

**EFFECTS OF COVID-19 PANDEMIC ON STOCK RETURNS FOR  
COMMERCIAL BANKS LISTED AT THE NAIROBI SECURITIES  
EXCHANGE**

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UNIVERSITY OF NAIROBI**

**NOVEMBER 2021**  
**DECLARATION**

I declare that this Research Project is my original work and has not been submitted for examination in any other university or institution of higher learning.



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Date...26/11/2021.....


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## **LIST OF ABBREVIATIONS**

<b>AR</b>	Abnormal Returns
<b>CAAR</b>	Cumulative Average Abnormal Return
<b>COVID-19</b>	Corona Virus Disease of 2019
<b>CRR</b>	Cash Reserve Ratio
<b>EAC</b>	East African Community
<b>EFT</b>	Exchange Traded Funds
<b>GDP</b>	Growth of Domestic Product
<b>LSE</b>	London Stock Exchange
<b>NSE</b>	Nairobi Securities Exchange
<b>PAYE</b>	Pay As You Earn
<b>SARS</b>	Severe Acute Respiratory Syndrome
<b>USD</b>	United States Dollar
<b>WHO</b>	World Health Organization



## **ABSTRACT**

Stock returns are crucial factors that determine investment in shares. They guide portfolio investments of investors as they seek to diversify their exposure as well as ensure they maximize their returns. This study sought to determine the effect of Covid-19 Pandemic on stock returns for commercial banks listed at the NSE, where three events were identified to cover Covid-19 pandemic in Kenya. The three events included the announcement of first case of Covid-19, the lifting of lock-down in major counties, and the arrival of Covid-19 vaccine. The event study methodology was adopted by the study where secondary data was collected from NSE website as well as from CBK websites where data was collected 15 days before the event and 15 days after the event. During announcement of first case of Covid-19 pandemic, there were 10 listed commercial banks, after which BK Group Plc and I&M holdings were added into the list to make up a final list of 12 listed commercial banks. Independent t test was used by the study to determine whether the difference between the means of daily actual stock returns and the daily projected stock returns before and after each event was as a result of chance or there was statistical significance in the differences in the means. The study found that the mean of daily actual returns before announcement of Covid-19 was -0.44% with a high standard deviation of 3.00%. This indicates that despite the fact that Covid-19 was not officially announced in Kenya, the share returns for commercial banks were not doing well. After the announcement of Covid-19 pandemic, the actual share return decreased further to -0.94% with an equally high standard deviation of 3.32%. Despite the decrease in the mean of actual stock prices after announcement of Covid-19, the independent sample t test failed to reject the null hypothesis with a t test p value of 0.177 that is greater than 0.05. It indicated that the differences were only occasioned by chance and not statistically significant. However, the difference in the means of daily projected stock returns was statistically significant indicating that the projected stock returns had projected a decrease in stock returns after announcement of Covid-19 case in Kenya. The result findings could be interpreted to mean that the stock returns for commercial banks are quite inelastic to external shocks as many people may have faith in the stock returns for commercial banks despite the projections of the market models that the stock returns would be affected. This is a critical observation that is crucial in determining investments in commercial banks stocks as they are least affected by global shocks.

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

Coronavirus disease (COVID-19) is an infectious deadly disease that is believed to be caused by a newly discovered coronavirus. However, most people who contract the virus experience mild to moderate symptoms and recover without special treatment. The disease is spread through getting into contact with droplets from an infected person that can be exchanged through inhaling the droplets, touching contaminated surfaces and then touching your nose, eyes or your mouth. The fatality of Corona virus may be low but the infection has greater impact with the virus spreading fast across populations in the world. The virus originated from Wuhan in China and it was reported first to World Health Organization (WHO) on 31<sup>st</sup> December 2019. The virus spread very fast and on March 13<sup>th</sup> 2020, the government of Kenya through the ministry of health announced the first case of Corona Virus in Kenya. The government then set out measures to curb the spread of the disease by restricting travel from and to countries with reported Corona virus cases. All the schools and higher learning institutions were closed by March 20, 2020 and government employees as well as business people to start working from home, except those offering essential services. The government advocated for cashless transactions over cash, Congregational meetings were cancelled such as weddings, malls, night clubs, churches and other worship facilities. The airports were also closed save for cargo vessels, aircraft or ship provided that they were disinfected at the point of departure and the crew quarantined on arrival.

Almost all businesses were caught unprepared in the country as lifestyles changed (Odhiambo et al., 2020).

During the Pre-Covid-19 period, the economy of Kenya was on a downward trend with most economic indicators suggesting a slump in the economic well-being in the country. It is expected that the external shock brought about by the global pandemic of Coronavirus would only act to aggravate the situation. According to Karungu et al (2020), foreign investors who had made significant investments at the Nairobi Securities Exchange (NSE) had started disposing off their shares at the Exchange due to fear of market collapse. The NSE -20 Share Index had also started losing its value declining with significant basis points. Although most of the companies listed at the NSE had already started reporting poor performance in their share prices due to economic slow-down that had aggravated the economy, the announcement of the first case of COVID-19 in Kenya, seems to have aggravated the situation. The effect of economic slow-down on commercial banks reduces the demand for loans as projects with positive NPVs dwindle with decreased economic activity. High risks increase uncertainty which translate to increase in non-performing loans; projected and expected returns fail to actualize forcing borrowers to default on their loan repayments/commitments (Odhiambo et al, 2020).

There are several theoretical approaches that would be important in understanding the movement of share prices as a result of an announcement of a global pandemic at the level of Covid-19 pandemic. First, the random walk theory that claims that share prices follow a random walk nature and there is no way an individual would be able to project future share prices since the movement does not follow a particular pattern and it is only random (Farrukh et al., 2017; Malombe, 2011). A theory with contrary view is the Markowitz Portfolio Theory that suggests that it is possible for an investor to determine an optimal portfolio where a trade-off between risk

and potential return is calculated to determine an ideal portfolio. The investors are risk averse and therefore they would prefer stocks that would generate high returns but at low risk. The concept that the future returns of a portfolio can be projected in order to maximize the returns suggests that it is possible to determine future share prices and therefore negates the proposition suggested by Random Walk Theory.

Kenya is a net importer meaning that it relies more on imports than the value of exports it makes. COVID-19 affected worldwide supply chain and therefore making industries and companies unable to access vital raw materials to sustain their businesses. The outbreak of the pandemic also inserted pressure on the Kenyan shilling aggravating the supply of foreign currency and loss of the value of the Kenyan shilling since the start of the pandemic in Kenya (Erkekoglu et al., 2020). The diaspora remittances in the country also reduced significantly as the income of Kenyans in diaspora were equally affected. At the Central Bank, the committee in charge of Monetary and Fiscal Policy had a meeting on 23<sup>rd</sup> March 2020. The meeting was to review the results of the committee's policy for prior decisions when it comes to dealing with the latest economic developments. In that meeting the Central Bank Reference rate was reduced by 50 basis points. This was to allow banks to lend more to the public which will result to more money in to the economy for circulation. Despite the stimulus packages that were adopted by the government to sustain the economy through the pandemic, businesses were closed, people panicked and reduced consumption as they tried to boost their savings, by holding on cash. The effect of holding cash, means that money in circulation reduced significantly and thereby aggravating the economy further. The decreased demand in loans as well as increase in default rate meant that commercial banks' performance was affected (Karungu et al., 2020).

### **1.1.1 Announcement of First Case of COVID-19**

UNICEF (2020) describes Covid-19 as a novel disease that is caused by the corona virus, which belongs to the same family with Severe Acute Respiratory Syndrome (SARS). According to Odhiambo et al (2020) the world economy has been in turmoil since china was incepted by Covid-19. Many economies in the world depend on china either directly or indirectly which creates a direct correlation between China and those economies. The looming world economic recession that has been brought forth due to job losses, reduced economic activity, and lack of vital inputs have brought governments in the world to undertake measures that counteracts to deal with the threats to their GDP growth rate individually, that may arise.

The first case of covid-19 in Kenya was confirmed on the 13th March, 2020, by the Kenyan government. A Kenyan woman aged 27 years old who had travelled to the country from USA via UK was the first case be reported having contracted corona virus disease. During this period the government was making preparations as it was anticipating the disease would have diverse effect to the economy once it landed in Kenya. Since then the economy of Kenya has faced huge adverse effect more so, the business sector. Two days later from the first case the government burned all public gatherings which lead to more massive challenges to the economy due to the fact that many markets that were found to have multitude gatherings were closed thereby affecting very many businesses. In Africa despite the fact that many countries were preparing for this attack of the disease, they lacked adequate resources that would enable them eventually conquer the disease given that their economies were not stable (Wanjala, 2020).

The government took measures regarding fiscal and monetary policies to deal with the pandemic disease where the president made executive orders to give a 100% tax relief the Kenyans who

were earning below \$230 USD. He reduced PAYE tax to 25% from the former 30%. SMEs and micro businesses turnover was reduced from 3% to 1%. The resident income tax was reduced to 25%. Value added tax was as well reduced from 16% to 14%. This order among other measures became effective on 1st April, 2020.

The intention of taking such measurement was to raise the liquidity level and money circulation velocity among the citizen in Kenya in order to curb the financial and economic constraints among the citizens as a result of the pandemic. The CBK made changes to fiscal and monetary policies where they reduced central bank rates from 8.25% to 7.25% in an attempt to encourage borrowing from commercial banks in Kenya. Cash reserve ratio for commercial banks in Kenya was reduced from 5.25% to 4.25% to ensure that commercial banks had increased cash liquid by \$ 360 million USD billion. This stimulated more borrowing among Kenyan as the commercial bank had enough money to lend thus lending at affordable interests to “financially- distressed Kenyans” or to citizens with any other kind of need (Munyaradzi, 2020).

### **1.1.2 Stock Returns**

Stock returns refer to the increase in capital gains acquired by an investor as a result of holding stock as well as any dividends generated from the stock. A major component of stock return is the share price, which is the current price that a share of stock is trading for in the market. The increase in the market prices of the shares could represent the growth of the wealth of their shareholders. For instance, short-term shareholders could sell the shares at a higher price than they acquired them before the announcement of the dividends, which could enable them to earn higher profits. The appreciation of the shares of a company could also benefit the entity, as it will be seen as a suitable investment opportunity attracting more investors. As pointed out by

Majanga (2015), the increase in the prices of the shares could also assist the management of the company by enabling them to influence the psychology of the existing and potential investors, which could help them in the capital planning especially if the company needs to raise additional capital by floating more shares in the market. Additionally, companies whose share prices are rising are rated better under the NSE 20-Index, which could improve the performance of the company in the stock exchange market.

The increase in the share prices was determined in two main ways: the daily abnormal return of the shares and the cumulative average abnormal return (CAR) in the event window. The daily abnormal rate is measured as the difference of the daily abnormal return of each share (AR) and the actual return of the security during a particular day (R). The mean of the AR (ARR) is summed up to get the CAR. Consequently, both the ARR and CAR are used to evaluate the shareholders' return that could result from the declaration of benefits.

### **1.1.3. Covid-19 Announcement and Stock Returns**

The two study variables are related in several ways. In efficient stock markets, the market prices of shares vary after a shock affecting shares. The nature of the shock, notwithstanding, the stock price movement is bound to take place after the shock. According to Karungu et al (2020), foreign investors who had made significant investments at the Nairobi Securities Exchange (NSE) had started disposing off their shares at the Exchange due to fear of market collapse. The NSE-20 Share Index also started losing its value declining with significant basis points. Although most of the companies listed at the NSE had already started reporting poor performance in their share prices due to economic slow-down that had aggravated the economy, the announcement of the first case of Covid-19 in Kenya, seems to have aggravated the situation. It is important to note that the Blue Chips typically record huge losses in their performance

during times of local crisis as investors sell-off their stocks and shift to less risky havens as opposed to holding other risky securities traded in the NSE (Odhiambo et al, 2020).

