AN ASSESSMENT OF THE EXTENT EFFECT OF SEASONAL ANOMALIES ON EFFICIENCY OF FIRMS: EVIDENCE FROM NAIROBI SECURITIES EXCHANGE.

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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ABSTRACT

The presence of security market anomalies provide an opportunity that market participants can exploit. The study tries to focus on the extent Month of the Year effect on efficiency of firms listed on the NSE particularly as an event based study on Covid-19 pandemic. Based on this study, the first objective of the study sought to examine the extent Month of the Year effect on efficiency of firms listed in the NSE. The study used closing monthly prices which were derived from NSE website for the period 2018-2021. From the results of the test carried out, the study established that Month of the Year effect was present and affected the efficiency of the market differently. January and December exhibited higher returns than other months. The study also sought to establish which stocks in the NSE were more prone to the extent month of the year effect on efficiency of firms. Also the study sought to establish which sectors in the NSE were more prone to the extent month of the year effect on efficiency of firms. A test of equality of mean was carried out to determine whether the mean returns for the different stocks and sectors were different. The findings of the test conducted indicated that the following stocks had more positive correlation to month of the year effect; Centum, Co-operative Bank, Absa, KCB, Scangroup, KenGen, KPLC, Scangroup and Stanbic compared to others. There was no single sector that was more prone to month of the year effect than the other. The findings from the analysis established that majority of trading participants had knowledge of market anomalies though also majority were affected during the Covid-19 pandemic. The results of the study contradict the efficient market hypothesis since the study has established month of the year effect is present.

TABLE OF CONTENTS

LIST OF FIGURES.

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS.

APT	- Arbitrage Pricing Theory
CMA	- Capital Market Authority
EMH	- Efficient Market Hypothesis
IPO	- Initial Public Offering
NSE	- Nairobi Securities Exchange
GDP	-Gross Domestic Product
EMH	- Efficient Market Hypothesis
NSE 20 Share Index	- Nairobi Securities Exchange 20 Share Index

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DEDICATION.

This work is dedicated to my Father and Mother who have supported and guided me all along this journey. To my sisters: I hope that you will do this one day. To my late Grandparents for encouraging me. I hope you are proud of me. To my family and friends for encouraging me.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Securities are financial assets which are grouped into equity stocks, bonds (debt securities) and derivative securities. Securities are traded on an exchange or over the counter. Security exchange is where securities, physically or electronically, are bought or sold, (Arora & Marwaha, 2006). This study focuses on equity securities which are termed as stocks. Stocks are part of ownership of a company that is bought by members of the public.

The stock market attracts many a variety of investors from around the world as they contribute greatly to the growth of the economy. Trading allows firms to contribute to raising capital so as to settle debt, launch diverse products and enlarge and multiply their operations (Elango & Macki, 2008). For investors stocks provide gains due to the value addition in the company dividend payments. As a prime institution, the stock market is key in the economy through policy implementation and in this it is effective in structuring of the economic growth and capital allocation(Li et al., 2020).

Anomalies are known as when occasions of trading arise from the from the tactics by which trading in stocks brings forth above-normal returns,(Haj, 2020). According to Mitchell, (2006) financial anomaly refers to a trend in which a price performs that is not in adherence with the traditional prognosticate of market efficiency. Market anomalies tend to be cross-sectional and of time series designs in assets as well as stock yields which are very unpredictable. The market anomalies are categorized as; fundamental, technical, seasonal and size effect anomalies (Khanh & Dat, 2020).

Seasonal anomalies, known as calendar anomalies are inanimate because they are in contrary to what is expected of how stocks should behave. They defy the normal behaviour of stocks over different time periods and also tend to have a relationship with specific time periods. This can be changes of stock prices from days, months and yearly (Khanh & Dat, 2020). The price changes are categorized into turn of year, turn of week effect, weekend effect, Monday effect, Holiday effect and January effect (Alagidede & Panagiotidis, 2009). Wachtel, (1942) was the first researcher to report on seasonal anomalies in stock earnings. Seasonal anomaly occurs when a certain stock does not follow what is expected and gives

a different price against the norm under a certain time period which in turn influences performance of a firm in turn affecting its operational efficiency (Wachtel, 1942).

Stock returns displays some regular forms during moments of the day, week or month (Bameka, 2019). At some times days in a week give low earnings in comparison to other days and is regarded as day of the week effect (Bameka, 2019). Majority of countries adopt the Gregorian calendar as an official calendar. The Gregorian calendar is a solar calendar composed from 12 months. Precedent research works show that some months, generally January or April, may be characterised by abnormal returns. This effect is called the January effect and implies that stock returns are higher than the other months of the year (Moller & Zilca, 2008). Monthly patterns is also one of the common patterns where particular months give more returns as compared to the rest of the months and this is known as month of the year effect (Marrett & Worthington, 2012).

Seasonality in a stock market violates the theory of EMH which is vital in the realm of finance. The EMH corresponds to how fast and correct the market responds to new information (Kiptanui, 2014).Calendar anomaly also termed as a weak form of efficiency goes against the weak form of efficiency as it hypothesizes that stock markets are efficient. It also concedes that past prices cannot influence and predict future prices of the stocks. Further, the presence of seasonality and monthly effects does not support market efficiency hypothesis where investors earn above normal returns (Alagidede & Panagiotidis, 2009). The basic theoretical case for EMH lies on three main assumptions: investors are assumed to be rational and hence to value securities rationally, to the extent that some investors are not rational, their trades are random and thus cancel each other without affecting prices, and finally, to the extent that investors are irrational similarly, their influence on prices is eliminated by rational arbitrageurs (Shleifer, 2000).

The EMH holds that asset prices rapidly change in adjustment to information and thus should move in an unpredictable, irregular pattern. If a foreseeable pattern exists, profit-maximizing investors would notice the pattern and price the assets in anticipation; when prices reflect the anticipation, the pattern would vanish (Ajinkya & Jain, 1989). These seasonal patterns in returns became clear contradictions to the EMH which proposed that prices should ideally not be predictable based on certain time periods.

Meshack & Nyamute, (2017) scope of seasonal anomaly is a well-recognized and an area where a wide area of weak form EMH research has been done. Tax preference theory also

fits in the area of seasonal anomalies. Seasonal anomalies may be measured daily, monthly or annually. This can be seen in some of the seasonal returns which show returns that recur weekly, monthly or yearly (Elango & Macki, 2008). Thus seasonal anomalies are a result of seasonal returns. In this study therefore, due to the nature of the stock market, seasonal anomalies are operationalized by the frequencies on a monthly basis (Marrett & Worthington, 2012).

The presumption that a certain security will perform well during a certain season brings distress that affects operational efficiency as the expectation is not upheld,(Baik et al., 2013). Seasonal anomalies disapprove the weak form of efficiency as the later posits that markets are efficient in past price and thus hard to predict future prices. Seasonalities disapprove market efficient theory where investors earn above normal returns (Gworo et al., 2020). The main causes of these seasonal anomalies are; changes in tax ranges, treatment of taxes, adjustment of cash flow, unprompted adaptation to new information and behavioural limitations of investors.

Fama & French, (1996) showed efficiency of the market, and observed that prices of the market completely indicate the possible information at any period. It detailed that markets are efficient or inefficient based on the ideology of investors being rational or irrational hence the prices of the market can be predicted partially. The theory of an efficient is classified into three categories as described by Fama; Weak form efficient market hypothesis, Semi-strong form efficient market hypothesis and Strong-form efficient market hypothesis. Efficient market hypothesis had a lot of studies emerging supporting the hypothesis. (Malkiel, 1973) in support of efficient market hypothesis presented random walk theory in which he explained that stock prices followed the random pattern or movement; therefore, shows that it is possible to anticipate prices. However, the theory soon began to face both theoretical and empirical challenges. As an example of contradicting findings, studies stated to record consistent abnormal returns based on seasonal patterns for financial asset returns. Thaler, (1993) asserted that the inefficiency in the market was caused by the irrationality which affected the prices in stocks. The investors and market participants got increasing gains through abnormal returns where it contradicted the assumptions of efficient market hypothesis theory. Wong et al., (1990) found that the average returns to be significantly low in December and high in January. Marrett & Worthington, (2012) found high returns in January while studying the performance of the Australian stock exchange.

The seasonal returns patterns show clear deviations to the theory of efficient market hypothesis that stock prices should not be predictable based on time periods.

According to Agrawal & Tandon, (1994) the turn of the year effect which also covers the January effect was first described in 1942 by Wachtel. The fundamental pattern of this anomaly is that stock returns in the first few days of January are higher, ranging from four to ten days (Marrett & Worthington, 2012).This pattern results in the occurrence of higher returns for January than the rest of the months in the year. However the recognition of a January effect did not happen until Rozeff and Kinney observed and documented it in 1976 (Ogden, 1990). Since then this anomaly has become one of the most researched.

Along with the mentioned month of the year effect, several hypotheses have emerged to offer possible explanations for existence of these anomaly. One hypothesis why investors (especially institutional investors) may make seasonal related changes in their portfolios is the practice often referred to as window dressing. According to the window-dressing hypothesis, developed by (Griffiths & Winters, 2005), institutional managers are evaluated based on their performance and their investment philosophy. The authors suggest that to improve their performance, the institutions buy both risky stocks and small stocks but sell them before the end of the year so that they do not show up in their year-end holdings. At the beginning of the following calendar year (in January), investment managers reverse the process by selling winners, large stocks, and low risk stocks while replacing them with small and risky stocks that typically include many past losers. Lakonishok et al., (1991) suggests that the patterned returns may be related to customs that influence the flow of funds in and out of the market. For example, mutual funds may receive payments and make corresponding changes in their portfolios at dates that coincide with the calendar points.

Muchemi & Kuria, (2013) investigated the Nairobi Securities Exchange for the stock market anomalies based on seasonal effects on average returns. The study considered the average returns of the months under the time period of investigation. The returns for both the November and end of January were significantly high as compared to the returns of the other months. The research therefore established that the NSE exhibited month of the year anomaly for the year 2010 to 2014. The presence of the month of the year effect in the NSE was further confirmed by the results of a later research by (Bameka, 2019) who also found presence of month of the year effect but this study is limited to 53 companies under investigation . This research by Charles et al., (2020) examined seasonal anomalies and

financial distress in the NSE for the holiday anomaly from 2008 to 2016 using data for the 67 registered companies in the NSE but it does not take into account an event based approach . Based on the findings of the previous studies done in Kenya, this research study seeks to highlight the previous limitations by digging deeper into event based approach by looking extent effect month of the year effect by examining the effect in the context of Covid-19 period identifying the stocks and sectors that are more prone to the month of the year effect in the Covid-19 period era.

Covid-19 outbreak since its first announcement was in 31st December 2019 WHO, (2020) Wuhan City, Hubei Province in mainland China . It recently followed to spread globally and in Kenya, reported by the Ministry of Health on 12th March 2020. The occurrence of Covid-19 is regarded as an event study. H. Liu et al..(2020) defines an event study approach as a statistical method to assess the impact of an event on the value of a firm. The Covid-19 virus created a shockwave in global markets in which investors held back from trading activities with the fear related to Covid-19 pandemic. H. Liu et al., (2020) examined the effect of Covid-19 in stock markets and found negative relationship in returns of stock prices and the global fear index proved that in pandemic Covid-19, the returns of stock prices reduced as the fear related to Covid-19 increased. Furthermore, according to Mazur et al., (2021) volatility of stock prices in the New York Stock Exchange showed asymmetric volatility because news of the pandemic Covid-19 affected the prices of crude oil and subsequently affected the efficiency of the New York Stock Exchange market. To comprehensively evaluate the extent effect of seasonal anomalies in context of Covid-19 and its impact on the level of efficiency towards firms in the NSE, the study adopted an event study approach.

