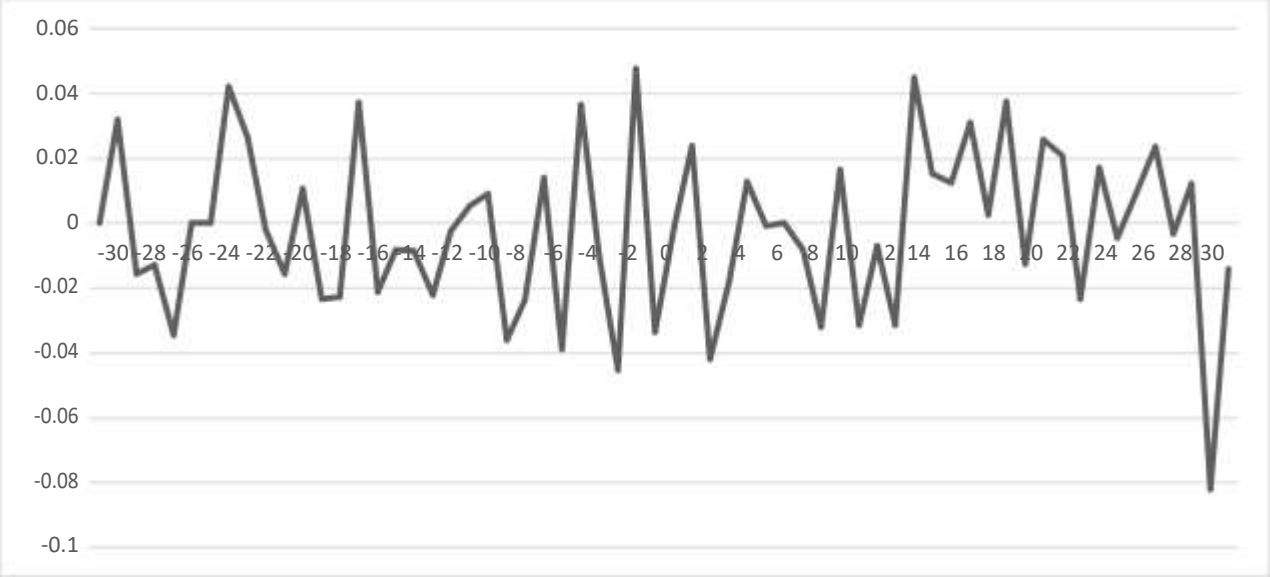


Figure 14: Real Estate

4.1.14 Exchange Traded Funds

There is only one firm, ABSA New Gold ETF. Both before and after, it is a relatively quiet stock. The below graph on share returns indicates a slight reaction to the arrival of news. A minimum share return of -0.05152 is observed on day 1, while the maximum is observed at 0.107383 on day 9.