The announcement of Covid-19 prevalence in Kenya therefore castigated a number of economic changes in the country that such changes are highly likely to affect share prices. The NSE may not be among the best and well developed markets in the world. Its ability to sustain shocks brought about by a pandemic is quite questionable and may be the reasons why most foreign investors started selling off shares, with the fear of eminent collapse of the market. History of market crash crisis, where markets crashed in a single day with devastating effects globally and massive losses to stockholders, attributed to selling off of shares to caution against such huge losses. The counter measures that were undertaken by the government and NSE regulatory bodies such as capital market authority (CMA) that made sure that investors did not entirely sell their shares out of panic, played a role to bring forth some elements of confidence. Since the share prices were already on a downward trend at the NSE before announcement of Covid-19 first case in Kenya, it remains a subject that is worth a study, to identify the effect of such an announcement on the share prices at the NSE (Wanjala, 2020).

#### **1.1.4. Commercial Banks in Kenya**

The banking system in Kenya is comprised of 42 licensed commercial banks with Central Bank of Kenya (CBK) as the primary regulator. Commercial banks are classified primarily by ownership, where ownership might be from local individuals/companies, or from foreign individuals or companies. CBK also classifies commercial banks by size which represents the total assets owned by a commercial bank. There are three tiers, where Tier 1 banks represent large banks with hundred of billions in assets and are least likely to collapse financially. Tier 2



banks on the other hand represents medium-sized banks while Tier 3 banks are small banks in the country. There are currently 28 domestically owned commercial banks and 14 foreign commercial banks. Each of the bank has outlets and branches across the entire country (CBK, 2020).

There are seven Tier 1 commercial banks that are comprised of NCBA, Equity Bank, KCB, Barclays Bank of Kenya, Diamond Trust Bank, Cooperative Bank, and Standard Chartered Bank. The banking sector has also experienced in small banks, as the bid to merge small banks to attain the minimum capital requirements required by the regulator in order to license the bank and therefore protect the interests of depositors. There are more than 10 Kenyan banks that have subsidiaries that operate in the East Africa Community as well as South Sudan. The banking services in Kenya have also been improved by increasing access to finance through innovations such as agent banking. Agent banking entails the use of third parties as agents to the bank who through the use of modern technology, they are able to allow banking services such as making deposits, and withdrawal (CBK, 2020).

The financial sector in Kenyan economy is highly regulated as it is a support sector to all other sectors in the economy. It is through the finance sector that other sectors are able to access finance, they are able to undertake savings, manage their risks through insurance, undertake investments in firms through the NSE among other factors. The regulator is therefore concerned with the performance of commercial banks, as they are vital in enhancing economic growth as well as in providing critical services to all the other sectors. Important macroeconomic factors such as inflation, exchange rate fluctuations, interest rates among other factors are either directly or indirectly influenced by the financial services economic sector. The performance of commercial banks is therefore a vital variable which determines whether the goals and objectives

of the commercial banks are met and achieved. Shareholders of commercial banks have also established their target in form of minimum returns on their investments. Any factor that affects the prices of shares or dividends issued by the bank affects return on investments.

## **1.2 Research Problem**

Efficiency in financial markets is determined by the manner in which information is able to flow to all market participants and the same information included in the pricing of securities. Markets that are able to disseminate private and confidential information and the same information included in the pricing of shares are said to have strong efficiency, while those that are able to disseminate past and publicly available information is said to have semi-strong efficiency. Weak efficiency on the other hand is exhibited by markets that are only able to disseminate past information and incorporate it in pricing of shares (Fama, 1970). The ability of a shock or disturbance being incorporated in the prices of shares therefore suggests the efficiency of the market. The announcement of the first case of Covid-19 in Kenya is significant information that presents a shock in which the market should incorporate this information in the pricing of the shares, if the market is efficient.

Stock traders often make decisions to invest in a given stock based on the information that they have. The advancement of ICT technologies has enabled investors to have access to real-time information through the website of the NSE (NSE, 2019). Several studies have indicated that investors are likely to overreact to new information (Khisa, 2015; Singh et al., 2019; Kimani, 2018). Moreover, a trend has emerged where investors use the value of the dividends that have been declared by a company as an indicator of its financial performance (Chelimo & Kiprop, 2017). However, overreaction and speculation has led to Kenyan investors loosing 80 billion

from 2001 to 2011 (NSE Monthly Market Statistical Bulletins, 2012). Consequently, the findings of the research could enhance the financial literacy of NSE investors to reduce the likelihood of them making substantial tools.

The announcement of Covid-19 prevalence in Kenya therefore castigated a number of economic changes in the country that such changes are highly likely to affect share prices. Foreign investors who had made significant investments at the Nairobi Securities Exchange (NSE) had started disposing off their shares at the Exchange due to fear of market collapse. The NSE-20 Share Index also started losing its value declining with significant basis points. Although most of the companies listed at the NSE had already started reporting poor performance in their share prices due to economic slow-down that had aggravated the economy, the announcement of the first case of Covid-19 in Kenya, seems to have aggravated the situation. It is important to note that the Blue Chips typically record huge losses in their performance during times of local crisis as investors sell-off their stocks and shift to less risky havens as opposed to holding other risky securities traded in the NSE. The government then announced stimulus packages that were supposed to revamp the economy and help companies to wade through the crisis brought by the pandemic. However, it is still in question whether the decline in share prices was a continuity of the economic down turn that had previously rocked the country or it was as a result of the announcement of the first case of Covid-19 (Karungu et al., 2020).

The economic stimulus projects advocated by the government as a way to recover from the economic effects. After the first Kenyan was confirmed to have COVID-19 on 13<sup>th</sup> March 2020, less than few insights had prepared the economic turns and the shocks that still awaited ahead. A multi-sectoral taskforce was established, National Emergency Response Committee (NERC) which was composed of health, security, education, transport, finance and trade sectors that were

set out as a COVID-19 response. A policy documented suggested that the UN Economic Commission for Africa estimates Africa's growth to drop by 1.4% from 3.2% to 1.8% as a result of corona virus. Disruptions were also expected of global supply chains and a crash in oil prices. This study therefore provides a unique event study, where the study seeks to assess the effect of share prices after the announcement of prevalence of a global pandemic in Kenya. The study is therefore focused to answer the research question: what is the effect of the Covid-19 announcement on stock returns for commercial banks listed at the NSE?

### **1.3 Research Objective**

To determine the effect of Covid-19 pandemic on stock returns for commercial banks listed at the Nairobi Securities Exchange.

### **1.4 Value of the Study**

The findings and recommendations of the study were of help to several stakeholders. The management of the companies found the study useful in helping them adopt appropriate measures to enhance shareholders' wealth in time of crisis. These included future global pandemics, where it would be ideal to ensure that losses were mitigated by undertaking necessary measures in full preparedness to the pandemics.

Furthermore, investors were able to predict the variation in the value of the shares of the companies in the midst of future pandemics. This helped them in ensuring that they were able to implement measures of mitigating against risks occasioned by such pandemics. Diversification of an investor's portfolio was not enough to caution the investor against losses. Therefore, an

accurate determination of the movement of share prices after such a pandemic in all the sectors of the economy was ideal to the investor in making such future decisions.

Additionally, analysts were able to predict more accurately the variation of the share prices of companies. Consequently, they were able to provide more sound advice that would increase the number of their clients. Moreover, it assisted them in identifying the current research gaps that they could attempt to bridge in future studies.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The section on literature review assesses previous literature that has been written in the area of study. This includes the theories that have been proposed in the study area, empirical research and their study gap, summary of literature review and conceptual framework.

#### **2.2 Theoretical Framework**

The study will assess various theories that propose an explanation for changes in share prices or movement in share prices as a result of market shocks. These theories will be assessed on their proposition, the impact or suggested relationship with the study and critique of the theory. The study will review Random Walk Theory, Markowitz Portfolio Theory, and Efficient Market Hypothesis Theory.

##### **2.2.1 Random Walk Theory**

The Random Walk Theory was proposed by Burton Malkiel (1973). The theory proposes that changes in share prices have same distribution and are independent of each other. This therefore means that past movement or a trend that was formed by a certain share, may not be used to predict its future movement. The theory therefore proposes that stocks take a random and unpredictable path which makes it impossible to predict future stock prices in the long run. The theory is therefore of the opinion that it is impossible to outperform the market and therefore achieve arbitration without assuming additional risks.

Use of analysts to predict future changes in prices by using past and present information is futile as this information has already been factored in the prices of the stocks. The theory is therefore related to the study as it provides that despite the announcement of Covid-19 in Kenya, it would not be possible to predict changes in prices since this information was already factored in the prices of stock. Changes in prices would therefore take a random unexpected position even after the announcement of the first case of Covid-19 in Kenya. The theory therefore seeks to propose that there would be no effect of announcement of the first case of Covid-19 in the stock prices of firms listed at the NSE.

### **2.2.2. Efficient Market Hypothesis Theory**

The theory of efficient market hypothesis was proposed by Eugene Fama in the early 1960s. Fama together with other collaborators sought to critique and therefore improve the works of a French mathematician, Louice Bachelier. The theory proposed that prices of financial assets reflect all relevant information. They were of opinion that prices do not have a memory of past prices and movement of prices cannot be predicted since the movement follows a random distribution. Therefore, financial analysts who benefit from price changes, is not because of analysis but because they were lucky in the random distribution process. He supports this by suggesting that in the period where some analysts have made profits, there are other analysts who suffer huge losses, and they had still analysed the future prices based on past information. The theory therefore suggested three forms of market efficiency that he described as the weak form, the semi-strong form and the strong form (Fama, 1970). The type of efficiency of a certain market was dependent on the extent to which available information was reflected in the current prices of securities. Markets that were only able to reflect past information in the prices of

securities were said to have weak efficiency, while those that were able to reflect past and present information were referred as semi-strong efficient, the other category of strong efficient markets were able to reflect both public and private information in the prices of securities. The idea of random distributed prices of stock was developed further and presented in a book titled “A random walk down Wall Street” (Malkiel, 1973).

The theory relates to the variable of market efficiency of the study. It provides a way in which we can determine and measure market efficiency since markets efficiency may be grouped by either being, weak, semi-strong or strong market efficiency. The theory however, is critical on performance if market performance would be based on changes in share prices. This is because the theory proposes that future prices may not be predicted and therefore prices would only be distributed in a random manner and not based on events such as announcement of first case of Covid-19, among others. This mini-desk research would therefore have important contribution to the theory as the study would review research that would provide an indication whether the proponents of the theory had accurately predicted relationship between the study variables or else a criticism that provides why the theory may not hold in some circumstances (Dimson & Mussavian, 2016).

The criticism of efficient market hypothesis theory is on the assumption that all investors perceive all available information in precisely the same manner. It is almost impossible for all investors in the market to perceive new information in the same manner. The fact that there exist different methods of measuring value of stocks, then investors who rely on different methods of measuring stocks, may arrive at different conclusion on the fair value of the stock. If for example an investor seeks to invest on undervalued stocks so that he may benefit from the future potential of the stock, he will arrive at a different valuation from another investor who seeks immediate



returns and therefore focuses on the stocks that are currently performing well. The theory also assumes that no investor would be able to beat the market and earn above average returns consistently. However, there are cases where fund managers declare consistent annual returns that are far much above the average returns. Despite the fact that Fama had envisioned that some stocks would take time to reflect change in information on their prices, he did not provide time limits for such stocks. It remains a grey area where it is not clear how much time is required for a stock to reflect change of information in its price (Hagin, 2017).

### **2.2.3 Modern Portfolio Theory**

Modern Portfolio Theory (MPT) is a theory that was proposed by Harry Markowitz in his works that was entitled “Portfolio Selection” that made him awarded with a Nobel Prize. The theory suggests that risk-averse investors are capable of selecting portfolios that can be able to maximize expected return based on a certain level of market risk. The theory can also be used to select a portfolio which minimizes risk for a given level of expected return. The theory is therefore very crucial for investors who intend to construct efficient portfolios using (Exchange Traded Funds) ETFs (Markowitz, 1952). This theory therefore tends to have a contrary view of random walk theory and EMH theory. It suggests that it is possible to generate a certain return given the level of risk. This insinuates that under favorable circumstances, it is possible to predict future changes in prices of stocks. It suggests that the future prices of well selected portfolio given a certain risk level will not follow a random distribution and can be predicted with a certain level of certainty that would allow for positive required rate of return on the portfolio (McFarlan, 1981).