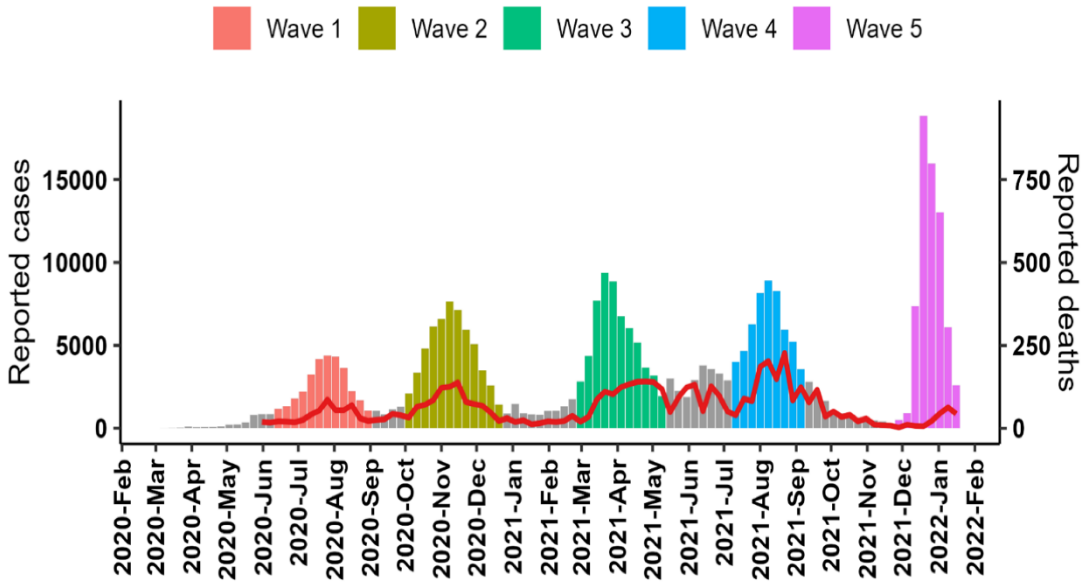


Figure 1: SARS Covid-19 Variant Spread of Infections across Kenya

Source: (Nasimiyu et al., 2022)

1.2 Problem Statement

In an efficient market stock prices tend to fully reflect all the available information at a time (Fama & French, 2008). In an efficient market information is responsively adjusted in stock prices and investors cannot trade to leverage gains by using predicting future stock prices using past stock price data. Efficient Market Hypothesis has been ridiculed and supported in equal measure by researchers in recent studies. Khanh & Dat, (2020) argues that with ability to investors to make profit gains from seasonal anomalies does contradict the theory of efficient market hypothesis. Month of the year effect is one of the most common anomalies identified and studied in previous empirical studies by (Alagidede & Panagiotidis, 2009; Bameka, 2019; Marrett & Worthington, 2012; Muchemi & Kuria, 2013).

EMH assumes that stock prices adjust rapidly to the arrival of new information, and thus, certain prices 'fully reflect' all available information. The basic theoretical case for EMH lies on three assumptions: investors are assumed to be rational and hence to value securities rationally, to the extent that some investors are not rational, they trade randomly and thus cancel one another without affecting prices, and finally, to the extent that investors are irrational similarly, their influence on prices is eliminated by rational arbitrageurs. Several authors have disproved the Efficient Market Hypothesis (EMH) by showing seasonality in the returns of stocks. The presence of a calendar anomaly in a stock market would provide an opportunity for market timing as strategy for investors; investors could buy stocks on days (months) with abnormally low returns and sell on days (months) with abnormally high returns. Market timing as a viable investment strategy further disproves the EMH.

As described in the latter part of the introduction, some researchers have disputed seasonal anomalies and suggest that these anomalies tend to disappear over time. The diminishing of seasonal effects over time is an indication of an increase in informational efficiency. As such, findings to this end would support the EMH since the market would seem to be undergoing a gradual elimination of the market timing opportunity. The presence or absence of seasonal anomalies can therefore be used to determine the level of market efficiency.

In Kenya, month of the year effect has been identified by Kiptanui, (2014), Muchemi & Kuria, (2013) and Charles et al.,(2020) for the period between 2010 and 2020 respectively but they don't tend to explain its impact on the level of efficiency in the market. This study intends to test for the presence of seasonal anomalies in the NSE. The extent to which these anomalies are present or absent will provide an indication as to how much room there is for timing strategies for stock trading. Additionally, the trend with regard to the strength of these anomalies over time would show the growth of market efficiency in the securities market. Therefore these few questions remain unanswered under the study: What is the extent effect of month of the year effect on the level of efficiency of firms in the NSE during pre and post Covid-19 pandemic? Which stocks in the NSE were most affected and its impact on the level of efficiency during pre and post Covid-19 pandemic? Which sectors in the NSE were most affected and its impact on the level of efficiency in the NSE during pre and post Covid-19 pandemic? This study sought to respond to these questions.

1.3 Research Objectives

1.3.1 General Objectives

The general objective of this study was to establish whether the month of the year effect is present and its impact on the level of efficiency on firms during pre and post Covid-19 pandemic period.

1.3.2 Specific Objectives

1. To determine the extent of month of the year effect on the level of efficiency of firms in the NSE during pre and post Covid-19 pandemic.
2. To determine which stocks were most affected by the extent of month of the year effect and its impact on the level of efficiency on these stocks during pre and post Covid-19 pandemic period of firms listed in the NSE.
3. To identify which sectors were most affected by the extent of month of the year effect and its impact on the level of efficiency during pre and post Covid-19 pandemic period of firms listed in the NSE.

1.4 Research questions

1. What is the extent of month of the year effect on the level of efficiency of firms in the NSE during pre and post Covid-19 pandemic period?
2. Which stocks were most affected by the extent effect of month of the year effect and its impact on the level of efficiency on these stocks during pre and post Covid-19 pandemic period of firms listed in the NSE?
3. Which sectors were most affected by the extent effect of month of the year effect and its impact on the level of efficiency during pre and post Covid-19 pandemic period of firms listed in the NSE?

1.5 Scope of the study

The study was carried on the NSE 20 Shares Index on all the shares of the 20 companies in the index trading in the Nairobi Securities Exchange from 2018-202I. The year 2018 was chosen because it fall under Covid-19 period era and because the study is based on an event based study period the period before the occurrence of Covid-19 should match the period after the occurrence of Covid-19 period era. Covid-19 pandemic started late in December 2019 before its spread globally which eventually was recorded in its first case on March 2020. The study used closing monthly price of shares and monthly closing price of NSE 20 shares index as used by previous studies.

1.6 Significance of the study

By establishing the extent effect of month of the year effect on the level of efficiency of firms listed on the NSE exchange, a greater amount of information regarding stocks and sectors affected by the anomaly will be available. The possible patrons of this information will be:

1.6.1 Fund Management Institutions and Active trading investors

If equities are susceptible to the presence or absence of month of the year effect, then fund managers are sensitive to creating value and maximising on profits hence the need for them to rebalance their portfolios to avoid making losses during periods or days that are before holidays.

1.6.2 Regulatory and Policy Formulators

The study on the effect of month of the year effect during Covid-19 pandemic period of firms would bring a ‘gold’ pot of knowledge about the informational efficiency in the Nairobi Securities Exchange which would give the level of sensitization about the level of investors’ literacy securities trading as well as being able to guide companies on how to maximise operational efficiency in terms of creating economic wealth for the nation.

1.6.3 Companies

There are firms to maximize the wealth of the owners. In an effort to increase the wealth of owners and reduce the cost of capital, firm managers need to identify opportunities for financing where their securities are overvalued or undervalued by irrational investors and capitalize on them by developing new securities products.

1.6.4 Academicians and Scholars

The study hopes to shed light as to whether month of the year effect seasonality is present or not in the Nairobi Securities Exchange. It will build on the existing literature on seasonal anomalies effect of listed firms in the NSE. It will add to the literature on calendar anomalies effect of firms by explaining whether the firms listed in the NSE are affected by 'reverse' trading patterns. This study will also identify areas for further research.

1.6.5 Investors

The study will also be important to market participants because it can inform the way they do risk assessment and risk management when doing their investment strategies. The existence of price seasonality’s presents an opportunity for the market participants to earn abnormal returns. This research will offer information that is useful in guiding the investors when they are investing.

CHAPTER TWO: LITERATURE REVIEW.

2.1 Introduction.

This chapter outlines the various theories that form the basis for the research. Under the theoretical framework three theories are considered for the research: Dow's Theory Fractal Market Hypothesis and Behavioural Finance theory. This chapter reviews other research work that has been done regarding determinants of stock market returns; stock market performance, macro-economic variables, risk free rate of return and half year and half of the month anomalies. The chapter concludes with a conceptual framework which illustrates the relationship among the variables.

2.2 Theoretical Review.

Theories were considered as an important anchor guide for the study. They enabled the study to define the study problem from a theoretical ground. Thus, the study was founded on Dow Theory, Fractal Market Hypothesis and J-Curve Phenomenon. These theories provided the theoretical underpinnings of the study on the analysis of the extent effect of seasonal anomalies on the operational efficiency of firms listed at the NSE. These enabled prediction of the relationship between the study independent and dependent variables and thus definition of the hypothesis. The theories presented herein are discussed in terms of the assumptions, proposition and criticisms that have been brought about by the theories over the years.

2.2.1 Dows Theory.

Charles Dow's works of 1896 in financial market analysis presents one of the earliest techniques developed to forecast the future states of the market, in what later came to be known as the Dow's theory after the compilation of the principles from his work by Hamilton in 1902,(Ghobadi, 2014). Dow's theory compares the movement of stock markets to the movement of sea waters. In particular, the theory says that the market will exhibit three distinct patterns, primary, secondary or tertiary which can be likened to the tides, waves or ripples, respectively. The tertiary phase just like the ripples represents small changes in the stock prices, usually the daily fluctuations. The waves represent bigger stock price changes over a relatively long period compared to the ripples. The final phase is the

tidal action, this phase is characterized by long and significant changes in the average of the stock prices(Bishop Jr, 1961).

The theory explains that rational investors are neither too concerned by ripples nor the waves but the tidal action of the primary phase(Hajar et al., 2014);(Avadhani, 2009). The primary phase shows two distinct and persistent changes. The bull and bear changes regimes characterized by persistent increase and decline of prices respectively. Each of the regime according to the theory will have three phases. The three phases in the bull regime are; one, the revival of confidence in the markets, followed by a good response by stock prices owing to the improved economic system, the final state is marked by widespread speculation and evident inflation. This phase paves the way to the first of the three phases of the bear regime. The phase realization that the stocks were at an inflated price and subsequent abandonment of hopes in the stock markets(Yadav, 2017). A key feature that hinges Dow's theory is reliance on average. According to the theory, the averages speak volumes. Its proposition is that at any particular point in time, the averages represent all that is known and that which can be foreseen by ordinary people and financial analysts. As such the averages are known to incorporate all the information that has any relevance to the market. The only exception is 'acts of God' and even in that case, the theory postulates they after effect are quickly incorporated (Elango & Macki, 2008)

The theory has been criticized for the late identification of changes in market phases and lack of statistical tests,(Ghobadi, 2014). Notwithstanding, the theory has been widely applied over a century and still has relevance to date. The theory has been advanced to develop trading rules which are guidelines for investment guidelines (Reilly & Brown, 2012). The impact here of this theory is that the evaluation of all the strategies was based on the moving averages of daily actual or differenced share prices and to test the performance of the moving averages during the five major waves of Covid-19 pandemic as shown on Fig 1.0.

2.2.2 The Fractal Market Hypothesis

The process followed by financial markets is assumed to be governed by Geometric Brownian Motion (GBM), Brownian motion is used to model processes which are subject to randomness, elsewise known as "noise". GBM refers to a lognormal stochastic process in continuous times which is defined by a combination of a deterministic part (drift) and stochastic part (volatility),(Hull, 2002) .Of relevance to this study are two properties of Brownian motion, independent increments and that Brownian motion processes have continuous sample paths. The latter two properties yield Fractal Brownian Motion which is a generalization of Standard Brownian Motion (SBM),(Leonenko et al., 2012) . A Fractal Brownian Motion with independent increments through time is characterized by a self-similarity a feature which is quite profound in financial time series. The financial markets will exhibit a pattern of up and down irrespective of time span selected.