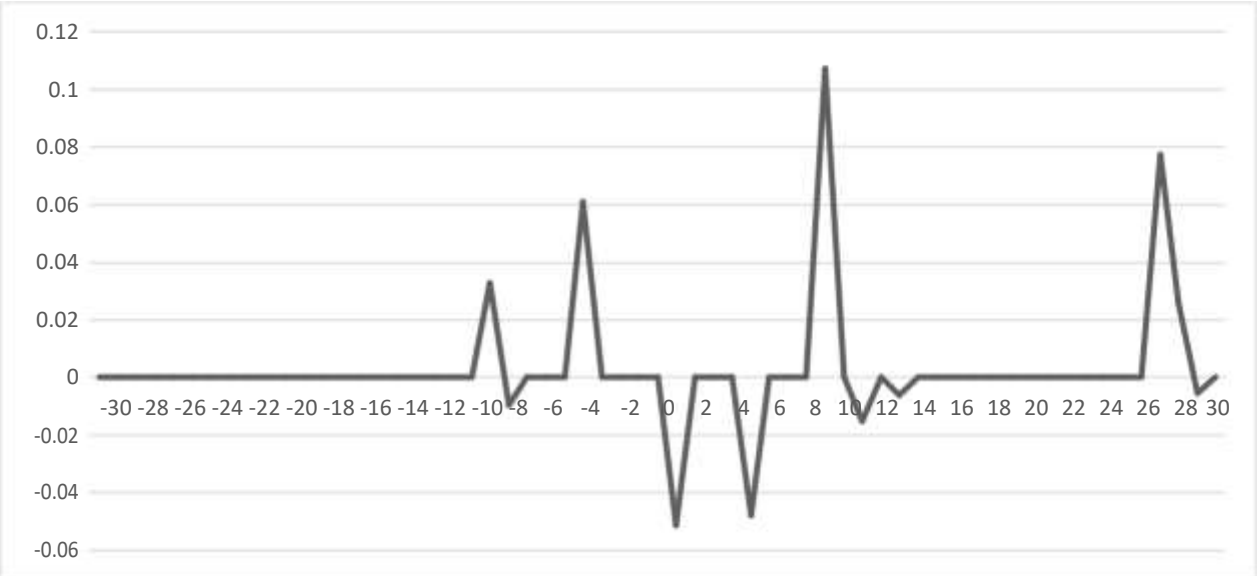


Figure 15: Exchange Traded Funds

4.1.15 Telecommunication & Technology

Safaricom Plc is the only listed firm in this category. Safaricom's total investor wealth as measured by the Nairobi Securities Exchange (NSE) more than 60% of the total wealth. The performance of the telecoms firm determines whether the market rises or falls on any given day. The below table graph shows the reaction immediately after the arrival of the news after in the market. The minimum return is observed on day 1, Minimum return of -0.0754, the positive return was observed on day 15 is 0.050186. Safaricom plc is a determinant NSE stock market performance in the sense that a slight decline in the share price of Safaricom creates the impression that the market is underperforming, despite the fact that other counters are gaining.

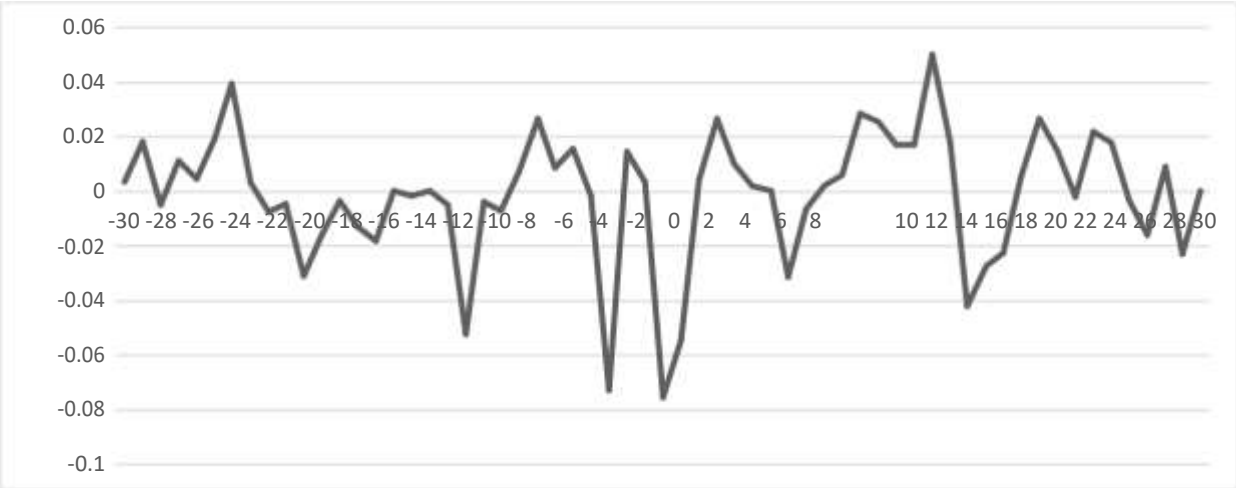


Figure 16: Telecommunication & Technology

4.1.6 Hospitality

TPS Eastern Africa Ltd is the sector's sole member. The graph indicates that there is less volatility following the vent day than there was previously. Unlike the majority of dynamic stock markets, which have witnessed destruction in the hotel business, TPS stock has remained reasonably stable, with no instant reaction as illustrated in the graph below. Then, on day -30, the minimum return is -0.09355, and the maximum is 0.098859 on day 26.