The criticism of MPT theory is that portfolios are evaluated based on variance and not on the downside risk. This means that a portfolio may have frequent small losses while another have less frequent but huge losses. The two portfolio would have the same variance and would be rated as equally desirable by use of MPT. However, investors since they are assumed to be risk averse will prefer the portfolio with frequent but low losses as compared to the huge losses. Perhaps the criticism brought forth on MPT brings out an element that after all there might not be a way to assess a perfect portfolio that would guarantee returns in future (Ndirangu, 2014).

MPT theory is therefore relevant to this study as it tries to indicate that given a certain level of risk it is possible to identify a portfolio that would maximize investors' required rate of return. Announcement of the first case of Covid-19 increased market risk and as such MPT suggests that it was possible to determine a portfolio that would maximize investors required rate of return and therefore result in an increase in share prices for the individual stocks in the portfolio. This study will therefore seek to identify any stock that increased its price after announcement of Covid-19 first case in Kenya, and whether the increase in share price was significant.

### **2.3 Determinants of Stock Returns**

The theoretical literature has contributions that suggests that future changes in prices of shares may not be predicted as the share prices follow a random walk. However, other theories suggest that it is possible to predict future changes in share prices by choosing portfolio that lies at the efficient frontier curve given a certain level of risk. At this section we assess various factors that have been known to affect or influence changes in share prices in addition to the expected change in share prices as a result of Covid-19 announcement of first case in Kenya.

### **2.3.1 Announcement of First Case of Covid-19**

The announcement of Covid-19 first case in Kenya is an event and therefore this study focuses on changes in share after a certain event takes place. Most of the previous studies have considered the changes in share prices after announcement of dividends, however, the changes in share prices after a recent and unique event such as announcement of Covid-19 in Kenya has not been undertaken by researchers. This study therefore seeks to bring new knowledge that would indicate the effect of announcement of the first case of COVID-19 in Kenya. Theoretically, the announcement of Covid-19 in Kenya brought out panic in the Kenyan market just as global markets had panicked as a result of the announcement of these cases in their respective countries. The panic could be attributed to the historical evidence of global market crashes that took place in only a single day. The emergence of a global pandemic in the country therefore brought about bad news and the reaction that was undertaken by the government was a clear indication that normalcy in the economic activities of the country was going to be interfered with. The suspension of international flights, the lockdown order in the capital city, and nationwide curfew were drastic steps that affected businesses from the core. A significant number of people lost their jobs, people were advised to work from their homes and therefore offices remain closed or almost closed. There was panic buying of some specific products, food, toiletries, detergents, sanitizers among others. The NSE market was closed and trading suspended for a couple of days (Wanjala, 2020).

### **2.3.2 Economic Recession**

An economic recession refers to a business cycle contraction when there is a general decline in economic activity. They occur when there is a widespread drop in spending. This is the opposite

of a demand shock where in a demand shock, there is an increased spending. An economic recession may be triggered by a number of events such as a financial crisis, external trade or supply shocks, bursting of an economic bubble or a natural disaster such as a pandemic. In Kenya, Wanjala (2020) notes that before the first case of Covid-19 was announced, the economy was in a recession where there was decline in economic activity in the country. Several publicly listed companies had already issued profit warnings, and market capitalization (number of shares traded) was significantly low. An economic recession would therefore also bring about decrease in share prices and therefore it would be important to understand whether changes in stock prices after announcement of Covid-19 was brought about by the economic recession that was already in the country or it was specifically as a result of the announcement of the first case of Covid-19 in the country.

### **2.3.3 Exchange Rate Fluctuations**

As stated by Williamson (1985) exchange rate volatility is a measure of the movements of fundamentals of economic situations such as inflation rates, interest rates, and balance of trade positions that cause unexpected movements in the exchange rate. It therefore entails the unexpected movement in the percentage changes in the exchange rate. Exchange rate volatility has largely been attributed to increase uncertainty in profits. It has also been associated with restriction in the movement of capital internationally by reducing both direct investment in financial portfolio investment and foreign operating facilities. Fixed exchange rate system is meant to remain unchanged for a long period of time and it therefore has low volatility. However, governments through their respective central banks were required to adopt a floating exchange rate which is controlled by the demand and the supply of foreign currency. The

floating exchange rate therefore changes from time to time and it becomes very cumbersome to accurately predict the exchange rate in a future period. Exchange rate fluctuations would therefore also affect changes in share prices. International investors are largely affected by exchange rate risks where increase in volatility of exchange rate increases exchange rate risks that means that the demand of shares decreases which inserts a downward pressure on share prices (Ayse, 2015).

## **2.4 Empirical Literature**

Empirical literature relates to the review of past empirical studies that have been undertaken locally as well as internationally on effect of certain events on share prices or on stock returns. This section therefore reviews various contributions by previous researchers on the effect of different events on stock prices or on stock returns.

Gormsen & Kojen (2020) investigated the impact of Coronavirus on stock prices and growth in the US. The study noted that equity markets in the European Union and in the United States dropped by as much as 30% between mid-February and Mid-March. These changes were attributed to the revised changes in expected returns. The study used data from aggregate stock and dividend futures markets in order to quantify investor's expectations in regard to the response of Coronavirus outbreak and subsequent policy responses. Despite the fiscal stimulus around March which boost stock market and long-term growth, the short-term growth expectations were still found to be low and insignificant. The expected dividend growth however, improved since April 1 in all aspects.

Ramelli & Wagner (2020) undertook a study that they entitled "Feverish Stock Price Reactions to Covid-19". The study was motivated by the need to understand how real shocks and financial

policies drive firm value. The study noted that initially it was only international firms that traded with China that had underperformed, however, with the spread of the virus to Europe and US, corporate debt and cash holdings become all important value drivers. The findings indicates that real effects of Coronavirus were amplified through financial channels.

Griffith et al. (2020) in their paper described the impact of COVID-19 and its variations across industries in the UK. The study used data from firms listed at the London Stock Exchange and more specific on the stock prices as the prices convey important information regarding market expectations on the current as well as on future profitability. This is because stock prices, indicate the current value as well as the future value of the company. If investors expects that future value of a company will increase, they will be willing to pay more for it today and therefore the prices would go up and the vice versa is true. The study was undertaken for the period January 2<sup>nd</sup> to May 20, 2020. The changes in share prices at FTSE All-Share price index were observed. The study indicated that the price remained pretty steady in the early weeks of the crisis but recorded a sharp decline in the weeks following the announcement of a lockdown in northern Italy, while it fell to its lowest point in the week following the announcement of social distancing in the UK. The decrease was 35% down from the share prices at the start of January. However, firms in medical and biotech research outperformed the market by share price increase of 6% as compared to overall decline of 21%.

Thomas et al. (2020) undertook a study to investigate the impact of Covid-19 announcements on Nifty Stocks. The study was influenced by the fact that over 90% of the companies hit their lowest after Covid-19 announcement. Foreign investors also sold out more than Rs 60,000 from the cash segment of Indian equity market in March 2020. The study utilized paired t-test and One-way ANOVA in the study analysis of the fifty companies. The study indicated that the

impact of Covid-19 announcement on NIFTY stocks had varied impact in different sectors. The highest negative effect was found on financial sector followed by pharmaceutical sector. The increase in shares after announcement on the other hand could be associated with the stimulus packages that were announced by the government. The study could therefore be replicated in Kenya to obtain the effect of announcement on different sectors in Kenya.

Orenge (2020) set out to investigate the impact of Covid-19 pandemic on stock performance in Kenya. The study used exchange rates, stock trade volumes and days to 2019 dividends book closure as control variables. Stock performance was determined by natural log of share prices and the effect of Covid-19 was determined by the number of days since announcement of first case. The study was undertaken 30 days after the first case was announced and the findings indicated that all the independent variables affected stock performance except exchange rate. This study was undertaken by the use of linear regression model, where data collected was data after the announcement of Covid-19. However, in order to understand the effect of an announcement, data is collected before the announcement and after the announcement in order to compare the study variables between the two periods and make a conclusion. The researcher will therefore target this study gap in order to ensure that a proper analysis before and after the announcement of Covid-19 is undertaken on the prices of shares.

The duty of the management to communicate to the shareholders on information relating to earnings and performance of their companies motivated Akinyi & Melissa (2017) to undertake a study on how such announcements affected share prices at NSE. The objectives of the study was to determine the efficiency of NSE on reacting to earnings announcements, and influence of these announcements on investments decision by investors. The study targeted all the companies listed at NSE but purposive sampling used to set out eight companies. The study used event

study methodology and correlational analysis and t-statistic were employed. The findings indicated a negative relationship between announcement and share price changes as positive returns were found before earnings announcement and negative returns after announcement of earnings. The stocks studied also had a positive beta and therefore adjusted linearly to market performance of the shares. This study sets to investigate the share prices after announcement of first case of Covid-19 in Kenya.

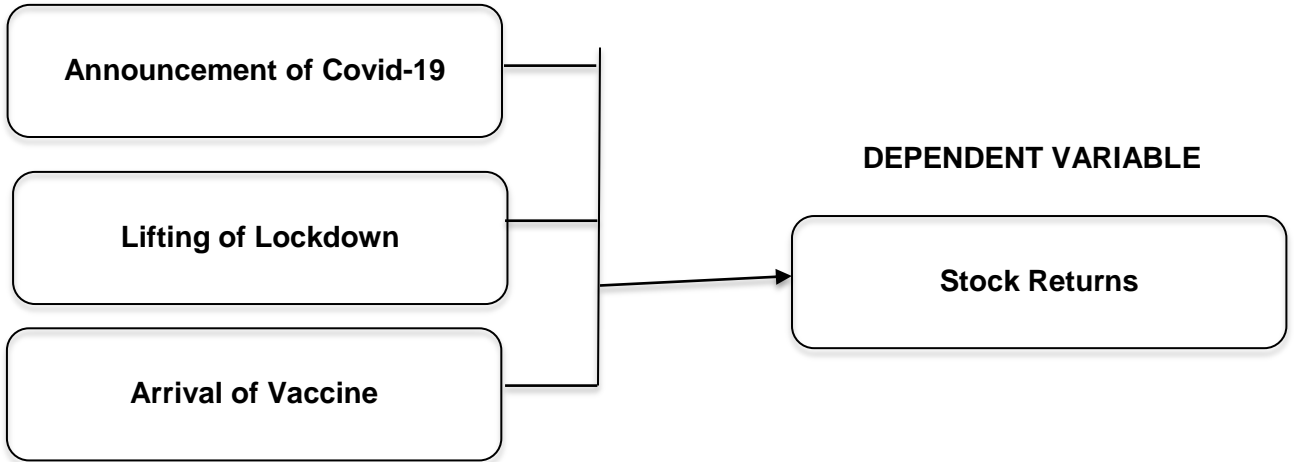
Mohamed (2014) undertook a study that investigated the effect of earning announcement on stock prices for firms listed at NSE. Data was extracted from NSE daily stock and NSE handbook for the period 2004-2008 in which SPSS was used in the analysis of student t value. The findings of the study indicated that significant movements in return were observed periodically, pre as well as post earnings announcements. Most of the shares indicated negative abnormal returns around earnings announcement date.

## **2.5 Conceptual Framework**

Conceptual framework is a pictorial analysis of the study variables, where their relationship is expressed diagrammatically. It helps to show the likely expected relationship between the study variables. This study will have share prices as the dependent variable, while announcement of first case of Covid-19, Exchange rate fluctuations, economic growth, as well as Foreign Direct Investment (FDI) as the independent variables.



**INDEPENDENT VARIABLES**



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The research methodology highlighted various processes, and procedures that were undertaken in order to meet the study objectives. This chapter therefore was composed of the introduction part, research design employed, the population targeted by the research, sampling and sample size of the study, data collection tools, data analysis as well as significance test.

#### **3.2 Research Design**

According to Myers et al. (2010) there is no single research that can be done exactly the same as another one since the answers to research questions will always be different. The researcher was therefore tasked with identifying a research design that best provided answers to the research questions and which represented the spirit of the research undertaken. It therefore provided a unique structure that was the main basis for answering the research questions. The most appropriate research design that was employed in this research was the descriptive research design because it was appropriate in answering the ‘what’ research questions rather than why. The research design was appropriate when explaining relationship that existed between the study variables.