The Fractal Market Hypothesis (FMH) was coined and formalized by Peters, (1993)by applying fractal geometry and proposed by Mandelbrot, (1982).Due to the shortcomings of the Efficient Market Hypothesis, FMH has been recommended as an alternative to EMH. Unlike the Efficient Market Hypothesis, which assumes a single investment horizon for all investment FMH is premised on the position that the stability of the market is defined by the variant time horizons for all market participants. FMH is able to provide an explanation of the behaviour through the cycles inherent in financial markets(Kristoufek, 2003). The theory has also been used to explain extreme events occasionally witnessed in financial markets and in these case Covid-19 pandemic period stands as a significant event in financial markets. FMH is based on a central premise that history repeats itself and, the stock markets follows a cyclic and repetitive pattern (Anderson & Noss, 2013). The theory is central to financial technical analysts in explaining investors' trading behaviour especially the announcement of the Covid-19 virus in Kenya on 12th March 2020 (Ministry of Health Kenya, 2021). In this study, the feasibility of market timing strategies assumes that history repeats itself and as such the historical price can be used to estimate the most likely future event in the Nairobi Stock Exchange.

2.2.3 Behavioural Finance Theory.

Behavioural Finance theory was first explored by(Thaler, 1993). The theory looks at the personality aspect of market participants by focusing on the sociological and psychological issues that influenced the decision-making process. At one given time a market participant makes the decision and strives to avoid the regret of making a wrong decision. According to Barberis & Huang, (1999) in the prospect theory which was part of the behavioural finance, market participants in most cases tend to compute losses and gains differently and will base their decisions on what they calculate to be gains rather than what they perceive to be the losses. There are two significant components of behavioural finance namely the decision making process and cognitive biases. Conservatism, heuristics, overconfidence and disposition effect are characterized to be cognitive biases(Ritter, 2003).

Decision making process by market participants is informed by the four underlying aspects that include the financial cognitive dissonance, overconfidence, prospect theory and regret theory. Human beings are known for tendering to over-rely on their abilities to predict the future outcomes while making decisions as a result of overconfidence. Market participants tend to associate themselves with good performance while distancing themselves from those decisions that earn losses. Human beings are also known to find reasons for justifying their decisions and reviewing their values to reduce internal conflicts(Dean & Sharfman, 1996). This is explained by the financial cognitive dissonance aspect. In regards to(Connolly et al., 2002) the regret theory, market participants who are in the process of making a decision currently will first re-evaluate the past turn of events or situation before they proceed to commit. According to Connolly et al., (2002) regret is emotion caused when an individual makes comparisons between a foregone state and a given outcome or state of events. However, there are critics of the prospect theory who argue that the fundamental and technical strategies are vital in informing the final decision of investors in as much as investor behaviour plays a role as well. Barberis & Huang, (1999)explained that the action of any rational participant is governed by moods and emotions which can in turn determine the operational efficiency of firms and returns of stocks.

From the various studies, Connolly et al., (2002); Ritter, (2003); Barberis & Huang, (1999) it is evident that the participant's moods and emotions play a massive role in capital markets. Behavioural Finance theory is relevant to this study because it can be used to explain the reason behind decisions by managers in regards to strategies used to meet efficiency of firms. Managers will support or be against strategic choices depending on how they perceive operational efficiency and if they tend to benefit or not while trying to arbitrage profits in the presence or absence of seasonal anomalies. When they are convinced that there are benefits that will accrue to the firm they will make decisions that will support it and when the perception on the presence or absence of seasonal anomalies in relation to operational efficiency of firms is non-beneficial, they will distance themselves from this strategy and will not make decisions supporting it.

2.2.4 Theoretical Review Summary

The theoretical framework has highlighted and summarized the theories that influence seasonal anomalies in regard to month of the year effect and behaviour of investors. In summary seasonal anomalies effects can be explained by three theories as stated by, Malkiel (2003). These theories are the Dow Jones Theory, Fractal Market Hypothesis and Behavioural Finance Theory. However, it is Fractal Market hypothesis and Dow Jones Theory that best explains the event based on Covid-19 pandemic in financial market in regard to the first wave, second wave and third wave as it looks at an investment return over time so as to make a certain decision on its relevance. This theory, therefore, helps in explaining how the demeanour of month of the year effect of firms and their trading of securities. The next section will look at the empirical framework.

2.3 Empirical review.

The empirical review focused on the seasonal anomaly; month of the year effect and with emphasis the explanation of these extent effect of month of the year effect.

2.3.1 Month of the Year effect

The common and most interesting findings of researchers carried out in the month of the year effect is the called January effect. It is argued that returns of stocks in this month is far different and significant from the rest of the year's returns. This violates the efficient market hypothesis (EMH) theory, an idea partly developed by Eugene Fama in the late 1960s. Among the pioneering works (Wachtel, 1942) documented the January effect and found that the Dow-Jones Industrial Average from 1927 to 1942 showed frequent bullish tendencies from January to December.

The first studies by Rozeff, (1986) and Watchel, (2016) analysed the US stock market and observe significant higher returns in January than in other months of the year. Also Gultekin & Gultekin, (1983) studied seventeen countries using both non-parametric and parametric tests , and concluded that January returns are significantly higher when compared with the other months, in thirteen of those countries.

Cross, (1973) investigated the January effect, that is, an increase in share price in January in the Malaysian stock market. The stock market efficiency is the idea that equity prices of listed companies reveal all the data regarding the company value (Fama & French, 1996). In this way, there isn't possible to make additional returns. However, evidence against the Efficient Market Hypothesis is growing. Researchers studied Calendar Anomalies (CAs) that characterised financial markets. These CAs contradict the efficient hypothesis. This research studies some of the most important market anomalies in France, Germany, Italy and Spain stock exchange indexes in the first decade of new millennium. Rossi & Gunardi, (2018) using markov-switching model analysed the stock returns for 1926-1992 but did not find any significant January effect. However, for low capitalization small firms, very strong January effect existed. Rossi & Gunardi, (2018) confirmed higher return in January for the stocks having accrued capital losses in last year. Le Bris & Tobelem, (2017) checked out the relationship of size effect and seasonality and found that half of the difference between rates of return (for large and small firms) take place in month of January. Also he established that small firm returns in January are significantly higher than the large firm returns.

A recent study conducted by Elango & Macki, (2008) using monthly average returns or U.S stocks for the period of 1970 to 2005 reveals that a significant January effect existed except for the period 1990-2005 where negatively July effect dominated. While examining Tokyo stock exchange, Japan for January and size effects, Rossi & Gunardi, (2018) found that both of these effects are present there and are just are similar as the U.S Stock Market. Agrawal & Tandon, (1994) found the presence of the January effect for Canadian stocks over the period 1951-1980. Alhajraf, (2021) investigated the month of the year effect in Turkey by employing percentage returns of Kuwaiti securities exchange index for 1988-93 study reported significantly high returns for three months: January, June and September. However, returns of January are almost double than the compounded returns of June and September.

Agrawal & Tandon, (1994) examined calendar anomalies in stock returns for South America for example Argentina, Brazil, Chile and Mexico for 1980 to 1992. By dividing data into two sub periods and then analysing, it is found that returns for the month of January are higher in Argentina only. Presented evidence Malaysian stock market where the average January returns were found significantly positive and higher as compared to other months during the period of 1970-1986. Another study conducted by Agrawal & Tandon, (1994) revealed significantly higher returns for month of January for six out of eight emerging Asian Pacific stock markets from 1975 to November 1987. While Examining Amman stock exchange, Haj, (2020)found no evidence of monthly seasonality as January effect.

Bameka, (2019) reports that roughly half of the small and large stocks of NSE and USE over the 2000 to 2018 period occurs during the month of January. Marrett & Worthington, (2012)studied the daily returns of the Australian Stock returns between 1980 and 1990 and found a significant January effect. This is subsequent to the research findings of Bameka, (2019) who investigated on both the NSE and USE. In both of these studies, there are recommendations that companies should adopt better operational efficiency measures that will improve the organizational performance translating well to the share price of a firms and in this regard managers can be able to earn higher returns for shareholders by trading through taking advantage of arbitrage or the can increase shareholders' wealth.

Kiptanui, (2014) and Kamau, (2017) also investigated the month of the year effect in Kenya for the NSE and found out that month of the year effect was established with the months of December and January demonstrating highest returns but with apparent returns during the months of May and August. This study was however limited to investigating the presence

of calendar anomalies alone and not it's consequent effects upon the presence or absence of these calendar anomalies. All this discussion shows that the existence of month of the year effect and in most cases this leading month is January.

2.4.2 Explanation for the effects

Three hypotheses have been formulated by many researchers in trying to explain the month of the year anomaly:

2.4.2.1 Event based approach

Sias & Starks, (1995) and Klein & Rosenfeld, (1987) document that event based approaches, especially selling activity, tends to increase trading activity when event that tends to have an impact on economies especially financial markets. Sias & Starks, (1995) report that the month of the year effect returns and volume patterns are more pronounced in securities in which institutional investors play a great role. Klein & Rosenfeld, (1987)assumes that increased institutional trading activity is responsible for the January seasonal returns. While investigating January effect for polish stock exchange, Mcwilliams & Siegel, (1997) also established that since no taxes are levied on capital gains, tax loss selling hypothesis is out of questions and event based activity by institutional investors is the only reason for increase in trading volume of continuous trading system during December and January. Mcwilliams & Siegel, (1997) report that month of the year effect primarily occurs in the last two weeks (fourth and fifth weeks) of the month. Yin et al., (2020) report for US that Month of the Year effect is caused by a combination of various factors, especially the fortnight of the month, account settlement day, ex dividend day, arrival of (bad) news on Fridays, trading activity and bid-ask spread.

The traditional economic and financial theory holds that stock prices are mainly affected by market and firm characteristic-based factors. Companies in the same industry face the same regulatory and policy environment and similar macroeconomic conditions. When faced with changes in the economic environment, the operating conditions of companies in the same industry are highly correlated (Moskowitz & Grinblatt, 1999). According to the theory of behavioural finance, in addition to the basic value of stocks, emergencies will have an impact on investors' psychological and behavioural factors, which in turn will have an important impact on stock prices. Z. Liu & Zhou, (2022)believe that investor optimism will reduce earnings volatility, while investor pessimism will increase earnings volatility. Therefore, the outbreak of Covid-19 will have an impact on the economic environment,

which will affect investor sentiment, causing stock price changes. The Covid-19 pandemic, as a public health emergency, is not only causing human infections and deaths, it is also disrupting the stock market. According to the Ministry of Health Committee in Kenya, as of June 5th 2020, the cumulative number of Covid-19 diagnoses in Kenya was 2,093, with a cumulative death of 2 (Ministry of Health Kenya, 2021). As the first country in East Africa to respond to Covid-19, Kenya made great efforts to resume work and production. When Covid-19 was declared, the Kenyan government called for greater macro-policy adjustments and an active fiscal and taxation policy. Bowmans, (2020) found that the outbreak of the pandemic caused a sharp rise in risks in the financial sector, which transmitted to other industries. However, different industries are affected by the pandemic to varying degrees, and their responsiveness also varies.

2.4.2.2 Tax selling loss hypothesis

Several authors carried more advanced studies on the tax loss hypothesis in order to investigate who the most probable firms and securities that participate in tax loss selling would be. Branch, (1977) suggests that small firms ' stock returns are more volatile than large firms ' returns, small-firm stocks are more likely to have generated usable tax losses and therefore be candidates for tax loss selling. Evidence in support of this hypothesis is provided by (Brown et al., 1983). However, contradicting evidences are also abundant. Fountas & Segredakis, (2002) in Japan report significant January effects, even though January is not the beginning of the tax year in the countries of study. Ogden, (1990)demonstrate that the January effect obtains in markets without capital gains taxes, and Patel, (2016) report that the January effect obtains even before the imposition of income taxes in the United States. Similar to Aggarwal & Rivoli, (1989) study the Canadian stocks where December is the tax year-end. They find a January seasonal prior to 1972 when Canada had no capital gains tax. One explanation they offer for the existence of a January effect in countries without December-end tax year is that foreign investors induce a January seasonal in those countries. If investors from countries with a December-end tax year have significant equity holdings in foreign countries, then the January seasonal would be observed due to trading by those investors.