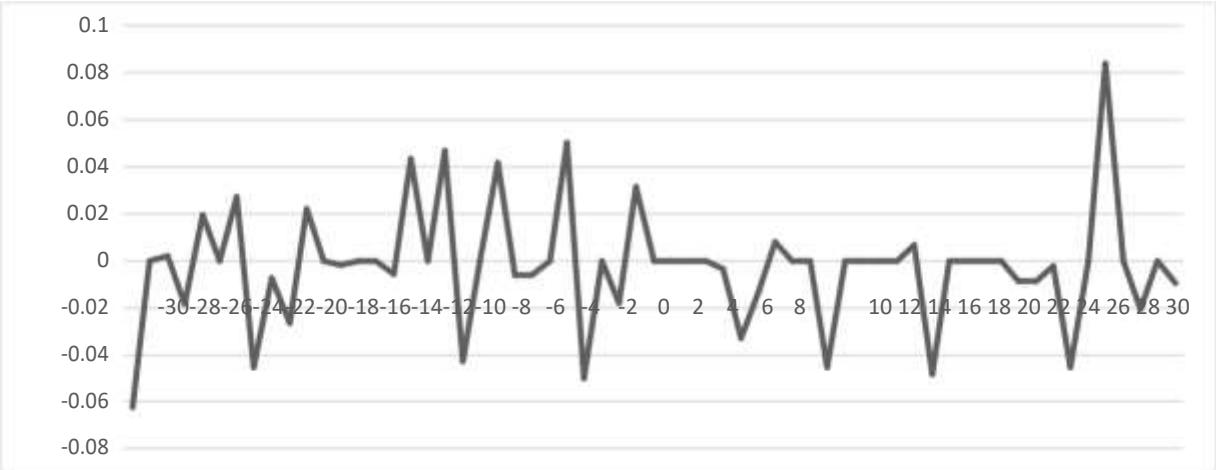


Figure 17: Hospitality

4.2 Expected Return

To obtain the expected return the research used the market mode

$E(R_{i,t}) = \alpha_i + \beta i\, R_{m,t} + \varepsilon_{i,t}$

The coefficients αi, βi were estimated through a linear regression model between the company's share price and the market price index NSE 20 index during the estimation window, to get a better result the research used a longer period of -90 actual days to determine the coefficients, below graph shows the stock returns for NSE 20 share index from the 12th December 2020 to 13th June 2021.

Figure 18: Market index returns

In particular there is a sharp decline on the stock returns after the announcement of the first COVID-19 case in Kenya on the 12th March 2020. The sharpest fall is on 13th of March 2020 when it recorded a negative stock return of -0.0501 (5%) fall. The stock appears to recover ruin the month if April oscillating in positives and negatives.

Alpha is a risk-adjusted measure of a security's performance in relation to the overall average return of the market. The alpha is the difference between the loss or profit and the benchmark. R-squared represents the link between the return on a stock and the return on the whole market (R2). Car & General (K) Ltd had the highest Car & General (K) Ltd of 0.00292 while Flame Tree Group Holdings Ltd of -0.0089. R2 is also referred to as the coefficient of determination, or the proportion of variance in a security's return that is explained by the market return given the estimated values of alpha and beta.42%, while Sameer group has the lowest at 0.0000311%, The average is at 7.18%

The beta value reveals how much an underlying market index's return influences the return on a single security. In other words, a rise (or decrease) in market index returns equates to an

increase (or reduction) in security return. A beta larger than one implies sensitivity to broad market returns, whereas a beta less than one indicates relative insensitivity. An inverse market return is indicated by a negative beta value. Kenya Airways had the maximum beta of 1.741971 While Uchumi Supermarket Plc has the most inverse relationship of -0.92731

Descriptive statistics for Beta	
Mean	0.360299
Standard Error	0.076407
Median	0.257779
Minimum	-0.92731
Maximum	1.741971
Sum	22.33856
Count	62
Confidence Level (95.0%)	0.152785

Table 1: Descriptive statistics for Beta

4.3 Abnormal returns

The abnormal returns were obtained using a formula

$AR_{i,t} = R_{i,t} - E(R_{i,t})$

Below table shows, the average abnormal returns for a period of 30 days. The graph depicts general increase in abnormal returns from day one day 30.