### **3.3 Population**

Mugenda and Mugenda (2003) defines a population as an aggregate of all those members who fit a certain description as to be classified in a certain group. In this study, the population represented all primary listed commercial banks at the NSE. As at the end of the year 2020, there were a total of 12 commercial banks that had been listed at the exchange. The population was not large enough to warrant the need for undertaking a sampling exercise. All the 12 primary listed commercial banks were studied.

### **3.4 Data Collection**

Secondary data was collected for the study. The data was obtained from published reports, websites, NSE data as well as data from government bodies such as KNBS (Kenya National Bureau of Statistics) and CBK (Central Bank of Kenya). The data collected included share prices for listed commercial banks, 15 days after each event took place, 91 days' treasury bills rate, the NASI index, and the beta for each listed commercial bank.

### **3.5 Data Analysis**

Data analysis was undertaken where the effect of Covid-19 pandemic was assessed on stock returns for listed commercial banks. The stock returns were first assessed prior to announcement of the first case of covid-19 pandemic then it was assessed after the announcement. On May 2020, the government of Kenya undertook an economic stimulus package to boost the economic growth but at the same time placed Nairobi, Kiambu, Machakos, Mombasa and Kajiado under lock-down. The study also reviewed the stock returns after the lock down was implemented and

lifted. It also assessed the returns after Covid-19 vaccine finally arrived in the country on 2<sup>nd</sup> March 2021.

Data analysis for each event was undertaken where daily returns were assessed for each listed commercial bank for each event. The study adopted 15 days return as they provided insight into the market response after each event took place. The stock returns were determined by the following formula:

$$\text{Actual Share Return} = \frac{(P_1 - P_0) + D}{P_0}$$

Where  $P_0$  = share price at the beginning of the day

$P_1$  = Ending share price at the end of the day

D = Any dividend issued

Expected Returns were calculated by the use of CAPM as below:

$$E(R) = R_f + \beta_i * (R_m - R_f)$$

Where;

$E(R)$  = Expected return of the stock

$R_f$  = risk free rate that was represented by the rate of government 91-day treasury bills

$\beta_i$  = represented asset beta that was determined by the average monthly beta for each stock.

Rm = represented market return that was represented by monthly market returns for Nairobi All Share Index (NASI). The Market Return was determined by

$$\frac{N_t - N_{t-1}}{N_{t-1}}$$

$$N_{t-1}$$

Where  $N_t$  = is the closing index value at time t (day)

Where  $N_{t-1}$  = is the closing index value at time t-1 (previous day)

### **3.6 Test of Significance**

The significance of the study findings was tested by the use of t statistic, at 5% significance level. This implied that there was only 5% chance of making type I error and therefore failing to reject the null hypothesis in a situation where the null hypothesis should have been rejected.

## **CHAPTER FOUR**

### **DATA ANALYSIS**

#### **4.1 Introduction**

The data collected is analyzed and the results of the analysis are interpreted in this chapter. The chapter therefore entails the data available for analysis, the description of data in regard to nature of distribution of data, empirical tests as well as interpretation of result findings.

#### **4.2 Data Response Rate**

There are a total of 12 listed commercial banks at Nairobi Securities Exchange. However, there were only 10 listed commercial banks when Covid-19 was first announced in Kenya. This implies that the data collected 15 days before and 15 days after announcement of Covid-19 comprised of only 10 listed banks. The actual and projected returns (as estimated by beta) was assessed before and after announcement of Covid-19 to determine the relative effect of announcement of Covid-19 on stock returns.

When the Covid-19 infections increased across the country, the government then locked down the County of Nairobi, Nakuru, Mombasa, Kajiado, Kiambu and Machakos. The lockdown in these counties was then lifted on 7<sup>th</sup> July and the study therefore collected data 15 days before lock down was lifted and 15 days after lock down was lifted. BK Group and I & M Holdings were by then added into commercial banks and therefore data for 12 listed commercial banks was available.

Similarly, the country received a reprieve after Covid-19 vaccine was manufactured. The study therefore collected data 15 days before the vaccine finally arrived in Kenya, and 15 days after the vaccine arrived. Share prices data was collected for 12 commercial banks.

### 4.3 Data Descriptive

The effect of Covid-19 pandemic on stock returns of listed commercial banks was investigated in three different periods. The first period involved the period after announcement of first case of Covid-19 pandemic, the second case was after lock down in 5 counties was lifted as well as after Covid-19 vaccine finally arrived in Kenya. The study therefore described both the actual stock returns and projected stock returns as projected by beta under CAPM model. The data collected for each period is therefore described in form of the mean, standard deviation and standard error.

#### 4.3.1 Announcement of First Case of Covid-19

The data collected pertaining announcement of first case of Covid-19 sought to determine stock returns before and after announcement of Covid-19. The returns were actual returns as well as returns as projected by beta. Table 4.1 describes the variables accordingly in form of mean, standard deviation and standard error.

**Table 4. 1: Descriptive Statistics**

	Serial	N	Mean	Std. Deviation	Std. Error Mean
Actual Return	Before Announcement	150	-0.4390%	3.00461%	0.24533%
	After Announcement	150	-0.9393%	3.31826%	0.27094%
Projected	Before Announcement	150	0.2887%	1.95031%	0.15924%
	After Announcement	150	-1.2243%	2.77691%	0.22673%

Source: Statistical Research Data, (2021)

The listed commercial banks during announcement were only 10. This implies that the data collected for 15 days before announcement and after announcement means that they are a total of 150 data points in each period for each variable.

The mean for the actual return before announcement was -0.44% with a high standard deviation of 3.00%. This indicates that despite the fact that Covid-19 was not officially announced in Kenya, the share returns for commercial banks were not doing well. After the announcement of Covid-19 pandemic, the actual share return decreased further to -0.94% with an equally high standard deviation of 3.32%.

The projected returns also exhibited similar pattern, where the projected stock returns before the announcement of Covid-19 pandemic was 0.29% with standard deviation of 1.95%, while the projected stock returns after announcement of first case of Covid-19 was lower at -1.22%. This indicates that the announcement of Covid-19 pandemic in Kenya decreased stock returns for listed commercial banks.

#### **4.3.2 Lifting of Lock-down in Major Counties**

The lock-down in major cities in Kenya, was one of the devastating effects of Covid-19 that slowed down economic growth as well as limiting business operations. There was a night curfew that further aggravated the bad situation. The lifting of lock-down was a major relief that allowed people to travel outside and into the five counties. The stock returns before lifting and after lifting of lockdown are therefore investigated in the study and descriptives defined in table 4.2.

**Table 4. 2: Descriptive Statistics Lifting of Lock-down**



	Serial	N	Mean	Std. Deviation	Std. Error Mean
Actual Returns	Before Lifting of Lockdown	180	-0.3403%	1.84639%	0.13762%
	After Lifting of Lockdown	180	-0.0108%	2.64264%	0.19697%
Projected Returns	Before Lifting of Lockdown	180	-0.0135%	1.13156%	0.08434%
	After Lifting of Lockdown	180	-0.4858%	0.99205%	0.07394%

Source: Statistical Research Data, (2021)

The actual stock returns before lifting of lock-down was at a low of -0.34% with a standard deviation of 1.85%. With the lifting of lock-down the actual returns increased marginally to a mean of -0.01% with a higher standard deviation of 2.64%.

On the other hand the projected returns before lifting of curfew had a mean of -0.01%, with a standard deviation of 1.13%. The projected stock returns after lifting of lock down indicated a mean of -0.49% which is lower than the mean stock returns before lifting of lock down.

### 4.3.3 Arrival of Covid-19 Vaccine

The arrival of Covid-19 vaccine was welcome news for most businesses and the entire population as it meant that livelihoods would eventually get back to normal. The stock returns are therefore expected to increase as the arrival of vaccine indicated that people would be involved more in businesses and increased production of goods and services would ensue. Commercial banks play a vital role in enhancing economic growth and therefore arrival of vaccine would increase banks' economic activity and lead to increase in stock returns. The mean of both actual and projected returns as well as their respective standard deviation is stipulated in table 4.3

**Table 4. 3: Descriptive Statistics**

**Group Statistics**

	Serial	N	Mean	Std. Deviation	Std. Error Mean
Actual	Before Vaccine	180	0.2466%	2.07270%	0.15449%
	After Vaccine	180	0.1590%	1.73719%	0.12948%
Projected	Before Vaccine	180	-0.2531%	1.96907%	0.14677%
	After Vaccine	180	0.2165%	0.89517%	0.06672%

Source: Statistical Research Data, (2021)

The mean for the daily actual stock returns before the vaccine arrived was 0.25% with a high standard deviation of 2.07%. However, the mean after vaccine arrived for daily actual stock returns was 0.16% with a lower standard deviation of 1.74%. This indicates that the actual stock returns for listed commercial banks decreased slightly after the vaccine first arrived in the country. However, the sharp deviations between stock returns among the banks decreased after the vaccine arrived which insinuates that the actual stock returns were almost uniform across all the banks after the vaccine arrived as opposed to the period before the vaccine arrived where standard deviation was high suggesting great disparity on the stock returns.

The projected daily stock returns on the other hand had a low mean of -0.25% with a standard deviation of 1.97% while the mean for projected daily stock returns after arrival of vaccine was a high of 0.22% with a lower standard deviation of 0.9%. This indicate that the prediction indicated that the daily stock returns for commercial banks would increase and follow the trend in the overall capital market.

#### **4.4 Independent Sample Test**

The study undertook an independent sample t test, which sought to compare the means of the population before the event and after each event. The statistical measure was to determine

whether at 95% confidence level the means are statistically different or the difference in the means arise as a result of chance.

The assumption that is made by independent t-test is whether the data contains variances with equal means. This entails the use of Levene’s test that tests whether the variances between the distribution have equal variances. If the distribution of the data passes this test, then the parametric test is undertaken while a non-parametric test (Welsh test) is undertaken when the study observes that the distribution in the populations have no equal variances.

#### 4.4.1 Announcement of Covid-19 T-Test

To determine whether announcement of Covid -19 had an impact on stock returns for commercial banks, the independent sample t test was undertaken. The Levene’s test was used to test whether there were equal variances or not. The null hypothesis in Levene’s test states that there are equal variances between the group means for the two populations.

**Table 4. 4: Independent Sample Test Table**

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Actual Returns	Equal variances assumed	2.77	.097	1.369	298	.172	0.5003%	0.366%	-0.219%	1.220%

	Equal variances not assumed			1.369	295.11	.172	0.5003%	0.366%	-0.219%	1.220%
Projecte	Equal variances assumed	21.3	.000	5.461	298	.000	1.513%	0.277%	0.968%	2.058%
d										
Returns	Equal variances not assumed			5.461	267.23	.000	1.513%	0.277%	0.968%	2.058%

Source: Statistical Research Data, (2021)

The F test used to determine Levene test has a p-value of 0.097 that means that the study fails to reject the null hypothesis. Equal variances are therefore assumed to exist between the populations of actual daily stock returns after and before announcement of Covid-19 pandemic. The t-test that is undertaken in the top row indicates a p-value of 0.172 which indicates that the p-value is greater than alpha value (0.05) and therefore the study fails to reject the null hypothesis. The null hypothesis of a sample t-test states that the difference between the means of the two population is zero.

The study therefore concludes that the actual stock returns for commercial banks before Covid-19 was announced and after Covid-19 was announced were not statistically different. The difference where the mean of the actual returns after announcement of Covid-19 was less than the stock returns after announcement of Covid-19 was only as a result of chance and not statistically significant.

Projected daily returns on the other hand had a Levene test with a p-value less than 0.05. The test indicated that there were no equal variances between the two populations and therefore the study used the second row in table 4.4. The t-test that followed had a p-value of 0.00 which indicates that the null hypothesis was rejected and therefore the differences between the means of the two population was not zero. The decrease in projected daily stock returns after announcement of Covid-19 was therefore statistically significant. This could mean that projections expected a decrease in daily stock returns for stocks in commercial banks, but in actual sense there was no significant change in actual stock returns for commercial banks after announcement of Covid-19.

#### 4.4.2 Lock-Down of Major Counties

The lock-down of major counties meant that the free movement of people was restricted and therefore businesses as well as investment opportunities were affected. The lifting of lock-down was an indicative of uplifting business operations although other measures were still in place to prevent spread of Covid-19. The general expectation was that with lifting of lock-down in major counties, then the stock returns would increase significantly.