2.5 Research gap

In perfect markets, according to Fama & French, (1996) , information that is new in a market is immediately supposed to be reflected in the market share price and the result investors should not be able to make returns over and above when trading, however this seems not to be the case in the occurrence of seasonal anomalies. Theories of Efficient Market Hypothesis and Tax loss selling also differ in how these factors are interpreted with each emphasizing on the case of the costs and benefits of trading strategies of managers who are managing their firms at various levels of operational efficiency under the occurrence of seasonal anomalies. From the empirical review, it is evident that the holiday anomaly is one of the most researched anomaly as different authors have researched different markets to identify whether it is present.

Studies carried out in Kenya by Charles et al., (2020), Kiptanui, (2014) and Muchemi & Kuria, (2013) have shown presence of calendar anomalies especially month of the year effect. These studies however did not investigate how the extent effect of month of the year effect in context of Covid-19. Kiptanui, (2014) recognises the need for this type of research and recommends investigating impact of seasonal anomalies on economic-sector based areas by looking at the firms listed as proxy especially in Nairobi Securities Exchange especially on an event based study basis .There is therefore a research gap on how the extent effect month of the year in the content of Covid-19 affected Nairobi Securities Exchange. Further of interest is how the different stocks and sectors of the NSE are affected. There is also a research gap on the level of market participants' awareness on the market anomaly and whether they take advantage of such anomalies.

2.5.1 Research Gap Matrix.

Table 1: Research Matrix

AUTHOR	**ARTICLE**	**STUDY METHOD**	**RECOMMENDATIONS**
(Woo et al., 2020)	Review on Efficiency and Anomalies in Stock Markets.	Review Study Method	Proposal only Recommends on further study in developing markets
(Muchemi & Kuria, 2013)	Stock Market Anomalies : A Study of Seasonal Effects on Average Returns of Nairobi Securities Exchange	Experimental Case Study	Study of how anomalies affect the stocks in relation to the operational function of a firm.
(Baik et al., 2013)	Changes in operational efficiency and firm performance: A frontier analysis approach	Review study case	Study implies that equity investors do not fully incorporate the information in efficiency changes. Suggests further study on how changes in stocks performance can alter operational efficiency in firms

(Musah, 2019)	Exploring the Link between Operational Efficiency and Firms' Financial Performance: An Empirical Evidence from the Ghana Stock Exchange GSE	Review Study Case	Specifically, the study sought to determine the association between operational efficiency and the firms' financial performance as measured by ROA; examine the connection between operational efficiency and the firms' financial performance as measured by ROE; and to find out the affiliation between operational efficiency and the firms' financial performance as measured by ROCE.
(Al-Jarrah et al., 2011)	The turn of the Month Anomaly "In the Amman Stock Exchange: Evidence & Implications.	Review study Method	January effect is examined and found to have insignificant role in explaining the "turn of the month trading anomaly" whenever the monthly anomaly exists, over study period. These findings, therefore, do not reject the random walk hypothesis in ASE. The average size of Namibian banks has not reached the optimum size at which their operating costs are lowest. Study suggest measurement by other

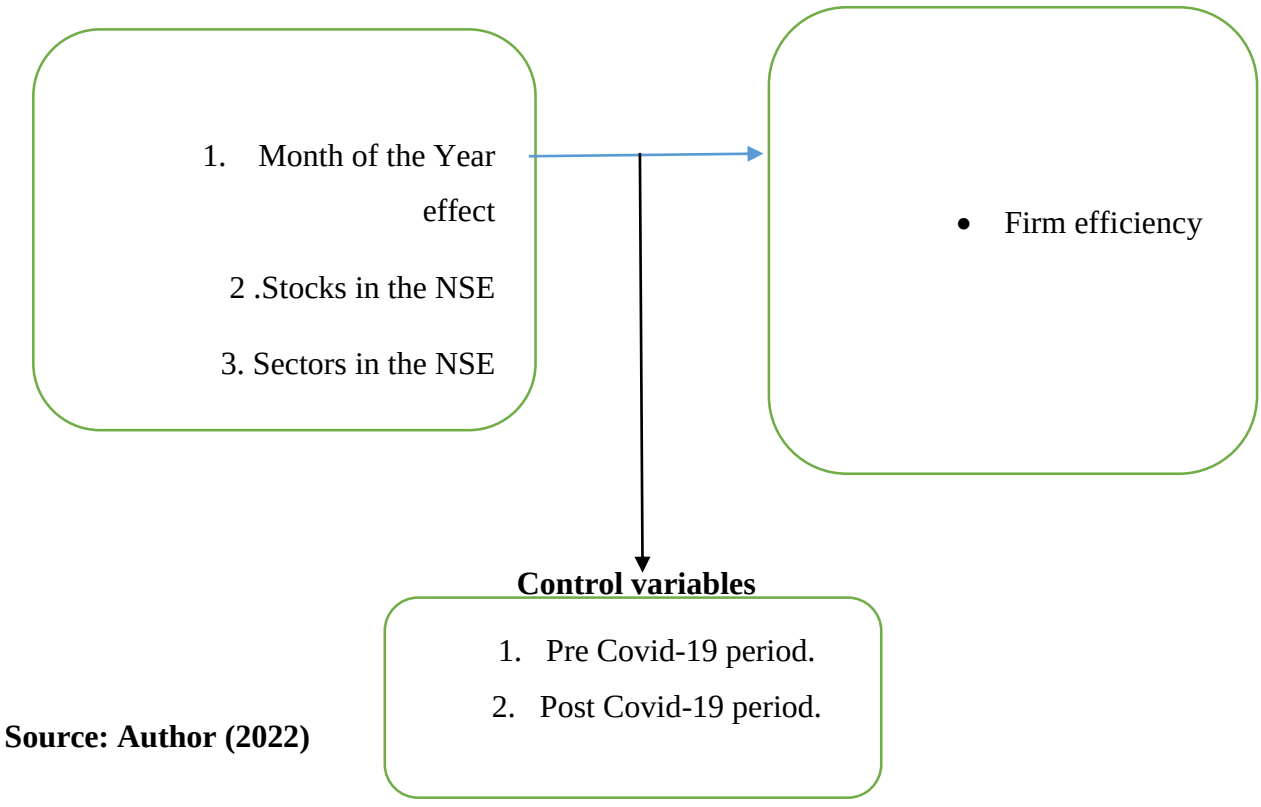
			operational metrics for further study.

Source: Author (2022)

2.6 Conceptual Framework on Seasonal anomalies

The conceptual framework presented below has been arrived at after reviewing previous researchers have been done by (Kamau, 2017), (Kiptanui, 2014), (Marrett & Worthington, 2012), (Bameka, 2019). This framework has helped in the examination of the extent effect of month of the year effect on efficiency of firms listed in the NSE. The dependent variable is firm efficiency while the independent variable are; Month of the Year effect, stocks in the NSE and sectors in the NSE.

Figure 2: Conceptual Framework



Source: Author (2022)

2.6.1 Operationalization of Variables

A description of how variables utilised in the study were measured is done in this section. This has been depicted in the table 1.1

Table 2: Study Variables

Variables	**Authors recommending measurement**	**Proxy**	**Definition**
Dependent variable			
Independent Variable:			
Stock prices at different periods	(Kiptanui, 2014)**,** (Gworo et al., 2020)	Stock prices	Current Stock Prices of individual Company at time ***t***
Dependent Variable			
Return on Stocks	(LÉ & Vinas, 2020)	Log Monthly returns	$R_t = Log(^{P_t}/_{P_{t-1}})x\ 100$

Source: Author (2022)

The framework of analysing returns is largely borrowed from (French, 1980) and (Pandey, 2010). In all of these studies, the variables to be used were divided into two categories: First is the independent variable namely be the stock returns at different month periods. In the ' month-of-the-year' effect, the time period (t) would be a particular month from a twelve-month calendar. Subsequently, the dependent variable is the return on the stocks. This is mainly on monthly returns. The log returns will be computed as below:

$$R_t = Log(^{P_t}/_{P_{t-1}})x\ 100$$

2.7 Summary of Literature review

This chapter reviews the Dow's theory, Fractal Market Hypothesis and Behavioural finance theory which are the theories that support the current research on month of the year effect in the context of Covid-19. It also further reviews previous literature on the month of the year effects by looking at the literature on month of the year effect anomaly. From the literature being reviewed, it is evident that despite the use of different methodology and a different set of data, few researchers globally have been able to identify month of the year effects in the stock returns but not in the recent context of Covid-19 pandemic. This chapter further looks at the extent effect of month of the year effect on the Nairobi stock exchange in the event of Covid-19 and the relationship between the market participants and market anomaly. The chapter concludes with a conceptual framework that helps identify the variables that are being studied.

CHAPTER THREE: RESEARCH METHODOLOGY.

3.1 Introduction

This chapter outlines the research Philosophy and the research design to be followed in this study. This is then followed by the description of the population to be considered and how sample selection is done succeeded by how data is to be collected. The methodology of how data was analysed follows and the chapter is then concluded with ethical considerations observed in this research.

3.2 Research Philosophy

Research Philosophy is a belief about gathering, analysing and using data about a phenomenon. The purpose of research philosophy is to assess the assumptions that support the adopted research strategy together with the practical experiences, relationship to knowledge and the process through which they have been formed in real life situations (Saunders et al., 2009). A positivism research philosophy was adopted in this study (Saunders et al., 2009) indicates that positivists recognize that only 'factual' knowledge can be gained through observation which includes measurement. In this philosophy, the researcher is limited to data collection and interpretation in an objective way, according to this philosophy. Positivism depends on quantifiable observations that lead to statistical analyses.

3.3 Research Design

According to Williams, (2007), research design is an arrangement of conditions for data collection and analysis in a way that attempts to combine relevant data on the study topic. It is the general project pattern that specifies the kind of information to be collected, sources to be used, and procedures to be employed. Based on the research objectives, mixed research design was adopted in this study. Event study methodology was used for the purpose of identifying Covid-19 pandemic to month of the year effect on efficiency of firms in the NSE. Descriptive research design was used then for the purpose of describing the attributes the various variables under the study. The choice of descriptive research was on the basis that it allows a researcher to determine the correlations among several variables either in isolation or in combination and their effects on the dependent variable(Singh, 2006). The study also employed qualitative aspects in examining stock returns and sectors in regard to the market anomaly.

3.4 Population and Sampling

Saunders et al., (2009) defines population as a set or totality of entire objects or members that conform to specific requirements, or have similar characteristics. It includes an entire group of people, happening or things of concern that a researcher is investigating. Williams, (2007)states that population is the total units from which data is to be collected. In this study census is considered as all the firms in the NSE are listed. Census is more dominant as it helps solve on accuracy which is related to sampling(Altman, 2013).

The population for this study was sixty-four (64) firms listed on the Nairobi Securities Exchange between 1st January 2018 and 31st December 2021. The year 2018 was chosen as this study was an event based approach study in which the period before and after should be equal in terms of data analysis. 2021 was latest period post Covid-19 period prior the occurrence of Covid-19 pandemic in which data is available at NSE.

3.5 Sample and Sampling Technique

A sample is a portion of the target population from which data is collected, summarised, analysed and inferences about the target population from which the sample is drawn is done(Taherdoost, 2020). A good sample is logical and practicable and should have regard for time, costs, validity and accuracy(Taherdoost, 2020). There was one sample used in undertaking this study.