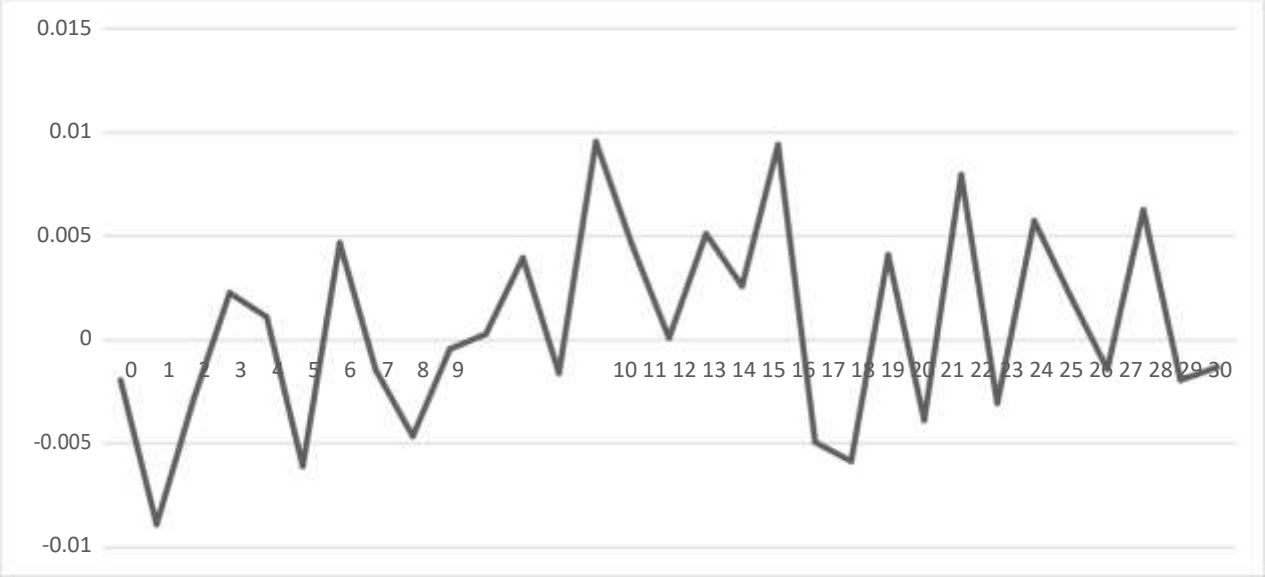


Figure 19: Abnormal returns

4.3.1 Test of Significance of AAR

Paired t-test of significance was calculated and the findings were as below.

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	AAR Before	-.542333	60	.322455755	.08956665
	AAR After	-.852233	60	2.23525666	1.2148555

Table 2: Paired Samples Statistics of AAR

Table 4.8 indicates that the AAR mean for the period after the announcement date was -0.852233. AAR mean for the period before the announcement date was -0.542333. This means that the average abnormal returns increased negatively after the announcement date.

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 AAR Before - AAR After	-.4206	3.4536	1.1248	-2.5423	2.8723	.435	60	.823

Table 3: Paired Samples Test of AAR

The paired t-test statistics was calculated with 5% level of significance. The p-value (0.823) is greater than the significance level of 5% hence the acceptance of the null hypothesis that announcement of the COVID-19 pandemic has no effect on stock prices

4.3.2 Test of Significance of CAAR

Paired t-test of significance was calculated and the findings were as below.

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	CAAR Before	-4.2154665	60	.78859362	.3568532
	CAAR After	-16.388956	60	4.5695369	1.285658

Table 4: Paired Samples Statistics of CAAR

Indicates that the CAAR mean for the period after the announcement date was -13.793080. CAAR mean for the period before the announcement date was -2.390630. This means that the cumulative average abnormal returns significantly increased negatively after the announcement date.

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1- CAAR Before CAAR After	14.56324	4.0255	1.89653	9.12457	15.2687	8.512	60	.000

Table 5: Paired Samples Test of CAAR

The paired t-test statistics was calculated with 5% level of significance. The p-value (.000) is less than the significance level of 5% hence the rejection of the null hypothesis that announcement of the COVID-19 pandemic announcement has no effect on stock prices.

Therefore, it is imperative to note that cumulatively the announcement of the COVID-19 pandemic announcement have a significant effect on stock prices

4.4 Interpretation of the Findings and Discussion

The study sought to investigate the NSE stock market reaction to COVID-19. Form the stock returns it is noted that various experienced negative returns on day one and the proceeding days, however wholesale and retail, commercial and exchange traded funds did not experience immediate negative returns on day 1, the share prices in the companies in these sectors remain relatively stable before and after the announcement hence minimal or nil stock returns. Observations indicate the reaction is dependent on the how active the particular stock is traded, active stocks experienced volatility due to COVID-19 announcement while the less active stock remain stable. This study concluded that enterprises listed on the NSE suffered negative returns following the COVID-19 announcement. Negative abnormal returns suggest that companies listed on the NSE are inefficient, as the efficient market hypothesis states that stock prices assimilate all information promptly, resulting in no abnormal returns. According to the research, it is exceedingly difficult for investors to earn a profit resulting from arrival of the pandemic new, particularly the day after the announcement, as indicated by the negative cumulative average abnormal returns that persisted long after the announcement. This reveals that COVID-19 is unfavorable to investors and has a detrimental effect on stock returns.