Independent sample t-test was used to determine whether the differences between the means of actual stock returns and projected stock returns before and after lifting of lock-down in major counties was statistically significant as indicated in table 4.5.

**Table 4. 5: Independent Sample T-Test after Lifting of Lockdown**

Independent Samples Test	
Levene's Test for Equality of Variances	t-test for Equality of Means

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Actual Returns	Equal variances assumed	1.12	.291	-1.371	358	.171	-0.329%	0.24%	-0.802%	0.143%
	Equal variances not assumed			-1.371	320.13	.171	-0.329%	0.24%	-0.802%	0.143%
Projected Returns	Equal variances assumed	.000	.987	4.211	358	.000	0.472%	0.112%	0.252%	0.693%
	Equal variances not assumed			4.211	351.98	.000	0.472%	0.112%	0.252%	0.693%

Source: Statistical Research Data, (2021)

The actual daily returns has a p value of 0.291 which is greater than 0.05. It therefore fails to reject the null hypothesis that equal variances are assumed. The t test has a p-value of 0.171 which is greater than 0.05. The study therefore fails to reject the null hypothesis that the means of the two populations are zero. This implies that the difference between the actual stock returns after and before lifting of lock-down was not statistically significant. Although the mean of actual stock returns after lifting of lock-down was higher than the mean of daily actual stock returns before lifting of lockdown, the study indicates that this difference was only arising as a result of chance and not statistically significant. The changes in actual stock returns before and after lifting of Covid -19 for commercial banks was not statistically different.

Projected returns, however, indicate a p-value of 0.000 that indicates that the null hypothesis is rejected and therefore the projected daily returns before lifting of covid 19 were lower than the projected daily returns after lifting of lock-down in the major cities. This indicates that despite

the fact that the market expected that the daily stock returns would increase after lock-down was lifted, the actual changes in stock returns was insignificant.

#### 4.4.3 Arrival of Vaccine

The arrival of vaccine is an indication of future and better hope. The study therefore was undertaken to determine whether actual daily stock returns would increase with arrival of vaccine.

**Table 4. 6: Independent Sample Test Vaccine Arrival.**

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Actual Returns	Equal variances assumed	1.44	.231	.435	358	.664	0.088%	0.202%	-0.31%	0.484%
	Equal variances not assumed			.435	347.39	.664	0.088%	0.202%	-0.31%	0.484%
Projected Returns	Equal variances assumed	98.98	.000	-2.913	358	.004	-0.47%	0.16%	-0.787%	-0.152%
	Equal variances not assumed			-2.913	249.96	.004	-0.47%	0.16%	-0.787%	-0.152%

Source: Statistical Research Data, (2021)

Table 4.6 indicates that F test of the actual daily returns was greater than 0.05 at a p-value of 0.231 and therefore fails to reject the null hypothesis that equal variances are assumed. The underlying t-test has a p-value of 0.664 that indicates that the study fails to reject the null hypothesis that the two population means differences is zero. There is therefore no significant difference between the differences in the means of the two populations. The mean for daily actual stock returns decreased marginally after the vaccine was announced, However the decrease was only as a result of chance and not statistically significant.

The daily projected stock returns on the other hand had an F test with a significance less than 0. The study therefore rejected the null hypothesis that equal variances were assumed. The study therefore had a p-value of 0.004 from the t test that indicated that the null hypothesis is rejected and therefore concluding that the differences between the means is statistically significant. This indicated that the projected stock returns before arrival of the vaccine increased from a mean of -0.25% to a mean of 0.22%. The increase in projected stock returns was statistically significant that indicates that projections indicated that after arrival of vaccine, the stock returns for commercial banks were expected to increase significantly though that was not the case.

#### **4.5 Results and Interpretation of Study Findings**

The study set out to determine the effects of Covid-19 announcement on daily stock returns for commercial banks listed at NSE. It also determined the effect of lifting of lock-down in major counties as well as arrival of vaccine in both daily actual stock returns and projected daily stock returns before and after each event. The study employed an independent sample t-test as the main method of analysis, where stock returns were assessed on daily actual stock returns as well as



projected stock returns (CAPM). The study collected daily data for these stocks, 15 days before each event and 15 days after each event. The actual stock returns were therefore determined 15 days before and 15 days after each event where the means of stock returns for each period was determined and compared with the mean for the event after the event took place. The same case applied to projected daily stock returns which was projected by the use of CAPM.

The study found that the mean of daily actual returns before announcement of Covid-19 was -0.44% with a high standard deviation of 3.00%. This indicates that despite the fact that Covid-19 was not officially announced in Kenya, the share returns for commercial banks were not doing well. After the announcement of Covid-19 pandemic, the actual share return decreased further to -0.94% with an equally high standard deviation of 3.32%. Despite the decrease in the mean of actual stock prices after announcement of Covid-19, the independent sample t test failed to reject the null hypothesis with a t test p value of 0.177 that is greater than 0.05. It indicated that the differences were only occasioned by chance and not statistically significant. However, the difference in the means of daily projected stock returns was statistically significant indicating that the projected stock returns had projected a decrease in stock returns after announcement of Covid-19 case in Kenya. The result findings could be interpreted to mean that the stock returns for commercial banks are quite inelastic to external shocks as many people may have faith in the stock returns for commercial banks despite the projections of the market models that the stock returns would be affected. This is a critical observation that is crucial in determining investments in commercial banks stocks as they are least affected by global shocks.

Similar study findings were indicated by daily actual returns for stocks before and after lifting of lock-down where the study found that there was no statistically significant changes in stock prices but the projected stock returns indicated that the differences in the means of the two

populations were statistically significant. The projected stock returns were expected to increase after lifting of lock-down in major counties. A similar result was obtained after the arrival of vaccines in the country with actual stock returns indicating no significant change while projected stock returns indicated that there was a significant increase in projected daily stock returns after the vaccine arrived in the country.

The results of the study are a caution to investors that the market model that they rely on, provides different findings from the actual returns recorded by the study. It insinuates that commercial banks in Kenya is a sector that is less elastic to changes and external shocks. Investors have confidence in prices and performance of commercial banks despite prevailing economic shocks. It indicates the confidence investors have with investments in commercial banks. The assumption may be considered right with the announcement of increased profitability for commercial banks, even with the prevalence of Covid-19 pandemic, while other sectors of the economy indicates that the firms were adversely affected by Covid-19 pandemic.

The findings were consistent with studies that found that such announcement had no impact or effect on share prices. Ramelli & Wagner (2020) found that there was no effect of Corona virus on stock prices of firms, a part from international firms that traded with China. The study however, had been carried out during the first stages of Covid-19 pandemic. Thomas et al. (2020) also found varied impact of announcement of Covid-19 on prices of NIFTY stocks, which they attributed to the generous economic stimulants introduced in the economy. However, despite the few studies that were consistent with the results in this study, the majority of the studies contradicted the findings of the study. This could be explained by the fact that the banking sector in Kenya is a critical sector which has diversified investments and ensured that the sector supports both government investments as well as individual and institutional investors.

The lending of government and county governments ensured that the performance of stock returns for commercial banks was not adversely affected in the pandemic season.

The findings however were not consistent to results found by a study undertaken by Gormsen & Koijen (2020) where they found that after announcement of Corona virus, stock prices and growth of firms in the US were affected despite the stimulus packages that had been introduced. Griffith et al. (2020) also found that after announcement of Corona virus, stock prices were steady in the first week of crisis but later on declined at a sharp rate. Orange (2020) found that all the variables investigated affected stock performance for stocks at NSE apart from exchange rate. Similarly, Mohammed (2014) on the study of the effect of earning announcement on stock prices found that there were abnormal returns around the announcement date of stock earnings.

## **CHAPTER FIVE**

### **SUMMARY CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

The summary of the study and the study findings are indicated in this chapter. From the summary of the study, conclusions are thereby arrived and recommendations suggested. The study then brings out the limitations experienced in undertaking the study from which suggestions for further research in the area is undertaken.

#### **5.2 Summary**

The study set out to determine the effects of Covid-19 announcement on daily stock returns for commercial banks listed at NSE. It also determined the effect of lifting of lock-down in major counties as well as arrival of vaccine in both daily actual stock returns and projected daily stock returns before and after each event. The study employed an independent sample t-test as the main method of analysis, where stock returns were assessed on daily actual stock returns as well as projected stock returns (CAPM). The study collected daily data for these stocks, 15 days before each event and 15 days after each event. The actual stock returns were therefore determined 15 days before and 15 days after each event where the means of stock returns for each period was determined and compared with the mean for the event after the event took place. The same case applied to projected daily stock returns which was projected by the use of CAPM.

The study found that the mean of daily actual returns before announcement of Covid-19 was -0.44% with a high standard deviation of 3.00%. This indicates that despite the fact that Covid-19 was not officially announced in Kenya, the share returns for commercial banks were not doing well. After the announcement of Covid-19 pandemic, the actual share return decreased further to -0.94% with an equally high standard deviation of 3.32%. Despite the decrease in the mean of actual stock prices after announcement of Covid-19, the independent sample t test failed to reject the null hypothesis with a t test p value of 0.177 that is greater than 0.05. It indicated that the differences was only occasioned by chance and not statistically significant. However, the difference in the means of daily projected stock returns was statistically significant indicating that the projected stock returns had projected a decrease in stock returns after announcement of Covid-19 case in Kenya. The result findings could be interpreted to mean that the stock returns for commercial banks are quite inelastic to external shocks as many people may have faith in the stock returns for commercial banks despite the projections of the market models that the stock returns would be affected. This is a critical observation that is crucial in determining investments in commercial banks stocks as they are least affected by global shocks.

### **5.3 Conclusion of the Study**

The conclusions made by the study arise from the findings and the summary of the study. The basic conclusion of this study is that commercial banks in Kenya have specific mandate that is distinct from other sectors in the economy. The operations of commercial banks have been diversified to an extent that the sector is able to thrive even after a major external shock such as Covid-19 pandemic, The performance of stock prices in commercial banks is thereby affected by other factors more than such an external shock could affect the stock returns. Actual daily stock

returns were not statistically affected by any Covid-19 event as predicted by economic models, The sector is therefore an interesting sector that defies prediction of existing market models.

The study also concludes that there appears to be increased deviation in actual stock returns for all the events. These shows that there are commercial banks that perform extra ordinarily well during external shock period, while other commercial banks perform poorly. This could be explained by the trust commercial banks earn as a result of perceived risks by depositors. During periods of external shocks, depositors prefer stable and large commercial banks despite them guaranteeing small interest payments than undertaking huge risks of depositing funds in small commercial banks that may likely fall under liquidation. The study therefore concludes that the performance of large stable banks is likely to improve during period of increased external shocks such as during pandemic as small banks lose business that is gained by larger banks.

The study also concludes that the market model does not predict accurately changes in stock returns. This conclusion is based on the fact that all the three events indicated that the market model arrived at wrong conclusion in regard to projected daily stock returns. The model contradicted the actual results after announcement of first case of Covid-19. Similarly, the model was again inaccurate after lifting of the lock-down in major counties as well as inaccurate predictions in regard to projected daily stock returns after arrival of Covid-19 vaccine.

#### **5.4 Study Recommendations**

The study makes various recommendations arising from the conclusion made by the study. The study in the first instance recommends that investors should be careful when undertaking investments in commercial banks in period of external shocks such as during a pandemic. This

arises from the fact that the projections made by market models in terms of the behavior of the prices of shares may be quite different from the actual prices and may result to heavy losses to investors who would rely on the market models.

Similarly, the government should ensure that during critical periods such as world pandemic, the commercial banks should not be treated the same, the problems that affect small commercial banks are not the same problems that affect large commercial banks during a pandemic. Depositors of funds are likely to withdraw their deposits from a small commercial bank and deposit the same in a large commercial bank, since the depositors fear losing their deposits from collapse of such small banks. When the government is therefore undertaking and implementing economic stimulus program in commercial banks, small banks should be supported such that the confidence of investors as well as depositors of funds is maintained for small banks. The large banks may as a matter of fact experience improved financial performance during global crisis periods as they are less likely to go under unlike their counterparts that are likely to collapse, with the severity of the crisis.