The sample used was listed companies included in the NSE 20 Share Index for the period under consideration. That sample was used to satisfy the first, second and third objective. This choice of the NSE 20 Share Index is mainly due to the investor attractive qualities that the NSE possesses; The NSE 20 share index measures the performance of 20 blue chip companies with strong fundamentals and which have consistently returned positive financial results. The NSE 20 Share Index is a price weighted index. The members are selected based on a weighted market performance for a 12-month period as follows; Market Capitalization 40%, Shares traded 30%, Number of deals 20% and Turnover 10%.

Preferably, these companies should be the most attractive to investors and much of the trading activity will be focused on this set of companies. The study intends to address the growing concern using NSE 20 as the stock index will provide the study with reliable data as the companies included in the NSE 20 index are set to have a minimum of trading continuously for one year, being a ‘blue chip’ with superior profitability and of dividend

record, and having a minimum of market capitalization of Kshs. 20 million. Therefore, with this set criteria of companies selected to be in the NSE 20 index the consistency of quoted shares at the NSE will ensure data provided is efficient and reliable. This will give more clarity and aim to the study in its objective to analyse the extent of seasonal anomalies on operational efficiency of firms listed at the NSE.

Table 3: Categorization of firms under the study by NSE

SECTOR	**NUMBER OF COMPANIES**	**PERCENTAGE OF FIRMS UNDER EACH CATEGORIZATION**
Banking	8	40%
Manufacturing & Allied	2	10%
Commercial & Services	2	10%
Construction &Allied	1	5%
Energy & Petroleum	2	10%
Insurance	2	10%
Investment	1	5%
Investment Services	1	5%
Telecommunication	1	5%
Total	**20**	**100%**

Source: Author 2022

The sample for this study comprised of firms listed at the NSE 20 share index as at the end of the year 2021 for a period of 14 years spanning, 2008-2021. Firms that has been threatened to be delisted from the NSE are exempted from the study. Firms that lacked data are also excluded in the final sample for the study.

3.6 Data Collection Methods

Data collection refers to the process of gathering and measuring information so as to answer questions that prompted undertaking of the research. This study utilised secondary data. Monthly data for the listed companies for 14 thirteen years (February 2018 to December 2021) was be collected and analysed. Audited financial statements for the companies listed under the NSE 20 share index were used, thus increasing the reliability and validity of the findings and conclusion. The specific data collected include the monthly share prices and stock returns of stocks,

3.7 Data Analysis

Data analysis is the process of transforming raw data into profitable information that can be used to the research in making conclusions about the research topic(Mugenda & Mugenda, 1999). This study employed, event study methodology, regression analysis and descriptive statistics for secondary data, where data was recorded, organized, coded in summary tables and distribution charts in readiness for analysis. The association between the independent and dependent variable was measured using a regression analysis. Additionally, this method has been commonly used to assess the extent month of the year effect in Nairobi Securities Exchange in the Covid-19 pandemic period. Secondary data was organized in excel spreadsheets and STATA was used to enable meaningful analysis afterwards this data was presented on frequency tables, graphs, pie charts and histograms for analysis purpose of secondary data considering the time series effect in the data.

To assess the extent effect of seasonal anomalies on operational efficiency of firms listed on the Nairobi Securities Exchange, secondary data was used. Inferential analysis including panel data and regression were used to determine the relationship between the dependent and independent variables. The results were then presented in tables from which interpretations were drawn.

3.7.1 Assessing Month of the Year Effect

The first step of the analysis was to carry out some statistical tests that would establish the suitability of the data to the methods of analysis proposed. The two preliminary tests carried out were the White test for heteroskedasticity and the Jacque Bera test for normality. The threshold for the White test is a p-value of the R^2 greater than 0.05 to guarantee that data is suitable. The Jacque Bera test requires that the p-value or the residuals to be of a value of zero to prove normality. Once the data was proven to be heteroskedastic and normal, it was suitable for use in an OLS regression.

Further, to test whether seasonalities exist in the returns, monthly year effect specifically, the study will use ordinary least squares (OLS) regression with dummy variables. It is suggested by Brooks, (2008) as a simple way of detecting seasonalities in stock returns.

As stated before monthly log returns will be computed as below;

$R_t = Log(^{P_t}/_{P_{t-1}})x\ 100$…… (a) (Bameka, 2019)

Where $R_t$the compounded rate of is return of the index at time (t) and P_t is the level of the index at time (t).

The objective is to test whether monthly returns are statistically different from each other. For detecting a possible month of the year effect, the following regression model is constructed;

$R_t = \propto_1 M_{1t} + \propto_2 M_{2t} + \cdots \propto_{12} M_{12t} + \varepsilon_t \quad -\infty < x < \infty$…….. (b) (Kiptanui, 2014).

M_{xt} are dummy variables such that M_{1t} if month (t) is January and zero otherwise; month *t* is February and zero if otherwise and so forth. The OLS coefficients $\propto_1$ to $\propto_{12}$ are the mean returns for January through December respectively and ε_t is the stochastic term. The presence of seasonality implies;

$H_0 : \alpha_1 = \alpha_2 \ \ldots\ldots\ldots \alpha_{12} \ = 0$ against $H_1 : \ \alpha_1 \neq \alpha_2 \ \ldots\ldots\ldots \alpha_{12} \neq 0$

If the null hypothesis is rejected then stock returns must exhibit some form of monthly seasonality(Kiptanui, 2014). In order to find out the seasonal pattern, each return observation is coded as day.

Previous studies examined the month of the year effect in various markets in the context of equation (b) using standard t and F-test without paying attention to the time series properties of the data. This may result in a major problem: The error term in the model may be auto correlated resulting in misleading inferences. The can be resolved by including autoregressive terms in (b)(Kiptanui, 2014).

3.7.2 Model Specification

The following regression model was employed in analysing the extent of the effect of month of the year effect listed in the Nairobi Securities Exchange.

$$R_t = Y_0 + \sum_{11}^{11} Y_t D_{it} + e_t$$

(Al-Jarrah et al., 2011).

Where is the return on month t for each country's index examined separately, D_{it} is dummy variable taking value of one for the returns which occur on month and zero otherwise, Y_0 is the intercept which measures the mean return for January and the coefficients from Y_1 to Y_{11} measure the difference the mean return of January and other months of the year and *t* is the random error term.

Monthly data for the four years was encompassed the entire period of the study which was considered as this ensures there are adequate degrees of freedom estimations in the models. The secondary data was acquired from published annual financial reports of all firms in the NSE. Also relevant literature in magazines, websites and other relevant secondary sources formed part of the secondary data.

3.8 Research Quality

This study ensured that research quality is maintained. According to Williams, (2007) research validity measures the effectiveness of the data collection instruments and whether the findings can be generalized from what they have found. Internal validity was observed by explaining the relationship between the independent variable and the dependent variable in this study. Mugenda & Mugenda, (1999) states that internal and external validity and reliability of data are very important in any given research. Validity checks whether the tests used to meet the stipulated objectives by measuring what they are supposed to measure(Saunders et al., 2009). Besides, the relationship between variables was explained because of enhancing internal reliability.

3.9 Ethical Consideration

Ethical considerations are taken into considerations throughout the whole process of the study. This was achieved by ensuring that there was high level of confidentiality with the data collection and ensuring the findings given were a true representation of the data analysed. All referenced materials were duly cited by using APA referencing style set by the university guidelines and plagiarism was avoided as well acknowledgement done for all scholars whose work has been used in the research. The research study also presents the actual results that it obtained. Additionally, permission was sought from Strathmore University to carry out the research study.

CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This Chapter describes the results of the applied methodology as described in the preceding chapter. It starts off with a description of the diagnostic tests undertaken to determine suitability of the data followed by details of the results of the regression analysis in the data. In order to satisfy objectives, set out in chapter one, it describes the findings with regard to the month of the year extent effect on the Nairobi stock exchange for stocks in the NSE20 index during the Covid-19 pandemic period.

4.2 General Information

This study used for the NSE 20 share index, the daily closing prices for the 20 listed companies listed in the index for the study from 2018 to 2021. The 20 companies that were selected had been trading consistently for the entire period of the study. The secondary data used for this study was collected from Nairobi Stock Exchange through its memorandum with Strathmore Business School.

4.3 Diagnostic tests

4.3.1 Relevance and application of diagnostic tests in this study

The use of an OLS regression analysis to establish month of the year effect in order to determine the extent effect of month of the year effect of firms listed in the NSE during the Covid-19 period presumes that data being used meets the minimum requirements. These requirements include the main assumptions that the data is normally distributed, serial uncorrelated and with constant variance (Brooks, 2008). This first test that is carried out is a test of homoscedasticity. If the returns for the NSE20 index are found to have a constant variance, state known as homoscedasticity is proven to be found. The OLS regression seeks to minimize residuals and in turn produce the smallest possible errors. Brooks, (2008) explains that OLS regressions give equal weight to all observations, but when heteroscedasticity is present the cases with larger disturbances have more “pull” than other observations. The coefficients from OLS regression where heteroscedasticity is present are therefore inefficient but remain unbiased. In this case, weighted least squares regression would be more appropriate, as it down weights those observations with larger disturbances.

Sheppard & Rahbek, (2012) also suggest that the error terms should be normally distributed in order to allow us to make exact inferences. Should the tests for homoscedisticty and normality turn out to be positive (showing the presence of homoscedasticity and normality), it would allow for the use of OLS regression.

4.3.2 Descriptive Statistics of the Return Series

Table 4: Descriptive Statistics

	N	Min	Max	Mean	Std.Dev	Skewness	Kurtosis
	Stat	Stat	Stat	Stat	Stat	Stat	Stat
Monthly Return	96	-0.22	0.30	0.0004	0.0155	0.0128	0.0423

From the table it can be seen that the frequency distribution of this series is not normal. The skewness coefficient is greater than 1. Researchers consider it as extreme [7]. But skewness of Bangladeshi return series (1.485) is much higher than that of the Indian counterpart (0.98).

Kurtosis calculation (72.31) shows that the return series is an extreme leptokurtic distribution. Generally, values for skewness zero and kurtosis value 3 represents that the observed distribution is perfectly normally distributed. So, skewness and leptokurtic frequency distribution of index return series on DSE indicates that the distribution is not normal. Non-normal frequency distributions of the stock return series asserts that return series of DSE may not follow random walk model.

It is also to be noted that in another study conducted by Professor Kevin Keasey and Asma Mobarek found the similar result in 2000. But this result shows that the extremity of both skewness and kurtosis has increased. This may imply further deviation from the random walk model.

4.3.3 Non-parametric test

4.3.3.1 Kolmogorov-Smirnov test

Kolmogorov-Smirnov Goodness of fit test (K-S test) is a non-parametric test and is used to determine how well a random sample of data fits a particular distribution (uniform, normal and Poisson). The one sample K-S test compares the cumulative distribution function for a variable with a uniform or normal distribution and test whether the distributions are homogeneous Both normal and uniform parameters used to test the distribution.

Table 5: One Sample Kolmogorov-Smirnov test

		Monthly Return Lognormal
	N	96
Normal parameters	Mean	.0006
	Std Deviation	.01685
Most Extreme	Absolute	.170
	Positive	.170
	Negative	-.165
Kolmogorov-Smirnov Z		10.827
Asymp Sig. (2 tailed)		.000
a.Test distribution is Normal		

From the test above the one sample Kolmogrov-Smirnov test indicates that the random sample of data fits the distribution which is normal with the number of observations for the four months at 96 months with the Kolgomorov- Smirnov Z at 10.827 and asympomatic sigma two tailed at .000. The Normal parameters for mean, standard deviation and absolute respectively are at .0006, .01685 and .170. This shows that the sample data fits the distribution and is normal.

4.3.3.2 Run tests

The Runs Test procedure tests whether the order of occurrence of two values of a variable is random. A run is a sequence of like observations. A sample with too many or too few runs suggests that the sample is not random(Chen, 2010).