Observations indicate an increase in average abnormal returns indicating effect and reaction of share prices to COVID-19. The p-value of the average abnormal returns AAR (0.823) is greater than the significance level of 5% hence the acceptance of the null hypothesis that announcement of the COVID-19 pandemic has no significant effect on stock prices. Significance tests for the Cumulative average abnormal returns (CAAR) he p-value (.000) is less than the level of significance of 5 percent, indicating that the null hypothesis, that the news of the COVID-19 epidemic has no influence on stock prices, has been rejected by the data.

Because of this, it is critical to highlight that the disclosure of the COVID-19 pandemic had a major impact on stock prices when taken as a whole.

Market sentiment has a substantial impact on the movement of stock prices. Investors' emotional instability leads to overreactions. Stock prices can rise and fall dramatically due to strong market pressure caused by reaction topping. Investors were stunned by the results, which led them to make investment decisions since they perceived the business environment as unclear. COVID-19 was a signal for stakeholders to use when making investment decisions. By evaluating fundamental elements such as expected earnings growth and market sentiment, as well as technical indicators such as the daily movement of stock prices, investors arrive at investment decisions based on the efficient market hypothesis. Having an efficient market means that stock prices will represent all the information that is available to investors.

The research findings are in tandem with various studies have been that have been conducted in various countries conducted on the market reaction of COVID-19, including one conducted in Indonesia by (Zack et al., 2020) using customer goods sector companies listed on the Indonesian stock exchange that deals with essential goods. Their independent variable was the volume of daily stock prices, shares, and indices traded in the Indonesian stock market ninety days before COVID-19 was announced. They observed that during the earlier phases, when the fever was high, there was a lot of turbulence. In their conclusion they indicated that announcement regarding the COVID-19 sparked widespread panic, causing customers to sell their stakes while others attempted to buy. Despite the fact that COVID-19 is non-financial information, it has an impact on stock prices and trading volume.

The results are in agreement with the findings of Mbithi (2020) investigated the relationship between the Covid-19 epidemic and stock performance on the NSE, and discovered a statistically significant negative relationship. He used the share prices and trade volume and

foreign direct investment as the control variable. The results further agree with Okoth (2020) who examined how COVID-19 has influenced the Kenyan economy thus far and discovered that the primary economic impact of COVID-19 has been the country's stock market volatility. Takyi and Ennin (2021), who analyse the short-term impact of COVID-19 on stock market performance in a few selected African countries. They track stock prices from October 2019 through June 2020. Bayesian structural time series technique. In their analysis, Kenya was found to have a 15percent negative performance, whereas our neighbour Tanzania had an 11 per cent negative performance, while Mauritius was the most brutally hit of the thirteen countries, with a 21 per cent loss.

The reaction in diverse industries is not related to industrial disruption, but rather to the NSE stock's activity. For example, in the hospitality industry, which was hardest hit by movement restrictions and lockdowns, the only firm listed on the NSE maintains a relatively stable share price and exhibits no immediate reaction. This is in contrast to the findings of (Huo & Qiu, 2020), who examined the market response to the COVID-19 outbreak and lockdown announcement during Chinese New Year. Cumulative abnormal returns (CARs) are being used in a wide number of businesses. According to their findings, during the COVID-19 pandemic, 22 out of 28 industries had adverse CARs. Tourism and travel were particularly heavily damaged. On the other hand, the pharmaceutical and biotechnology industries have the largest positive CARs as a result of increased demand for health-related products, most notably those used to treat COVID-19.

The finding however differs with the findings of Zhang et al. (2020), who used TGARCH model to examine market volatility caused by the epidemic in China, the Netherlands, Sweden, the United Kingdom, and the United States. Their forecast period begins in 2015, and the event window runs from December 2019 through April 2020. Their goal was to determine the impact of COVID-19 news on the China Stock Exchange from other nations, as well as the impact of

COVID-19 news on the stock as well as the news China on the of other countries. They remark that the stock market in China remained relatively stable in comparison to news from advanced countries; yet, they observe that the spike in China influences volatility in the stock markets of Sweden, Switzerland, the Netherlands, and the United Kingdom. The impact of Covid-19 news from the Chinese stock market on the US stock market was minimal.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the study's findings, recommendations, and conclusions about the on the stock market reaction to COVID-19 of the companies listed on the Nairobi Securities Exchange (NSE). Finally, new directions for investigation are recommended.