The study also recommends that market models should be designed in order to factor in the specific unique conditions in banking sector. The model should identify that with increase in risk element, the performance of a specific industry may not follow normal risks as described by beta under CAPM. Perhaps the use of other models such as APT where different factors are considered in predicting stock returns would help to capture the unique feature in commercial banks.

## **5.5 Limitations of the Study**

Although great care and accuracy was observed while undertaking the study, there are various limitations that had the capability of affecting the results of the study. The study used secondary data that was collected from NSE database for share prices stock market share indices as well as 91-day treasury bills rate. Great care was observed to ensure that data was collected accurately, however some outliers in data may be from errors made by the owners of these databases in presenting the data. This study ensured that the limitation was addressed by counterchecking the outliers of share prices from other published sources.

The actual returns calculated in this study ignored cash dividends issued. This was because commercial banks do not issue cash dividends on daily basis. The chance of a commercial bank issuing dividends to shareholders within the period of 15 days before a major event and 15 days after a major event pertaining to Covid-19 pandemic was low. These companies therefore prefer to issue stock dividends that adjusts itself in price. This argument was also presented by Ekisai (2015) as well as Kamau (2014). They found that calculating stock returns by ignoring cash dividends issued in certain months, prevented the stock returns from experiencing windfall returns that would affect the accuracy of the predicting models.

The study was also undertaken for commercial banks listed at the NSE. This is a limitation since the banks quoted at the NSE comprise only a quarter of all the licensed commercial banks in Kenya. The hurdle in obtaining an objective determinant of share prices for commercial banks that are not listed at the NSE meant that it would be more informative in studying only the quoted commercial banks as their data in regard to share prices are easily available and accessible. The study was therefore unable to achieve a normally distributed data since the target



population was already biased. The study however, was able to use non-parametric tests in undertaking analysis since non-parametric tests do not require data to be normally distributed.

## **5.6 Suggestions for Future Research**

A future study may be undertaken while taking into consideration the cash dividends issued within the study period. This may have significant effect on stock returns in the study period particularly as it would appear as an outlier of stock returns for the day when cash dividend was received. The study would be more accurate if cash dividends received in a certain day were to be prorated in the entire study period. The findings of such a study may then be compared to findings of this study.

The study would also suggest future research to be undertaken in considering stock returns for each economic sector during the three events and therefore determine whether all sectors may follow the findings in this study. The study would provide insight into the sectors of the economy and indicate sectors with similar characteristics and those sectors with contrary characteristics or entirely different characteristics.

Perhaps a similar study should be undertaken targeting all the licensed commercial banks and therefore determine whether the results are consistent with findings in this study. A study that would indicate on whether financial sector and particularly the commercial banks exhibit unique characteristics in predicting share prices during a period of external shock.

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## APPENDICES

### 1. Data Collection Form

Company Name	Date	Price of Shares (P)	Company Beta ( $\beta$ )	Daily Market Price (NASI) (Rm)	91-day Treasury Bills (Rf)	Dividends per share if any (D)

## 2. List of Banks Listed at NSE

1. ABSA Bank Kenya Plc
2. BK Group Holding
3. The Co-operative Bank of Kenya Ltd
4. Diamond Trust Bank Kenya Ltd
5. Equity Group Holdings Plc
6. HF Group Ltd
7. KCB Group Plc
8. National Bank of Kenya Ltd
9. NCBA Group Plc
10. Stanbic Holdings Plc
11. Standard Chartered Bank Kenya Ltd
12. I&M Holdings Ltd

### 3. Data Used

COVID -19 ANNOUNCEMENT			LIFTING OF LOCKDOWN			ARRIVAL OF VACCINE		
Serial	Actual	Projected	Serial	Actual	Projected	Serial	Actual	Projected
1	-2.16%	-1.33%	1	-2.21%	-0.54%	1	-0.21%	-0.25%
2	-3.40%	-1.68%	2	-3.47%	-0.54%	2	0.00%	-0.25%
3	-0.53%	-1.61%	3	-2.82%	-0.68%	3	0.00%	-2.08%
4	-4.89%	-1.76%	4	0.00%	-0.65%	4	1.77%	-1.71%
5	0.00%	-1.29%	5	-0.30%	-0.71%	5	0.00%	-2.52%
6	-5.63%	-1.90%	6	-3.16%	-0.52%	6	1.16%	-0.03%
7	0.00%	-1.18%	7	-1.21%	-0.38%	7	0.00%	1.73%
8	-3.51%	-2.08%	8	-1.16%	-0.77%	8	-1.04%	-3.25%
9	-5.24%	-1.13%	9	0.00%	-0.47%	9	0.00%	0.56%
10	-3.03%	-1.25%	10	0.19%	-0.84%	10	-6.79%	-4.20%
11	0.44%	1.27%	11	0.00%	-0.45%	11	-0.90%	0.85%
12	-0.39%	1.59%	12	-0.15%	-0.50%	12	0.00%	0.19%
13	0.00%	1.53%	13	-3.09%	-1.38%	13	0.63%	-0.54%
14	-1.51%	1.67%	14	0.00%	-1.38%	14	0.00%	-0.54%
15	-2.43%	1.23%	15	-0.83%	-1.73%	15	-0.38%	-2.44%
16	3.60%	1.80%	16	0.00%	-1.66%	16	0.00%	-2.06%
17	0.00%	1.13%	17	-3.82%	-1.82%	17	0.53%	-2.90%
18	-2.60%	1.96%	18	-1.96%	-1.34%	18	-1.15%	-0.31%
19	6.63%	1.08%	19	3.87%	-0.99%	19	-1.23%	1.52%
20	2.58%	1.19%	20	-0.58%	-1.96%	20	0.66%	-3.66%
21	-2.63%	0.18%	21	0.00%	-1.22%	21	0.00%	0.30%
22	-0.78%	0.22%	22	0.00%	-2.15%	22	4.86%	-4.65%
23	-1.07%	0.21%	23	-0.63%	-1.16%	23	1.81%	0.61%
24	-0.64%	0.23%	24	-0.60%	-1.29%	24	-0.19%	-0.08%
25	4.73%	0.17%	25	0.85%	-0.10%	25	-0.21%	-2.13%
26	-0.36%	0.24%	26	0.00%	-0.10%	26	0.00%	-2.13%

27	0.00%	0.16%		27	-0.84%	-0.12%		27	-1.15%	-4.45%
28	-0.36%	0.26%		28	0.00%	-0.12%		28	4.18%	-3.98%
29	1.55%	0.15%		29	1.11%	-0.13%		29	-0.13%	-5.00%
30	-1.06%	0.17%		30	0.00%	-0.09%		30	0.58%	-1.86%
31	-0.90%	-0.68%		31	-3.92%	-0.06%		31	2.04%	0.36%
32	-0.79%	-0.86%		32	0.15%	-0.14%		32	-0.13%	-5.93%
33	-2.44%	-0.82%		33	0.00%	-0.08%		33	0.00%	-1.12%
34	0.13%	-0.90%		34	-0.38%	-0.16%		34	-4.05%	-7.13%
35	-4.99%	-0.66%		35	0.00%	-0.08%		35	0.00%	-0.75%
36	-2.29%	-0.97%		36	-2.56%	-0.09%		36	0.00%	-1.58%
37	0.00%	-0.60%		37	-3.16%	0.19%		37	-0.84%	0.56%
38	-0.18%	-1.07%		38	0.00%	0.19%		38	0.00%	0.56%
39	-5.10%	-0.57%		39	-0.84%	0.23%		39	-1.56%	-1.09%
40	3.48%	-0.64%		40	-1.79%	0.22%		40	0.00%	-0.76%
41	0.00%	0.05%		41	3.77%	0.24%		41	0.13%	-1.48%
42	1.59%	0.06%		42	-1.78%	0.18%		42	0.58%	0.76%
43	0.00%	0.06%		43	2.55%	0.14%		43	-1.78%	2.34%
44	-0.26%	0.06%		44	0.00%	0.26%		44	1.97%	-2.14%
45	4.50%	0.05%		45	0.00%	0.17%		45	0.00%	1.29%
46	-0.12%	0.07%		46	0.19%	0.28%		46	-1.81%	-3.00%
47	0.00%	0.05%		47	0.00%	0.16%		47	-1.78%	1.55%
48	0.89%	0.07%		48	1.55%	0.18%		48	0.00%	0.96%
49	6.45%	0.05%		49	0.22%	-0.81%		49	-0.63%	2.67%
50	-0.13%	0.05%		50	0.00%	-0.81%		50	0.00%	2.67%
51	-7.27%	-3.48%		51	1.28%	-1.01%		51	1.58%	1.56%
52	-1.18%	-4.37%		52	0.00%	-0.97%		52	0.33%	1.79%
53	-6.11%	-4.19%		53	2.87%	-1.07%		53	1.58%	1.30%
54	-8.34%	-4.59%		54	-0.45%	-0.78%		54	-0.86%	2.81%
55	0.00%	-3.37%		55	0.00%	-0.58%		55	0.00%	3.87%
56	-7.64%	-4.94%		56	2.06%	-1.15%		56	0.64%	0.85%
57	0.00%	-3.09%		57	0.00%	-0.71%		57	0.00%	3.16%
58	-2.12%	-5.41%		58	-1.51%	-1.26%		58	-1.64%	0.28%
59	0.00%	-2.94%		59	0.00%	-0.68%		59	0.00%	3.34%
60	-2.72%	-3.27%		60	-1.68%	-0.75%		60	-0.19%	2.94%
61	-4.51%	-2.80%		61	-0.43%	0.27%		61	-0.42%	0.23%
62	-3.97%	-3.53%		62	0.00%	0.27%		62	0.00%	0.23%
63	-7.40%	-3.38%		63	0.00%	0.33%		63	0.39%	-1.50%
64	-8.82%	-3.70%		64	0.36%	0.32%		64	0.00%	-1.16%
65	1.67%	-2.72%		65	1.18%	0.35%		65	1.81%	-1.92%
66	-9.48%	-3.99%		66	-8.86%	0.26%		66	-2.60%	0.44%
67	0.00%	-2.49%		67	-0.50%	0.20%		67	-2.27%	2.10%

68	-9.22%	-4.36%		68	1.87%	0.37%		68	0.26%	-2.61%
69	-4.04%	-2.37%		69	0.00%	0.24%		69	0.00%	0.99%
70	-4.65%	-2.63%		70	-0.38%	0.41%		70	0.42%	-3.51%
71	-3.08%	-0.19%		71	-1.27%	0.23%		71	0.00%	1.27%
72	-2.07%	-0.24%		72	0.31%	0.25%		72	0.19%	0.65%
73	0.32%	-0.23%		73	-0.65%	0.06%		73	0.21%	-0.32%
74	0.92%	-0.25%		74	0.00%	0.06%		74	0.00%	-0.32%
75	-2.59%	-0.18%		75	0.84%	0.07%		75	0.39%	-2.20%
76	3.39%	-0.28%		76	0.00%	0.07%		76	0.33%	-1.82%
77	0.00%	-0.17%		77	-0.58%	0.07%		77	1.65%	-2.65%
78	0.40%	-0.30%		78	-0.25%	0.06%		78	1.19%	-0.10%
79	-0.79%	-0.16%		79	0.00%	0.05%		79	-0.35%	1.70%
80	-2.09%	-0.18%		80	-0.85%	0.08%		80	1.78%	-3.40%
81	4.87%	0.62%		81	0.00%	0.06%		81	0.00%	0.50%
82	-0.42%	0.78%		82	-0.39%	0.08%		82	3.11%	-4.37%
83	0.00%	0.75%		83	1.28%	0.05%		83	0.00%	0.80%
84	0.91%	0.81%		84	-1.08%	0.06%		84	0.00%	0.13%
85	-3.38%	0.60%		85	0.66%	0.20%		85	-0.64%	0.41%
86	0.00%	0.88%		86	0.00%	0.20%		86	0.00%	0.41%
87	0.00%	0.56%		87	-1.25%	0.25%		87	-0.77%	-1.28%
88	3.17%	0.96%		88	0.00%	0.24%		88	-0.33%	-0.94%
89	-0.53%	0.53%		89	-0.58%	0.26%		89	0.00%	-1.69%
90	-0.28%	0.59%		90	0.00%	0.20%		90	2.05%	0.61%
91	-0.81%	1.73%		91	-0.30%	0.15%		91	0.00%	2.23%
92	2.54%	2.17%		92	0.43%	0.28%		92	-0.75%	-2.36%
93	4.14%	2.08%		93	0.00%	0.18%		93	0.00%	1.15%
94	0.15%	2.27%		94	-2.51%	0.30%		94	-2.41%	-3.24%
95	4.00%	1.68%		95	-0.63%	0.17%		95	0.00%	1.42%
96	-0.14%	2.45%		96	0.00%	0.19%		96	0.00%	0.81%
97	0.00%	1.54%		97	0.00%	-0.02%		97	-0.43%	0.32%
98	1.54%	2.68%		98	0.00%	-0.02%		98	4.76%	0.32%
99	-1.87%	1.47%		99	-0.42%	-0.03%		99	0.00%	-1.39%
100	1.86%	1.63%		100	0.00%	-0.03%		100	-2.00%	-1.05%
101	3.36%	1.86%		101	-0.44%	-0.03%		101	0.12%	-1.80%
102	6.20%	2.33%		102	-0.25%	-0.02%		102	-1.15%	0.53%
103	-2.14%	2.24%		103	-1.20%	-0.01%		103	0.00%	2.17%
104	2.41%	2.45%		104	-0.57%	-0.04%		104	0.76%	-2.48%
105	0.48%	1.81%		105	0.00%	-0.02%		105	0.00%	1.07%
106	0.00%	2.63%		106	3.57%	-0.04%		106	-0.21%	-3.37%
107	0.00%	1.66%		107	0.00%	-0.02%		107	4.22%	1.35%
108	6.25%	2.88%		108	-0.16%	-0.02%		108	-0.19%	0.73%