The run test, also called Geary test, is a non-parametric test whereby the number of sequences of consecutive positive and negative returns is tabulated and compared against its sampling distribution under the random walk hypothesis (Elbarghouthi et al., 2012). "*A run is defined as the repeated occurrence of the same value or category of a variable"*(Chen, 2010).

It is indexed by two parameters, which are the type of the run and the length. Stock price runs can be positive, negative, or have no change. The length is how often a run type occurs in succession. Under the null hypothesis that successive outcomes are independent, the total expected number of runs is distributed as normal with the following mean:

$$\mu = \frac{n(n+1)x^2}{n}$$

And the following standard deviation:

$$\mu = (+\frac{nx}{(n-1)} + \frac{n(n+1)}{n(n-1)}) \text{ ^1/2}$$

(Elbarghouthi et al., 2012).

Table 6: Run test

	Market Return	Log Market Return
Test Value a	0.01515302	0.010284698
Cases < Test Value	50	45
Cases > = Test Value	46	51
Total cases	96	96
Number of Runs	46	46
Z	-3.22019318	-3.604011033
Asymp. Sig (2 tailed)	0.001365098	0.003133440

a. Mean

From the run test results of run test we see that the actual number of runs significantly lower than expected number of runs for daily return of NSE 20 Share Price Index. It rejects the null hypothesis the return patterns of NSE follows the random walk behavior. On the whole the results of the runs test shows that the monthly return of Nairobi Stock Exchange are not random as the probabilities associated with expected number of runs are all greater than the observed number of runs.

The above run tests shows that positive changes of return are 46 and the negative change in return is 50 out of 96 cases. The number of actual observation where the actual price changes equals or exceeds the test value (average monthly changes in NSE All share price index) is 46 and the actual number of changes where the actual price changes gets below the test value (average daily changes in NSE All share price index) is 50.

The model shows the critical value of 3.20 and 3.60 is cases of percentile monthly return and logarithmic monthly return which is quite higher than the table value of 1.96. Furthermore p value of 0.136% and 0.031% in case of percentile return and log return being significantly lower than that of acceptable table of risk of 5% indicates that we can reject that there existed Random walk characteristic theoretically and vice versa. That is stock returns of NSE do not follow random walk hypothesis.

4.4 Month of the Year effect in Returns in the NSE 20 index.

Table 7: Test of equality of mean across monthly returns

Months	Pre-Covid-19 Returns	Post Covid-19 Returns	Combined Returns
D1	0.08435	0.01292	0.000365
D2	0.00125	0.00101	0.000113
D3	0.00316	0.00056	0.000186
D4	0.00455	0.00012	0.002335
D5	0.00862	0.00005	0.002934
D6	0.03256	0.00002	0.001629
D7	0.02587	-0.00001	0.003293
D8	0.03582	0.00001	0.003792
D9	0.00878	0.00000	0.002439
D10	0.00589	-0.00082	0.025070
D11	0.05682	-0.00082	0.178000
D12	0.07568	0.01062	0.001253
P-Value	0.0365***	0.0086**	0.1255
F Statistic	2.8671	2.33	0.9253
F-Critical	2.098	2.098	1.098

***p< 0.01

**p < 0.05

* p < 0.10

Source: Author 2022

The results of the test of equality of mean across are shown in table 1.5. The first column of the table shows month for the year considered for the study. The second column shows the pre-Covid-19 returns. The third column shows the returns for the post-Covid-19 returns while the last column shows the combined returns for the pre-Covid-19 and post-Covid-19 returns. The bottom rows show that the P-value and F-statistics from the results of the test of equality across the returns for the time period.

From the test of equality of mean for the pre-Covid-19 return, the P-Value is 0.0365 while the F statistics 2.8671. It can therefore be deduced that, there is significant difference in pre Covid-19 returns for the time period investigated. The P-value for the test of equality for the post-Covid-19 returns is 0.0086 while the F-statistics is 2.33. This imply that the post-Covid-19 returns are significantly different for the years in time considered. The P-Value from the test of equality for the combined pre-Covid-19 and post-Covid-19 returns is 0.1255 while the F-statistic is 0.9253. This implies that, when combined, the pre-Covid-19 return and post-Covid-19 mean return are statistically different from each other.

From the results, the returns for the pre-Covid-19 and for the post-Covid-19 are significantly different across the four years' time period for the twenty companies. After establishing that the returns for the twenty companies in four years were significantly different for the pre-Covid-19 and post-Covid-19, the study further established the number of times that the returns were higher as compared to the ordinary trading days. This helped to establish whether month of the year effect had more impact during pre-Covid-19 and post-Covid-19.

Table 8: Number of times the return is greater than normal days

Months	Number of times Pre-Covid-19 Returns are greater than	Number of times Post Covid -19 Returns are greater than
D1	55	65
D2	15	7.3
D3	9	5
D4	6	-3.1
D5	2.6	-2.9
D6	3.2	-1.89
D7	4.8	1.1
D8	2.89	-8.3
D9	7.89	1.8
D10	2.389	2.23
D11		
D12		

Source: Author 2022

The second column of the table 1.6 shows the number of time that the pre-Covid-19 return is greater than ordinary trading days. The results indicate that January the highest positive returns for pre-Covid-19 which are 55 times the returns for the ordinary trading days. December had the second highest positive returns which were 12.35 times the return for the ordinary trading days. October had the least pre-Covid-19 returns which were at 2.389 times the mean return for the ordinary days.

August also had a mean of 2.89 times which followed October in terms of low pre-Covid-19 returns. From these findings it is clear that the NSE returns are affected differently by the extent month of the year effect in the event of Covid-19 in pre period era and post-Covid-19 era.

The third column of the table 1.6 shows the number of times that the post-Covid-19 return for each month for the companies in the four-year period is greater than the ordinary days. January exhibits the highest positive post Covid-19 returns which was at 65 times the returns of the ordinary trading days. February exhibited the second highest positive post-Covid-19 returns which were at 7.3 times the return for the ordinary days. December exhibit the lowest positive post Covid-19 returns which were at 0.59 times for the ordinary trading days. April, June, August and November have negative post-Covid-19 returns.

The Covid-19 pandemic occurred in waves in Kenya which started as from March 2020. The Covid-19 pandemic waves had been further categorized into first wave, second wave and the third wave in order to determine the impact on the month of the year effect. T –test was used to test which category had more impact on the month of the year effect. The results of the t-test for the pre Covid-19 and post Covid-19 period are shown in the table 1.7

Table 9: Test for the waves during Covid-19 period

Months	Pre-Covid-19 Returns	Post Covid -19 Returns
First wave	0.00135	0.00127
Second wave	0.00121	0.00112
Third wave	0.00115	0.00102
Fourth wave	000110	0.00232
Fifth wave	0.00114	0.00102
P -Value	0.053*	0.38

*** p < 0.01

** p < 0.05

* p < 0.05

Source: Author 2022.

The Table above shows the results of a t-test that was carried in order to determine which category of Covid-19 pandemic waves had more impact on the returns. The results indicate that the pre Covid-19 are significantly higher for the first wave as compared to the second wave, third wave, fourth and fifth wave. The returns for the post Covid-19 are also higher for the first wave though not at significance level.

The findings from the test done established that the different waves had different effects on the share returns for both the pre Covid-19 and post Covid-19 period. January had the highest return for both pre-Covid-19 and post Covid-19. This was followed by February

which had the second highest return for pre Covid-19 and post Covid-19. August presented to have negative returns for both the pre Covid-19 and post Covid-19 pandemic period.

The findings also indicate that the first wave had significantly higher pre Covid-19 returns as compared to the second and third waves. There was no significant difference between the post Covid-19 returns for the first, second, third, fourth and fifth wave.

4.5 Development of Month of the Year effect.

In order to achieve the second objective of this research study, the NSE stocks needed to be individually looked into for the month of the year effect. The monthly stock log returns were ordered for the 13 years under consideration. Time series data and stock price returns have been found to be susceptible to auto correlation since the current monthly prices are greatly influenced by the previous month prices. To eliminate this issue of autocorrelation, a lag variable is introduced in the regression analysis. Each individual stock's return was regressed a series of dummy variables and one lag variable (representing the previous month's return). All the stocks that were trading in the NSE-20 index were included.

4.5.1 Development of the month of the year effect in volatility

The development of the month of the year effect shows greater volatility in the post-Covid-19 sub-period compared to the Pre Covid-19 sub-period. January and December together with May and June exhibit the greatest volatility. November shows the lowest volatility for both sub periods.

Table 10: Development of Month of the Year effect volatility

MEASURE	NSE 20 2018-2020	ρ-values	NSE 20 2020-2021	ρ-values
α	0.924636	0.2287	0.816325	0.0367
β	0.135462	0.0056	0.133821	0.3624
δ_2	0.146863	0.0356	0.695842	0.0487
δ_3	0.295657	0.0612	0.278621	0.6584
δ_4	0.556942	0.3245	0.521581	0.0014
δ_5	0.269847	0.9436	0.321681	0.8921
δ_6	0.771652	0.1381	0.624582	0.9456
δ_7	0.555571	0.7265	0.475821	0.8168
δ_8	0.266821	0.1456	0.287135	0.0517
δ_9	0.247232	0.8932	0.982287	0.7584
δ_{10}	0.357247	0.1821	0.745235	0.0248
δ_{11}	0.036588	0.0893	0.568248	0.4872
δ_{12}	0.843353	0.2456	1.026787	0.4852
WALD	2.2054	0.0278	1.9824	0.0458

The section below represents the findings of the regression analysis in two chart diagrams due to the large data set.

4.5.1 Month of the year effect

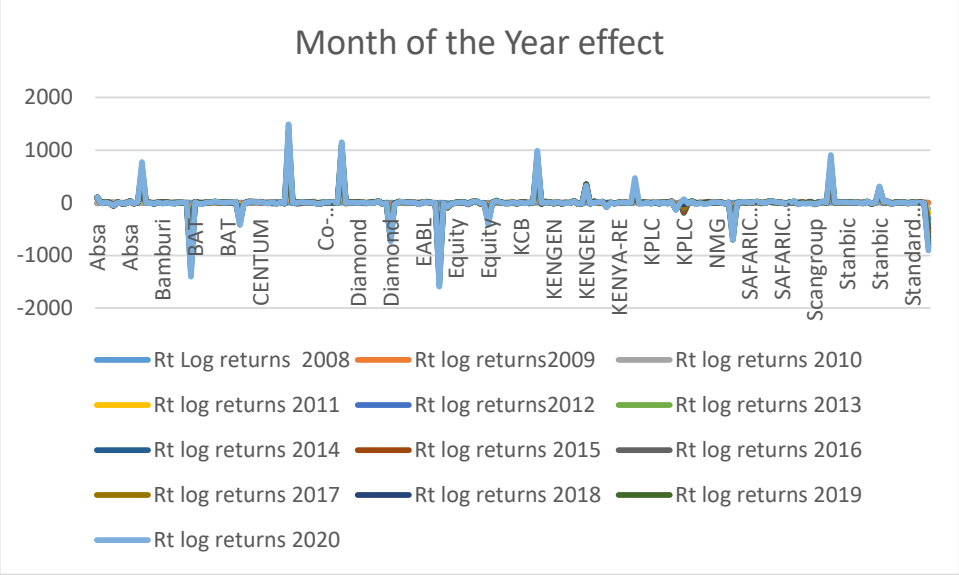


Figure 3: Month of the Year effect for Individual Stocks (a)

In the first chart the following companies were included as the data set were ABSA, Bamburi, BAT, Centum, Co-operative Bank, Diamond, EABL, Equity, KCB, KenGen, KPLC, NMG, Safaricom, Scangroup, Stanbic and Standard Chartered. The average month of the year effect showed a mixed highly statistically significant set of returns. These included positive results for Centum, Co-operative Bank, ABSA, KCB and Scangroup. Those that exhibited negative results included British American Tobacco, Diamond Trust Bank, Equity Bank, Nation Media group and Standard Chartered.