5.1 Summary of Findings

The purpose of this study was to determine the effect of the COVID-19 announcement on the stock market reaction of companies listed on the Nairobi securities exchange using an event study methodology for 61 - day event period (-30, 30) for with, the research however used -90 days the estimation period for determining the market model coefficients. According to the research, there were negative AR and CAR from the day before COVID-19 was announced to the day (+30). This suggests, COVID-19 announcements have a negative effect on stock returns. The study discovered that the majority of stocks, particularly active stocks in the Financial Services, agricultural, and telecommunications and technology sectors, suffered a decline in return soon after the market COVID-19 news of the first case is revealed. However, the markets appear to be fast recovering. Equities in wholesale and retail, as well as commercial and exchange-traded funds, have a negligible response to COVID-19. Statistically there the form the AAR there is no significant effect on the stock however, the CAAR show that there is significant effect hence he conclusion the NSE stock market experienced a negative reaction due to COVID-19.

5.3 Conclusions

The goal of this study was to look at the market reaction to COVID-19 using the daily share prices of firms listed on the NSE, with a focus on whether there was evidence of post-announcement drift. The study discovered that the market reacts negatively following the occurrence, despite the fact that there were favorable abnormal returns in the days preceding

the announcement. The study concludes that COVID-19 have a negative effect on stock returns, as evidenced by statistically significant highly negative cumulative returns. There was an outpouring of support days after the first instance was reported.

The purpose of this study was to examine the market reaction to COVID-19 using daily NSE share prices, with a particular emphasis on whether there was evidence of post-announcement drift. The study discovered that the market reacts badly following the incident, despite the fact that the days previous the announcement saw favorable abnormal returns. The study shows that COVID-19 have a detrimental effect on stock returns, as indicated by highly negative cumulative returns that are statistically significant. Days after the first incidence was revealed, there was an outpouring of support.

5.3 Recommendations

According on the findings of this study, it is recommended that companies, shareholders, and regulatory authorities make the following recommendations. Governments and all stakeholders should collaborate during times of crises to enable a swift recovery of the market. For investors, knowledge on the Covid-19 epidemic can be utilized to forecast stock prices. Investors, in particular, may obtain anomalous returns as a result of a health crisis that results into a financial crisis. As a result, investors should actively collect information in order to make trading decisions at the appropriate point in the event's timeframe. The Covid-19 epidemic has had a significant impact on enterprises' production and commercial activity. During crisis the Short-and medium-term timelines and objectives should be changed. Executives should be willing to shift their focus from strategy to tactics; It is crucial for the government and regulatory agencies to implement effective and expeditious steps to assist firms that have been adversely affected by the Covid-19 epidemic in overcoming obstacles and resuming production and operations. This will improve the financial position of these firm’s as well provide employment which will enable the population to have income and savings for investment this will boost the stock

market. The administration should expedite immunization in order to restore normalcy. The CMA should fresh listings of high value firms to correct dominance and reduce imbalance.

5.4 Limitations of the study

COVID-19 is relatively new area of study. Although there are a lot of studies that have been done, there is limited study especially in the African continent. The study focused on census approach where shares of all firms listed in the NSE were used. On analyzing individual sectors, it was noted the effect on some sectors was insignificant or minimal. It is noted that Safaricom, Equity and Co-op Bank are the top dominant of the shares came into the market during the IPO boom years of 2005 to 2009. Since a few stocks are the most active the findings may not give a clear general picture of the market. As a frontier stock market, Kenya's stock market has been affected by the country's epidemic. Nevertheless, no country-specific factors were taken into account in this research. Covid-19-related occurrences can be studied further by incorporating country-specific factors or other market indicators like Trading Volume Activity and Trading Frequency Activity.

Moreover, the scope of the investigation was limited to only the thirty days after public disclosure of the first COVID-19 case in Kenya. However, it is worth mentioning that the epidemic may not have had a significant influence on the economy during the time period investigated. A long-term study can be carried out to establish the effects especially with the announcements of lockdown and increase in number of positive cases and deaths.

5.5 Recommendations for Further Research

The study's exclusive focus on the Kenyan setting, the conclusions cannot be extrapolated outside of that nation. It is advised to employ a higher number of global samples while conducting comparison investigations. Additionally, there may be analogies to pandemics. Additionally, a long-term research might be conducted to acquire additional data for future use. As COVID-19 is still an ongoing pandemic, future research should assess the virus's long-term

effects on the NSE stock market following its elimination in order to determine its overall impact. Restriction on how the COVID-19 epidemic was treated in different countries reflected this diversity of attitudes as well. A future study should check for correlations between the factors examined here and those in other nations that were either on lockdown or ignored the outbreak, and an analysis of the three types of countries should be conducted, the study concluded.