109	0.00%	1.58%		109	-1.74%	-1.06%		109	0.21%	0.45%
110	0.28%	1.75%		110	0.00%	-1.06%		110	0.00%	0.45%
111	-0.49%	1.66%		111	-1.27%	-1.33%		111	-0.39%	-1.23%
112	0.00%	2.08%		112	1.09%	-1.28%		112	4.42%	-0.89%
113	10.00%	2.00%		113	-2.51%	-1.40%		113	0.50%	-1.63%
114	-0.15%	2.18%		114	-1.00%	-1.03%		114	1.16%	0.65%
115	0.00%	1.61%		115	-1.52%	-0.76%		115	0.00%	2.26%
116	0.00%	2.35%		116	-0.71%	-1.51%		116	0.38%	-2.30%
117	0.00%	1.48%		117	0.00%	-0.94%		117	0.00%	1.19%
118	1.25%	2.57%		118	-1.53%	-1.65%		118	1.03%	-3.18%
119	0.00%	1.41%		119	0.00%	-0.89%		119	-0.87%	1.45%
120	-0.42%	1.56%		120	-0.16%	-0.99%		120	-0.37%	0.85%
121	-1.19%	0.99%		121	0.00%	0.18%		121	0.43%	1.39%
122	0.78%	1.24%		122	0.00%	0.18%		122	0.00%	1.39%
123	-1.42%	1.19%		123	0.86%	0.22%		123	3.52%	-0.04%
124	-0.15%	1.29%		124	-2.51%	0.21%		124	-2.61%	0.25%
125	0.24%	0.96%		125	-3.79%	0.23%		125	3.73%	-0.39%
126	-0.29%	1.39%		126	0.25%	0.18%		126	0.00%	1.57%
127	0.00%	0.88%		127	2.99%	0.14%		127	0.00%	2.95%
128	-0.18%	1.52%		128	-1.58%	0.25%		128	1.87%	-0.96%
129	3.26%	0.84%		129	0.00%	0.16%		129	0.00%	2.03%
130	-1.12%	0.93%		130	-0.58%	0.27%		130	2.45%	-1.71%
131	0.20%	2.52%		131	0.64%	0.16%		131	-0.58%	2.26%
132	-0.77%	3.16%		132	-0.63%	0.17%		132	0.00%	1.74%
133	-1.44%	3.03%		133	-0.22%	1.05%		133	0.64%	1.04%
134	-0.15%	3.31%		134	7.78%	1.05%		134	2.27%	1.04%
135	0.00%	2.45%		135	-2.55%	1.32%		135	4.91%	-0.49%
136	-1.86%	3.57%		136	-0.37%	1.27%		136	-1.34%	-0.18%
137	0.00%	2.24%		137	0.31%	1.38%		137	-0.24%	-0.85%
138	0.53%	3.90%		138	0.00%	1.02%		138	-1.72%	1.22%
139	0.00%	2.14%		139	-3.90%	0.77%		139	0.47%	2.69%
140	2.70%	2.37%		140	0.15%	1.49%		140	1.22%	-1.46%
141	-1.00%	1.43%		141	0.00%	0.94%		141	0.00%	1.71%
142	0.39%	1.80%		142	-1.57%	1.63%		142	-0.40%	-2.26%
143	2.63%	1.72%		143	0.00%	0.90%		143	0.00%	1.96%
144	0.44%	1.88%		144	-1.89%	0.99%		144	-0.56%	1.41%
145	0.24%	1.39%		145	0.67%	1.59%		145	-0.64%	0.47%
146	1.02%	2.03%		146	-7.22%	1.59%		146	0.00%	0.47%
147	0.00%	1.28%		147	-2.62%	1.99%		147	-0.36%	-1.20%
148	-0.70%	2.21%		148	2.21%	1.91%		148	-0.34%	-0.87%
149	1.05%	1.22%		149	2.04%	2.09%		149	-0.60%	-1.60%

150	2.35%	1.35%		150	-5.05%	1.54%		150	9.94%	0.67%
-1	-7.33%	-5.40%		151	2.08%	1.16%		151	-0.46%	2.28%
-2	-7.55%	-6.79%		152	0.15%	2.25%		152	-1.09%	-2.27%
-3	-5.60%	-6.51%		153	0.00%	1.41%		153	0.00%	1.20%
-4	-7.64%	-7.12%		154	1.39%	2.46%		154	-1.20%	-3.14%
-5	-8.01%	-5.24%		155	0.00%	1.35%		155	-3.23%	1.47%
-6	-7.50%	-7.67%		156	-0.32%	1.49%		156	0.00%	0.87%
-7	0.00%	-4.79%		157	-0.44%	2.02%		157	0.64%	1.08%
-8	-7.51%	-8.39%		158	0.00%	2.02%		158	0.00%	1.08%
-9	-6.81%	-4.57%		159	-3.14%	2.54%		159	-1.08%	-0.44%
-10	-2.63%	-5.07%		160	-2.53%	2.43%		160	-2.04%	-0.14%
-11	-2.81%	-5.06%		161	0.00%	2.66%		161	0.60%	-0.81%
-12	-2.46%	-6.36%		162	0.27%	1.96%		162	9.84%	1.27%
-13	-2.02%	-6.10%		163	-5.51%	1.47%		163	4.65%	2.73%
-14	-4.43%	-6.67%		164	1.46%	2.86%		164	0.73%	-1.42%
-15	-2.70%	-4.91%		165	0.00%	1.80%		165	0.00%	1.76%
-16	-6.11%	-7.19%		166	0.39%	3.13%		166	0.41%	-2.22%
-17	0.00%	-4.49%		167	1.27%	1.72%		167	-1.21%	2.00%
-18	-2.95%	-7.87%		168	-0.65%	1.90%		168	1.32%	1.45%
-19	0.00%	-4.29%		169	3.77%	-1.83%		169	-4.66%	0.05%
-20	-1.28%	-4.75%		170	3.29%	-1.83%		170	0.00%	0.05%
-21	0.00%	0.33%		171	0.00%	-2.31%		171	0.00%	-1.74%
-22	3.42%	0.41%		172	0.37%	-2.21%		172	-1.74%	-1.38%
-23	0.74%	0.39%		173	0.31%	-2.42%		173	0.84%	-2.17%
-24	0.00%	0.43%		174	-0.53%	-1.78%		174	9.93%	0.27%
-25	0.66%	0.32%		175	-3.89%	-1.32%		175	-4.00%	1.99%
-26	1.75%	0.46%		176	0.14%	-2.61%		176	1.58%	-2.88%
-27	0.00%	0.30%		177	0.00%	-1.63%		177	0.00%	0.84%
-28	0.30%	0.50%		178	-0.59%	-2.85%		178	-5.25%	-3.81%
-29	-4.41%	0.28%		179	3.75%	-1.55%		179	1.53%	1.13%
-30	-1.27%	0.31%		180	0.97%	-1.72%		180	4.64%	0.48%
-31	-2.34%	0.46%		-1	0.70%	0.11%		-1	0.43%	2.41%
-32	-0.35%	0.57%		-2	0.00%	0.11%		-2	0.00%	2.41%
-33	0.00%	0.55%		-3	-0.81%	0.13%		-3	1.20%	3.02%
-34	1.91%	0.60%		-4	-3.78%	0.13%		-4	1.10%	2.90%
-35	-3.74%	0.44%		-5	-0.15%	0.14%		-5	0.80%	3.17%
-36	2.30%	0.64%		-6	-1.09%	0.11%		-6	-0.29%	2.34%
-37	0.00%	0.41%		-7	-3.24%	0.08%		-7	4.39%	1.75%
-38	-2.27%	0.70%		-8	1.15%	0.15%		-8	0.67%	3.41%
-39	-9.62%	0.39%		-9	0.00%	0.10%		-9	0.00%	2.14%
-40	-0.38%	0.43%		-10	0.19%	0.16%		-10	-0.82%	3.73%

-41	-1.53%	-5.14%		-11	-0.31%	0.10%		-11	0.00%	2.04%
-42	-4.59%	-6.46%		-12	0.00%	0.10%		-12	0.00%	2.26%
-43	-1.75%	-6.19%		-13	-0.50%	0.01%		-13	2.13%	0.92%
-44	-6.17%	-6.77%		-14	1.69%	0.01%		-14	0.49%	0.92%
-45	-0.64%	-4.98%		-15	-1.64%	0.01%		-15	0.00%	1.15%
-46	-7.60%	-7.30%		-16	0.00%	0.01%		-16	0.00%	1.10%
-47	0.00%	-4.56%		-17	0.46%	0.01%		-17	0.13%	1.20%
-48	-1.33%	-7.98%		-18	-2.42%	0.01%		-18	0.29%	0.89%
-49	5.78%	-4.35%		-19	0.00%	0.02%		-19	2.27%	0.67%
-50	0.25%	-4.82%		-20	-0.14%	0.01%		-20	0.66%	1.29%
-51	0.00%	-0.27%		-21	0.00%	0.01%		-21	0.00%	0.82%
-52	0.00%	-0.34%		-22	0.00%	0.01%		-22	0.82%	1.41%
-53	0.98%	-0.33%		-23	0.00%	0.01%		-23	0.00%	0.78%
-54	-1.73%	-0.36%		-24	0.00%	0.01%		-24	0.00%	0.86%
-55	0.84%	-0.26%		-25	0.00%	-0.23%		-25	0.00%	1.06%
-56	-0.50%	-0.39%		-26	0.00%	-0.23%		-26	0.00%	1.06%
-57	0.00%	-0.24%		-27	1.25%	-0.29%		-27	-0.79%	1.32%
-58	-1.75%	-0.43%		-28	2.14%	-0.28%		-28	0.72%	1.27%
-59	-4.55%	-0.22%		-29	4.09%	-0.31%		-29	0.40%	1.39%
-60	-0.87%	-0.25%		-30	1.81%	-0.22%		-30	-0.57%	1.03%
-61	1.50%	1.23%		-31	1.32%	-0.16%		-31	-3.22%	0.77%
-62	0.00%	1.54%		-32	2.71%	-0.33%		-32	0.13%	1.49%
-63	0.25%	1.48%		-33	0.00%	-0.20%		-33	0.00%	0.94%
-64	1.60%	1.61%		-34	0.19%	-0.37%		-34	-1.23%	1.63%
-65	-5.96%	1.19%		-35	4.98%	-0.19%		-35	0.00%	0.90%
-66	1.98%	1.74%		-36	-0.15%	-0.21%		-36	0.00%	0.99%
-67	0.00%	1.09%		-37	0.00%	-1.38%		-37	-0.63%	-0.77%
-68	6.17%	1.90%		-38	0.00%	-1.38%		-38	2.44%	-0.77%
-69	0.00%	1.04%		-39	0.00%	-1.74%		-39	-1.19%	-0.98%
-70	-0.12%	1.16%		-40	-1.05%	-1.67%		-40	-0.72%	-0.94%
-71	0.76%	1.00%		-41	1.02%	-1.83%		-41	2.63%	-1.02%
-72	5.41%	1.25%		-42	-2.22%	-1.34%		-42	-0.57%	-0.75%
-73	-0.74%	1.20%		-43	0.00%	-1.00%		-43	-0.92%	-0.56%
-74	2.55%	1.31%		-44	1.11%	-1.97%		-44	1.45%	-1.11%
-75	6.83%	0.97%		-45	0.00%	-1.22%		-45	0.00%	-0.68%
-76	3.64%	1.41%		-46	0.00%	-2.16%		-46	-0.41%	-1.21%
-77	0.00%	0.89%		-47	0.00%	-1.17%		-47	-3.53%	-0.65%
-78	0.15%	1.54%		-48	0.44%	-1.30%		-48	0.00%	-0.73%
-79	-3.04%	0.85%		-49	1.00%	-1.42%		-49	0.42%	0.33%
-80	-1.48%	0.94%		-50	0.00%	-1.42%		-50	0.00%	0.33%
-81	0.38%	1.90%		-51	1.65%	-1.79%		-51	0.00%	0.41%