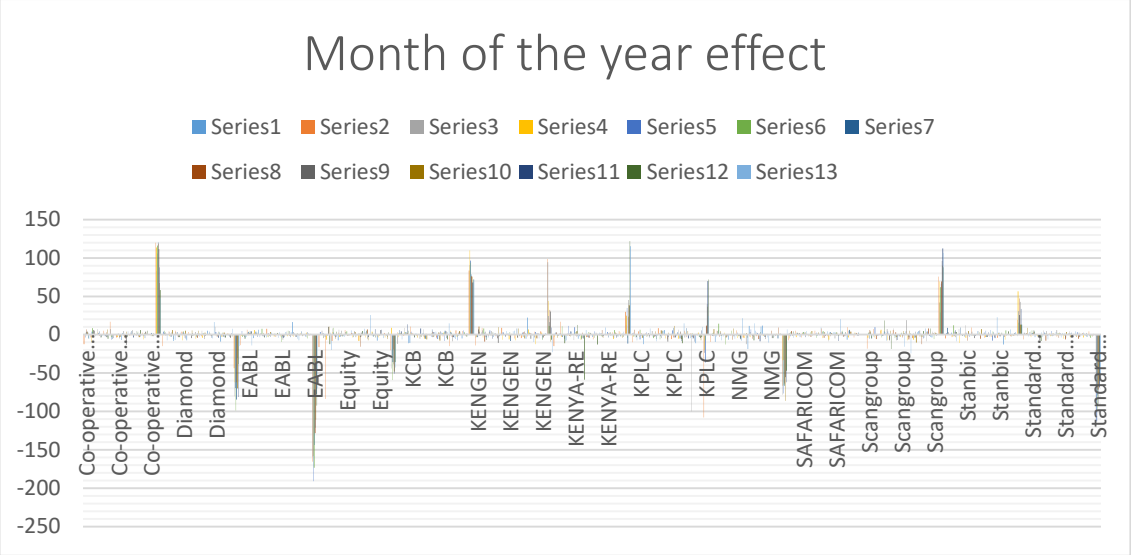


Figure 4: Month of the Year effect for Individual Stocks (b)

In the second data set, shows a continuation of the first data set and not a different data set. Companies included are; Co-operative Bank, Diamond Trust Bank, EABL, Equity Bank, KCB, KenGen, Kenya-Re, KPLC, NMG, Safaricom, Scangroup and Standard Chartered. The Month of the Year effect returns show a definite and larger set of increases and decreases in return. The stocks that showed a marked positive increase in returns included Co-operative Bank, KenGen, KPLC, Scangroup and slight positive increase in Stanbic. The majority of changes were negative decreases in returns covering the stocks of EABL, Kenya-Re, Kenya Power, Nation Media Group and Standard Chartered.

4.6 Month of the Year effect on NSE sectors.

The third objective of the study sought to investigate which sectors in the NSE are more prone to month of the year effect. Nine sectors were considered for the study. In order to achieve this objective a test of equality of mean across the nine sectors was done. The result of the test for the pre Covid-19 and post Covid-19 pandemic period are presented in the section 4.6.1.

4.6.1 Month of the Year effect and the NSE sectors.

For the purpose of determining which sectors are prone to pre Covid-19, post Covid-19 pandemic mean return for nine sectors was calculated. A test of equality of mean across the nine sectors was then carried out. Table 1.8 shows the result of the test

Table 11: Test of equality of mean across sectors in the NSE

Sectors in the NSE	**Pre-Covid-19 Returns**	**Post Covid-19 Returns**
Banking	0.00065	-0.01565
Commercial & Services	-0.00187	-0.00305
Construction & Allied	-0.00065	-0.00256
Energy & Petroleum	-0.00278	-0.00074
Insurance	-0.00012	- 0.00005
Investment	0.00854	-0.2568
Investment Services	0.24579	-0.3365
Manufacturing & Allied	0.35578	-0.2645
Telecommunication & Technology	0.25789	-0.2578

ANOVA

Source of Variation	***SS***	***df***	***MS***	***F***	***P-Value***	***F critical***
Between Groups	0.00077	8	0.000086	0.4682	0.7992	2.6432
Within Groups	0.06584	412	0.000184			
Total	0.06661					

Source: Author 2022

The first column of table 1.7 shows the ten sectors considered for the study while the second column shows the mean return for the nine sectors. Only five of the sectors in the NSE exhibit positive pre Covid-19 month of the year effect anomaly. These sectors are; banking; investment; investment services; manufacturing and allied; telecommunication and technology. The other sectors which include: commercial and services; energy and petroleum; construction and allied and insurance had negative return for the pre Covid-19 pandemic period. All the sectors for the post Covid-19 period exhibited a negative return. The test of equality done resulted to a P-value of 0.7992 and an F-statistic of 0.4632. These results imply that there is no significant statistical difference of the mean return for the nine sectors in the NSE in the pre Covid-19 period but the sectors in the NSE that are more prone to month of the year effect are in the post-Covid-19.

The test carried out investigate which sectors were more prone to both the pre Covid-19 period and the post Covid-19 period indicated that the sectors that were more prone to month of the year effect are in the pre Covid-19 period. These sectors were commercial & services; construction & allied; energy & petroleum; insurance. Also, during the post Covid-19 period all the sectors were more prone to month of the year effect. This study has therefore been able to be able to achieve the second objective by concluding that during the pre Covid-19 period and post Covid-19 period most of the sectors were more prone to the month of the year effect.

4.7 Summary of findings

To sum up the findings in objective one, there was presence of month of the year effect amongst listed firms in the NSE 20 share index in the years under review; 2008-2020. The returns prove that there is indeed a 'Month of the Year effect' with the returns on January, February and December exhibiting high returns. Data used was first checked whether it was suitable for the study. The findings of the study established that the pre Covid-19 period and post Covid-19 period had different implications to the extent effect of month of the year effect where in some stocks and sectors as well had significantly higher returns during the pre Covid-19 period than the post Covid-19 period. The findings of the study also established that the stocks that were more prone to month of the year effect during the pre Covid-19 and post Covid-19 period were; British American Tobacco, Diamond Trust Bank, Equity Bank, EABL, Kenya-Re, Kenya Power, Nation Media Group and Standard Chartered. The sectors in the pre Covid-19 period that were more prone to month of the year effect were commercial & services, construction & allied, energy & petroleum and insurance this is different from the post Covid-19 period all the sectors were prone to months of the year effect.

CHAPTER FIVE: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS.

5.1 Introduction

This chapter presents the research findings, discussions and interpretation, conclusions and recommendations. The objective of the study was to examine the extent effect of Month of the Year effect of firms listed at the NSE.A summary of findings is presented in line with the objectives. Finally, the limitations of the research, the research findings contribution to the body of knowledge and areas of possible further research are discussed.

5.2 Discussion of findings

The purpose of this study was to determine the extent effect of Month of the Year effect on the efficiency of listed firms in the NSE. The findings of the study were determined by use of secondary data obtained from monthly closing prices of stock data and annual reports of those firms. The raw data was in two sets used namely stock returns. The data was thereafter used to come up with variables that would be used and were divided into two categories; the first category is the dependent variable namely the log returns of the stocks at different time periods described as pre Covid-19 and post Covid-19 period. In the 'Month of the Year effect', the time period (t) would be a particular month from a twelve month- calendar. The second category would be made up of independent variable namely stock prices at different time periods classified as pre Covid-19 and post Covid-19 period.

The volatility in different months of the year showed consistency in both sub periods considered; pre covid-19 and post covid-19 and in June during pre covid-19 and September during post covid-19 where it actually increased. This demonstrates a possible seasonality in market activity that coincides with certain activities being high economic trading activity during pre covid-19 and announcement of uplifting of the ban on movement in between counties in Kenya during post covid-19. It is also indicates a random walk with 'drift' phenomenon that may be mistaken for seasonality in volatility.

The Month of the year effect has been demonstrated through the findings recorded in the preceding chapter. With Month of the Year effect being present it showed that NSE exchange market has weak form of efficiency as trading tends to increase during presence of anomalies with trading patterns times being higher than during normal days. However when the sample was split into two sub-periods, it was clear that the seasonality in returns

was slightly diminished in the period covering 2020 to 2021. In contrary fashion, the seasonality in volatility was maintained and even in some cases decreased.

Previous studies by Kiptanui, (2014) , Charles et al., (2020), Muchemi & Kuria, (2013) and Roche et al., (2020) identified the presence of month of the year effect in the NSE. Based on the findings of these previous studies conformed with this study investigating on the existence of month of the year effect in the NSE during pre and post Covid-19 period; identify which stocks are more prone to month of the year effect in the NSE and show which sectors are more prone to month of the year effect in the NSE during pre and post Covid-19 period.

5. 3 Summary of findings

5.3.1 Month of the Year effect in the NSE 20 index during pre and post Covid-19 period.

Based on the results of the NSE 20 returns index during the pre and post Covid-19 period, it can be deduced that there is a weak Month of the year effect in the NSE 20 share index for the period of 2008 to 2020. The seasonality that is demonstrated by the Month of the Year effect show a reverse January effect i.e. returns on January and February are higher than the rest of the year. Interesting the returns start to peak on December and climax on January. Reverse January effect according to Patel, (2016) is where investors buy more stocks rather than selling off stocks during January to offset on expenses.

Therefore, the Month of Year effect was established with months of November, December and January demonstrated the highest returns in the year for the pre Covid-19 period. In the post Covid-19 period the months of December, January and February showed highest returns in the year. Of interest were apparent positive returns in June in pre Covid-19 period and March for the post Covid-19 period. This was not similar to any documented month of the year effect that is supported by an underlying explanation. Different months of the year showed consistency in both pre and post Covid-19 periods considered and in two cases (June and March) actually increased. This demonstrates a possible seasonality in market activity that coincidentally happens with certain calendar points. It is also indicative of a ‘Random walk’ with ‘drift’ phenomenon that may be mistaken for seasonality.

The first objective of the study sought to establish the extent effect of month of the year effect experienced in the NSE during pre and post Covid-19 period. The test results indicate

that mean returns for months during the pre Covid-19 period were significantly different from each other. The results also indicated that the mean return for the months during the post-Covid-19 period were also significantly different form each other. January, February, November and December experienced the highest positive returns for the pre and post-Covid-19 returns. On the other hand, the returns during the post-Covid-19 period were negative for the July, October and November. This meant that the individual months affected the month of the year differently. These findings are consistent to the findings of Alagidede & Panagiotidis, (2009) that established that the different months had different monthly impact on the month of the year anomaly present in the Ghana stock market.

The impact of each month to the month of the year anomaly depend on the manner that it has to the investor hence the difference in returns during the various months. The findings of this study are however a contradiction to the findings of (Al-Jarrah et al., 2011) whose findings indicate that there was no single month that had more impact on the other month than the other in the Amman stock market. This contradiction of the results can be attributed to the difference in the culture of the countries under the investigation. The study further categorized the period into pre Covid-19 and post Covid-19. The test conducted to investigate which of these two categories had more effect on the month of the year anomaly indicate that the pre Covid-19 had higher returns as compared to the post-Covid-19 returns. These results conformed to earlier findings of (Marrett & Worthington, 2012) that established that, Month of the year effect was stronger for the peak period than for the recession period in the Australian stock market.

5.3.2 Stocks in the NSE and Month of the Year effect in pre Covid-19 and post Covid-19 period.

The second objective of the study sought to investigate the stock in the NSE to find out which ones were more affected by the month of the year anomaly in pre Covid-19 and post Covid-19 period. The test of equality of mean monthly returns across series was conducted for the twenty stocks in the NSE for both pre- Covid-19 and post Covid-19 period from 2008 to 2020. The results from the test of equality of mean monthly return for different stocks showed that there was significant difference between the returns of the different stocks. This meant that British American Tobacco, Equity Bank, Diamond Trust Bank, EABL, Kenya-Re, Kenya Power, NMG and Standard Chartered stocks in the NSE were more affected by the month of the year than the other remaining twelve stocks in the NSE 20 share index.