It was discovered that the pandemic had varying effects on different sectors and even on individual firms. It was noted that stocks that were actively traded had a higher volatility than those that had little activity. Future research may look at specific industries and firms, particularly those that are the most active and influence the market capitalization, such as Safaricom, Equity bank, and the Co-op bank. Additionally, Covid-19-related occurrences can be investigated further by factoring in country-specific characteristics or other market indicators like as Trading Volume and Trading Frequency Activity.

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APPENDICES

Appendix I Data Collection Schedule

Date	Company	Share Price	Volume

Appendix II Listed Firms at Nairobi Securities Exchange

Sector	Company
Agricultural	Eaagads Ltd
Agricultural	Kakuzi Plc
Agricultural	Kapchorua Tea Kenya Plc
Agricultural	The Limuru Tea Co. Plc
Agricultural	Sasini Plc
Agricultural	Williamson Tea Kenya Plc
Automobiles & Accessories	Sameer Africa Plc
Automobiles & Accessories	Car & General (K) Ltd
Commercial	Express Kenya Ltd
Construction & Allied	ARM Cement Plc
Construction & Allied	Bamburi Cement Ltd
Construction & Allied	Crown Paints Kenya Plc
Construction & Allied	E.A.Cables Ltd
Construction & Allied	E.A.Portland Cement Co. Ltd
Energy and Petroleum	KenGen Co. Plc
Energy and Petroleum	Kenya Power & Lighting Co Ltd
Energy and Petroleum	Total Kenya Ltd
Energy and Petroleum	Umeme Ltd
ExchangeTraded Funds	ABSA New Gold ETF
Financial Services	ABSA
Financial Services	BK Group Plc
Financial Services	The Co-operative Bank of Kenya Ltd
Financial Services	Diamond Trust Bank Kenya Ltd
Financial Services	Equity Group Holdings Plc
Financial Services	HF Group Plc
Financial Services	I&M Holdings Plc
Financial Services	KCB Group Plc
Financial Services	National Bank of Kenya Ltd
Financial Services	NCBA Group Plc
Financial Services	Stanbic Holdings Plc
Financial Services	Standard Chartered Bank Kenya Ltd
Hospitality	TPS Eastern Africa Ltd
Information, Communication and Technology	Longhorn Publishers Plc
Information, Communication and Technology	Nation Media Group Plc
Information, Communication and Technology	Standard Group Plc
Information, Communication and Technology	WPP Scangroup Plc
Insurance	Britam Holdings Plc
Insurance	CIC Insurance Group Ltd
Insurance	Jubilee Holdings Ltd
Insurance	Kenya Re Insurance Corporation Ltd
Insurance	Liberty Kenya Holdings Ltd
Insurance	Sanlam Kenya Plc
Management of Companies and Enterprises	Centum Investment Co Plc

Management of Companies and Enterprises	Kurwitu Ventures Ltd
Management of Companies and Enterprises	Olympia Capital Holdings Ltd
Management of Companies and Enterprises	Trans-Century Plc
Management of Companies and Enterprises	Nairobi Securities Exchange Plc
Manufacturing & Allied	British American Tobacco Kenya Plc
Manufacturing & Allied	B.O.C Kenya Plc
Manufacturing & Allied	Carbacid Investments Plc
Manufacturing & Allied	East African Breweries Ltd
Manufacturing & Allied	Flame Tree Group Holdings Ltd
Manufacturing & Allied	Kenya Orchards Ltd
Manufacturing & Allied	Mumias Sugar Co. Ltd
Manufacturing & Allied	Unga Group Ltd
Real Estate	Home Afrika Ltd
Real Estate	STANLIB FAHARI I-REIT.
Telecommunication & Technology	Safaricom Plc
Transport	Kenya Airways Ltd
Wholesale and Retail	Deacons (East Africa) Plc
Wholesale and Retail	Eveready East Africa Ltd
Wholesale and Retail	Nairobi Business Ventures Ltd
Wholesale and Retail	Uchumi Supermarket Plc

Source: NSE, (2021)

Appendix III Market Model Coefficients

COMPANIES	Alpha	Beta	Standard Error	R-Squared
Kenya Airways Ltd	0.00149	1.74197	0.03689	13.69%
Nation Media Group Plc	-0.0017	1.53818	0.02793	17.75%
Britam Holdings Plc	0.00108	1.52101	0.02294	23.82%
KCB Group Plc	0.00172	1.38236	0.01372	41.93%
Nairobi Securities Exchange Plc	0.00163	1.27782	0.0221	19.21%
Diamond Trust Bank K. Ltd	0.00125	1.26657	0.0221	18.94%
Equity Group Holdings Plc	0.00104	1.26511	0.01395	36.91%
The Co-op Bank of Kenya Ltd	0.00108	1.17416	0.01339	35.37%
WPP Scangroup Plc	0.00189	1.07673	0.02602	10.86%
HF Group Plc	-0.0017	1.05951	0.03344	6.66%
Kenya Re Insurance Corporation Ltd	0.00062	1.03118	0.02413	11.49%
KPLC	-0.0026	1.02296	0.02348	11.90%
NCBA Group Plc	0.00147	0.94403	0.01391	24.68%
Safaricom Plc	0.00051	0.92668	0.01554	20.19%
East African Breweries Ltd	0.00226	0.90424	0.01136	31.08%
Bamburi Cement Ltd	-0.0056	0.82136	0.02721	6.09%
Carbacid Investments Plc	0.00159	0.79294	0.03466	3.59%
Centum Investment Co Plc	-0.002	0.75739	0.01117	24.64%
I&M Holdings Plc	0.00146	0.69142	0.01725	10.25%
TPS Eastern Africa Ltd	-0.0022	0.59733	0.03891	1.65%
CIC Insurance Group Ltd	-0.0021	0.58353	0.02216	4.70%
E.A.Cables Ltd	-0.0032	0.51788	0.03281	1.74%
ABSA	0.00071	0.4968	0.00688	27.03%
Standard Chartered Bank Kenya Ltd	0.00066	0.4618	0.01435	6.87%
Umeme Ltd	########	0.4404	0.02713	1.84%
Liberty Kenya Holdings Ltd	-0.0058	0.34978	0.03519	0.70%
Crown Paints Kenya Plc	-0.0007	0.34128	0.02523	1.28%
Car & General (K) Ltd	0.00292	0.30703	0.04295	0.36%
Kapchorua Tea Kenya Plc	0.00073	0.30024	0.01848	1.84%
B.O.C Kenya Plc	0.00066	0.26121	0.01859	1.38%
Nairobi Business Ventures Ltd	-0.0011	0.25919	0.02545	0.73%
Williamson Tea Kenya Plc	-0.0014	0.25636	0.01332	2.57%
Total Kenya Ltd	-0.0005	0.24593	0.02495	0.69%
Sasini Plc	-0.0006	0.18647	0.03334	0.22%
STANLIB FAHARI I-REIT.	-0.0008	0.14875	0.02839	0.19%
KenGen Co. Plc	-0.0014	0.11847	0.00921	1.16%
Unga Group Ltd	-0.0003	0.08484	0.03371	0.05%
Jubilee Holdings Ltd	-0.0006	0.07798	0.0085	0.60%
Longhorn Publishers Plc	-0.0033	0.05749	0.03078	0.02%
Sameer Africa Plc	-0.0039	0.00237	0.03587	0.00%

National Bank of Kenya Ltd	0	0	0	0
Deacons (East Africa) Plc	0	0	0	0
ARM Cement Plc	0	0	0	0.00%
Kurwitu Ventures Ltd	0	0	0	0.00%
Kenya Orchards Ltd	0	0	0	0
The Limuru Tea Co. Plc	-0.0004	-0.0091	0.00289	0.07%
E.A.Portland Cement Co. Ltd	-0.0002	-0.0271	0.01967	0.01%
Stanbic Holdings Plc	0.00082	-0.0431	0.03436	0.01%
Sanlam Kenya Plc	0.00052	-0.0497	0.03547	0.01%
BK Group Plc	-0.0037	-0.0593	0.0182	0.08%
Standard Group Plc	-0.0033	-0.1278	0.04006	0.07%
Flame Tree Group Holdings Ltd	-0.0089	-0.1443	0.05913	0.04%
Kakuzi Plc	-0.0016	-0.163	0.02193	0.39%
Home Afrika Ltd	-0.0047	-0.2099	0.04522	0.15%
Eveready East Africa Ltd	-0.0033	-0.2923	0.03821	0.41%
British American Tobacco Kenya Plc	-0.0011	-0.3038	0.01934	1.73%
ABSA New Gold ETF	0.00133	-0.3661	0.01315	5.22%
Eaagads Ltd	-0.0008	-0.4422	0.03117	1.41%
Trans-Century Plc	-0.0053	-0.4493	0.03135	1.44%
Express Kenya Ltd	-0.0032	-0.664	0.03473	2.53%
Olympia Capital Holdings Ltd	0.00153	-0.6738	0.02864	3.79%
Uchumi Supermarket Plc	-0.0034	-0.9273	0.04345	3.14%
NSE20				

Source; Data 2021