These findings however contradicted the results of Charles et al., (2020) that established that most stocks in the NSE were more affected by the month of the year effect anomaly. These results were similar to the findings of Kiptanui, (2014)that established that the month of the year effect anomalies experienced in the NSE market due to the stability of the market prior towards 2018 up to 2020 when Covid-19 was announced in Kenya. Hence this explains the extent month of the year effect were consistent across the stocks under investigation period.

5.3.3.2 Stocks & Sectors affected by the extent of month of the year effect on the efficiency of firms.

The third objective of the study sought to investigate in the NSE which sectors were more affected by extent of month of the year effect during pre Covid-19 and post Covid-19 period. The test of equality of mean across was conducted for the nine sectors in the NSE for both the sectors. The results from the test equality of mean of different sectors showed that there was significant difference between the mean returns of the sectors. This meant that the sectors in the NSE 20 index which were more affected by extent effect of Month of the Year effect especially during pre Covid-19 were commercial & services; construction & allied; energy & petroleum; insurance. For the post Covid-19 period all the sectors were prone to month of the year effect due to the impact of Covid-19 generally towards economic activities hence affecting businesses.

These findings however contradicted the results of Kiptanui, (2014) that established that some sectors in the Nairobi Securities Exchange were more affected by the extent Month of the Year effect. These results were similar to findings of Al-Jarrah et al., (2011); Kamau, (2017) which established that the extent Month of the Year effect experienced in Amman and Nairobi market were not significantly different among various markets in the market. These results are also similar to the results of Charles et al., (2020); Njuguna, (2015) that established that the extent Month of Year anomaly experienced on the Nairobi market were consistent across the sectors under investigation.

5.4 Conclusions.

It is evident from this study, that the different time periods have different effect on the return of shares in the NSE. The mean returns for the different periods for both pre Covid-19 and post Covid-19 periods were significantly different from each other. Pre Covid-19 period also exhibited higher returns as compared to the post Covid-19 period. Despite exhibiting different returns for the pre Covid-19 and post Covid-19, the returns for the different stocks and sectors were not statistically different from each other. The stocks that were more prone to month of the year effect were British American Tobacco, Equity Bank, Diamond Trust Bank, EABL, Kenya-Re, Kenya Power, NMG and Standard Chartered. There were no sectors in the NSE that was more prone to the month of the year effect anomaly than the other.

5.5 Contribution to Knowledge

The study did extend the empirical literature done in the developing economies like Kenya on the finance area of seasonal anomalies. It hopes to achieve this in two way; first the study did extend the research scope of the previous empirical research to other financial area of seasonal anomalies, done, but not been given the required attention in recent peer studies. Secondly, it helps in validating the findings of the recent papers done in anomalies areas.

The study hopes to contribute towards the advancement policy setting by the market regulators like the Capital Market Authority. The threat of delisting the firms from the NSE will be guided from a more informed point of view, knowing clearly what some of the red flags regulators should be constantly checking on in firms. This will help the regulator to achieve their core objectives of safeguarding the investment environment in the market. The study could have been one of the few researches done in seasonal anomalies concentrating on month of the year effect. It opens doors towards more researches to be done in future on that area.

The study on Covid-19 had limited empirical literature to refer to during the study. The study has made way for other researchers on the impact of Covid-19. The researcher hopes that the future researchers can give the area the required focus it does require.

5.6 Recommendations

5.6.1 Policy makers

The study established that extent Month of the Year effect has a significant influence on listed firms at the NSE, during pre Covid-19 and post Covid-19 period. This implies that in the presence of event based activities, Month of the Year effect has an impact on firms listed in the NSE. The study recommends to the regulator on strict guideline to the listed companies they should adhere to in relation to major announcements made by government institutions regulating capital markets such as the CMA. The guidelines will help assist firms on how to respond as a result of such information that would result in occurrence of an anomaly.

5.6.2 Investors

Profitable companies will be an attraction to the investors in an economy. Investors can also be making an assessment of a firm's efficiency operation practices before making an investment decision since efficiency operation does influence the value of their investment. The management can enhance the shareholder's value through application of sound efficient operation measures.

5.7 Suggestions for Further Research

Further studies can be done on Weekend effect in relation to political activities in Kenya, adding more variables to assess the true variables that do influence the Weekend effect in relation to political activities. This study was carried out over a period of 2008-2020; a study over an extended period of time could enhance the models.

5.8 Limitations of the Research

The study did not factor in taxation rates on capital gains and tax exemptions. This may have introduced a bias since it is possible that taxation rates on capital gains and tax exemptions trends may have been different for pre and post Covid-19 periods. The effects were tested for both currently and previously listed companies. Knowledge on the month of the year effects for previously listed companies may not be as relevant as findings on the currently listed companies.

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APPENDIX I: ETHICAL CLEARANCE LETTER

Strathmore UNIVERSITY

15th September 2021

Mr Njuguna Evans,
njuguna.evans@strathmore.edu

Dear Mr Njuguna,

RE: Seasonal Anomalies and Operational Efficiency of Firms; Evidence from Nairobi Securities Exchange

This is to inform you that SU-IERC has reviewed and **approved** your above **SU-master's** research proposal. Your application reference number is **SU-IERC1076/21**. The approval period is **15th September 2021 to 14th September 2022.**

This approval is subject to compliance with the following requirements:

i. Only approved documents including (informed consents, study instruments, MTA) will be used
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-IERC.
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-IERC within 48 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-IERC within 48 hours
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to SU-IERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) https://research-portal.nacosti.go.ke/ and also obtain other clearances needed.

Yours sincerely,

for: Dr Virginia Gichuru,
Secretary; SU-IERC

STRATHMORE UNIVERSITY INSTITUTIONAL ETHICS REVIEW COMMITTEE (SU-IERC)
15 Sep 2021
TEL: +254 (0)70303400
P.O BOX 59857-00200
NAIROBI-KENYA

Cc: Prof Fred Were,
Chairperson; SU-IERC

APPENDIX II: LETTER OF INTRODUCTION.

Ole Sangale Rd, Madaraka Estate,
P.O Box 59857 00200, Nairobi, Kenya.
Cell: +254 703 414 [illegible], Twitter: @SBSKenya
Email: info@sbs.ac.ke or visit **www.sbs.strathmore.edu**

Strathmore UNIVERSITY BUSINESS SCHOOL

31st May 2021

RE: FACILITATION OF RESEARCH – EVANS NJUGUNA

This is to introduce Evans Njuguna who is a Master of Commerce (MCOM) Student at Strathmore University Business School, admission number MCOM/122693. As part of our MCOM Program, Evans is expected to do applied research and undertake a project. This is in partial fulfilment of the requirements of the MCOM course. To this effect, Evans would like to request for appropriate data from your organization.

Evans is undertaking a research paper on **"Seasonality Anomalies and Operational efficiency of Firms; Evidence from Nairobi Securities Exchange"**. The information obtained shall be treated confidentially and shall be used for academic purposes only.

Our MCOM seeks to establish links with industry, and one of these ways is by directing our research to areas that would be of direct use to industry. We would be glad to share our findings with you after the research, and we trust that you will find them of great interest and of practical value to your organization.

We appreciate your support and shall be willing to provide any further information if required.

Yours sincerely,

Caroline Tiara
Manager – Graduate Programs.
Strathmore University Business School.

Strathmore Business School is a Proud member of

APPENDIX III: NACOSTI RESEARCH LICENSE

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 340454

Date of Issue: 11/June/2021

RESEARCH LICENSE

This is to Certify that Mr.. EVANS KAMAU NJUGUNA of Strathmore University, has been licensed to conduct research in Nairobi on the topic: SEASONAL ANOMALIES AND OPERATIONAL EFFICIENCY OF FIRMS; EVIDENCE FROM NAIROBI SECURITIES EXCHANGE for the period ending : 11/June/2022.

License No: NACOSTI/P/21/11167

340454

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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APPENDIX IV: LIST OF FIRMS LISTED AT THE NAIROBI SECURITIES EXCHANGE AS AT DECEMBER 2021.

AGRICULTURAL

1. Eaagads Ltd

2. Kapchorua Tea Co. Ltd

3. Kakuzi

4. Limuru Tea Co. Ltd

5. Rea Vipingo Plantations Ltd

6. Sasini Ltd

7. Williamson Tea Kenya Ltd

AUTOMOBILES AND ACCESSORIES

8. Car and General (K) Ltd

BANKING

9. Absa Bank Kenya PLC

10. Stanbic Holdings PLC

11. I&M Holdings Ltd

12. Diamond Trust Bank Kenya Ltd

13. Housing Finance Co Ltd

14. Kenya Commercial Bank Group Ltd

15. National Bank of Kenya Ltd

16. NCBA Group PLC

17. Standard Chartered Bank Ltd

18. Equity Group Holdings

19. The Co-operative Bank of Kenya Ltd

20. BK Group PLC

COMMERCIAL AND SERVICES

21. Express Ltd

22. Kenya Airways Ltd

23. Nation Media Group

24. Standard Group Ltd

25. TPS Eastern Africa (Serena) Ltd

26. Scan group Ltd

27. Uchumi Supermarket Ltd

28. Deacons (East Africa)

29. Longhorn Kenya Ltd

30. Sameer Africa PLC

31. Nairobi Business Ventures Ltd

CONSTRUCTION AND ALLIED

32. Athi River Mining Cement Limited

33. Bamburi Cement Ltd

34. Crown Paints Kenya PLC

35. E.A.Cables Ltd

36. E.A.Portland Cement Ltd

ENERGY AND PETROLEUM

37. Total Kenya Ltd

38. KenGen Ltd

39. Kenya Power & Lighting Co Ltd

40. Umeme Ltd

INSURANCE

41. Jubilee Holdings Ltd

42. Sanlam Kenya PLC

43. Kenya Re-Insurance Corporation Ltd

44. Liberty Kenya Holdings Ltd

45. Britam Holdings Ltd

46. CIC Insurance Group Ltd

INVESTMENT

47. Olympia Capital Holdings Ltd

48. Centum Investment Co Ltd

49. Trans-Century Ltd

50. Home Afrika Ltd

51. Kurwitu Ventures

INVESTMENT SERVICES

52. Nairobi Securities exchange

MANUFACTURING AND ALLIED

53. Flame Tree Group Holdings

54. B.O.C Kenya

55. British American Tobacco Limited

56. Carbacid Investments Limited

57. East African Breweries

58. Eveready East Africa

59. Kenya Orchards Limited

60. Mumias Sugar Company Limited

61. Unga Group

TELECOMMUNICATION AND TECHNOLOGY

62. Safaricom PLC

REAL ESTATE INVESTMENT TRUST

63. Stanlib Fahari I-REIT

EXCHANGE TRADED FUND

64. New Gold Issuer (RP) Ltd

Source: https://www.nse.co.ke/listed-companies

APPENDIX V: NSE-20 INDEX CONSITITUENT COMPANIES

Banking Sector

1. Absa Bank Kenya Plc

2. Equity Group Holdings Plc

3. KCB Group Plc

4. Diamond Trust Bank Kenya Ltd

5. The Co-operative Bank of Kenya Ltd

6. NCBA Group Plc

7. Standard Chartered Bank Kenya Ltd

8. Stanbic Holdings Plc

Manufacturing & Allied Sector

9. East African Breweries Ltd

10. British American Tobacco Kenya Plc

Commercial & Services Sector

11. WPP Scangroup Plc

12. Nation Media Group Plc

Construction and Allied Sector

13. Bamburi Cement Ltd

Energy and Petroleum Sector

14. KenGen Co. Plc

15. Kenya Power & Lighting Co Ltd

Insurance Sector

16. Britam Holdings Plc

17. Kenya Re Insurance Corporation Ltd

Investment Sector

18. Centum Investment Co Plc

Investment Services Sector

19. Nairobi Securities Exchange Plc

Telecommunication Sector

20. Safaricom Plc

Source: https://www.nse.co.ke/listed-companies