-82	0.36%	2.38%		-52	-1.06%	-1.72%		-52	0.72%	0.40%
-83	-0.49%	2.28%		-53	1.15%	-1.88%		-53	-1.15%	0.43%
-84	1.67%	2.49%		-54	2.04%	-1.38%		-54	-0.29%	0.32%
-85	2.37%	1.84%		-55	-2.10%	-1.03%		-55	4.29%	0.25%
-86	2.20%	2.69%		-56	0.14%	-2.03%		-56	0.65%	0.47%
-87	0.00%	1.69%		-57	0.00%	-1.26%		-57	0.00%	0.30%
-88	2.91%	2.93%		-58	1.32%	-2.22%		-58	0.42%	0.51%
-89	5.49%	1.61%		-59	-1.19%	-1.20%		-59	-1.52%	0.29%
-90	-3.90%	1.78%		-60	-1.91%	-1.33%		-60	0.00%	0.31%
-91	0.00%	1.05%		-61	0.00%	-1.40%		-61	0.21%	-0.43%
-92	2.87%	1.31%		-62	0.00%	-1.40%		-62	0.00%	-0.43%
-93	1.96%	1.26%		-63	1.21%	-1.76%		-63	0.80%	-0.55%
-94	3.83%	1.37%		-64	0.00%	-1.69%		-64	-0.72%	-0.53%
-95	-0.44%	1.02%		-65	-0.14%	-1.85%		-65	-0.52%	-0.58%
-96	3.64%	1.48%		-66	0.67%	-1.36%		-66	0.00%	-0.42%
-97	0.00%	0.93%		-67	2.15%	-1.01%		-67	0.00%	-0.31%
-98	-4.42%	1.62%		-68	0.00%	-2.00%		-68	0.39%	-0.62%
-99	0.00%	0.89%		-69	0.00%	-1.24%		-69	0.00%	-0.38%
-100	5.98%	0.99%		-70	0.56%	-2.19%		-70	-0.21%	-0.68%
-101	-1.16%	-1.87%		-71	-1.50%	-1.18%		-71	4.02%	-0.36%
-102	-7.38%	-2.35%		-72	0.30%	-1.31%		-72	0.00%	-0.41%
-103	-7.00%	-2.25%		-73	-0.50%	-0.64%		-73	0.21%	0.74%
-104	-6.08%	-2.47%		-74	-1.67%	-0.64%		-74	0.00%	0.74%
-105	-9.01%	-1.81%		-75	-2.40%	-0.80%		-75	1.99%	0.92%
-106	-3.78%	-2.66%		-76	0.00%	-0.77%		-76	2.54%	0.89%
-107	0.00%	-1.66%		-77	-6.28%	-0.84%		-77	0.26%	0.97%
-108	-5.74%	-2.91%		-78	0.22%	-0.62%		-78	1.74%	0.72%
-109	0.00%	-1.58%		-79	-1.30%	-0.46%		-79	-0.44%	0.54%
-110	-0.75%	-1.75%		-80	-3.71%	-0.91%		-80	1.28%	1.04%
-111	0.76%	-0.60%		-81	0.00%	-0.56%		-81	0.00%	0.66%
-112	-1.72%	-0.76%		-82	-2.03%	-1.00%		-82	-0.21%	1.14%
-113	-1.17%	-0.72%		-83	-2.13%	-0.54%		-83	0.00%	0.63%
-114	-0.31%	-0.79%		-84	1.35%	-0.60%		-84	0.00%	0.70%
-115	6.45%	-0.58%		-85	-0.50%	0.14%		-85	1.04%	0.18%
-116	-4.07%	-0.86%		-86	10.73%	0.14%		-86	0.00%	0.18%
-117	0.00%	-0.53%		-87	2.05%	0.17%		-87	0.00%	0.23%
-118	-0.29%	-0.94%		-88	0.71%	0.16%		-88	8.83%	0.22%
-119	8.04%	-0.50%		-89	6.24%	0.17%		-89	-0.65%	0.24%
-120	-0.25%	-0.56%		-90	-4.19%	0.13%		-90	-1.71%	0.18%
-121	0.00%	-2.86%		-91	-0.20%	0.10%		-91	0.45%	0.14%
-122	-0.68%	-3.60%		-92	4.71%	0.18%		-92	-0.51%	0.25%

-123	-3.46%	-3.45%		-93	0.00%	0.12%		-93	0.00%	0.17%
-124	-0.93%	-3.78%		-94	5.28%	0.20%		-94	0.83%	0.27%
-125	-3.23%	-2.78%		-95	-0.31%	0.12%		-95	-4.76%	0.16%
-126	-0.93%	-4.07%		-96	-1.33%	0.13%		-96	0.00%	0.17%
-127	0.00%	-2.54%		-97	0.00%	0.74%		-97	0.62%	0.02%
-128	-1.57%	-4.45%		-98	0.00%	0.74%		-98	2.14%	0.02%
-129	-2.91%	-2.42%		-99	0.00%	0.92%		-99	0.00%	0.02%
-130	1.36%	-2.69%		-100	0.35%	0.89%		-100	-2.60%	0.02%
-131	-1.15%	-0.85%		-101	0.14%	0.97%		-101	0.00%	0.02%
-132	0.34%	-1.08%		-102	-5.98%	0.72%		-102	4.93%	0.02%
-133	2.46%	-1.03%		-103	-0.51%	0.54%		-103	-3.44%	0.02%
-134	-1.75%	-1.13%		-104	-0.54%	1.04%		-104	-1.40%	0.02%
-135	-1.67%	-0.83%		-105	0.00%	0.66%		-105	0.00%	0.02%
-136	-1.53%	-1.22%		-106	-0.18%	1.14%		-106	-2.47%	0.02%
-137	0.00%	-0.76%		-107	0.00%	0.63%		-107	0.00%	0.02%
-138	-0.42%	-1.33%		-108	-0.45%	0.70%		-108	-0.37%	0.02%
-139	0.71%	-0.72%		-109	-0.60%	-0.78%		-109	0.61%	-0.02%
-140	-2.13%	-0.80%		-110	0.00%	-0.78%		-110	0.00%	-0.02%
-141	1.52%	0.01%		-111	0.40%	-0.99%		-111	1.56%	-0.03%
-142	0.00%	0.00%		-112	-1.06%	-0.95%		-112	-6.33%	-0.03%
-143	-2.52%	0.00%		-113	2.00%	-1.04%		-113	-0.65%	-0.04%
-144	-0.10%	0.00%		-114	-0.73%	-0.76%		-114	-0.28%	-0.02%
-145	-8.83%	0.01%		-115	-1.53%	-0.56%		-115	3.57%	-0.01%
-146	-0.50%	0.00%		-116	-1.10%	-1.12%		-116	-0.90%	-0.04%
-147	0.00%	0.01%		-117	0.00%	-0.69%		-117	0.00%	-0.02%
-148	0.00%	0.00%		-118	-3.05%	-1.23%		-118	3.38%	-0.05%
-149	-0.71%	0.01%		-119	-0.31%	-0.66%		-119	0.00%	-0.02%
-150	1.10%	0.01%		-120	0.00%	-0.73%		-120	0.19%	-0.02%
				-121	-0.80%	0.04%		-121	-1.02%	-0.12%
				-122	0.00%	0.04%		-122	2.10%	-0.12%
				-123	0.00%	0.04%		-123	-0.77%	-0.16%
				-124	-2.86%	0.04%		-124	-0.71%	-0.15%
				-125	0.56%	0.04%		-125	0.00%	-0.17%
				-126	-1.48%	0.04%		-126	-2.22%	-0.12%
				-127	0.00%	0.03%		-127	-5.33%	-0.08%
				-128	0.14%	0.04%		-128	-0.78%	-0.18%
				-129	0.00%	0.03%		-129	0.00%	-0.11%
				-130	1.85%	0.05%		-130	0.00%	-0.20%
				-131	2.82%	0.03%		-131	5.00%	-0.10%
				-132	0.75%	0.03%		-132	0.00%	-0.11%
				-133	0.00%	0.03%		-133	-0.21%	-0.15%

				-134	0.00%	0.03%		-134	0.00%	-0.15%
				-135	0.40%	0.03%		-135	1.16%	-0.19%
				-136	0.00%	0.03%		-136	-0.72%	-0.18%
				-137	-0.14%	0.03%		-137	-0.13%	-0.20%
				-138	0.00%	0.03%		-138	-1.13%	-0.14%
				-139	8.81%	0.03%		-139	5.52%	-0.10%
				-140	-0.28%	0.03%		-140	1.71%	-0.22%
				-141	0.00%	0.03%		-141	0.00%	-0.13%
				-142	0.00%	0.03%		-142	0.20%	-0.24%
				-143	0.91%	0.03%		-143	-1.19%	-0.12%
				-144	0.30%	0.03%		-144	0.00%	-0.14%
				-145	0.20%	1.28%		-145	-0.82%	-0.06%
				-146	-2.55%	1.28%		-146	0.00%	-0.06%
				-147	1.59%	1.60%		-147	-0.38%	-0.08%
				-148	1.47%	1.54%		-148	1.08%	-0.07%
				-149	-1.54%	1.68%		-149	0.00%	-0.08%
				-150	-1.75%	1.24%		-150	-0.57%	-0.06%
				-151	-2.38%	0.93%		-151	0.00%	-0.04%
				-152	-0.14%	1.81%		-152	0.13%	-0.09%
				-153	0.00%	1.14%		-153	0.00%	-0.05%
				-154	1.82%	1.98%		-154	-0.20%	-0.10%
				-155	-1.81%	1.09%		-155	0.00%	-0.05%
				-156	0.00%	1.20%		-156	-0.19%	-0.05%
				-157	-0.20%	-1.11%		-157	-0.83%	-0.22%
				-158	0.00%	-1.11%		-158	-4.11%	-0.22%
				-159	-3.53%	-1.40%		-159	0.38%	-0.28%
				-160	7.25%	-1.34%		-160	0.71%	-0.27%
				-161	-0.85%	-1.47%		-161	0.26%	-0.29%
				-162	1.53%	-1.07%		-162	-2.02%	-0.21%
				-163	-2.44%	-0.80%		-163	-0.11%	-0.15%
				-164	-0.14%	-1.58%		-164	-0.26%	-0.32%
				-165	0.00%	-0.98%		-165	0.00%	-0.19%
				-166	-1.79%	-1.73%		-166	2.45%	-0.35%
				-167	0.00%	-0.94%		-167	-1.20%	-0.18%
				-168	0.30%	-1.04%		-168	0.00%	-0.20%
				-169	0.81%	-2.02%		-169	0.00%	-0.89%
				-170	-9.42%	-2.02%		-170	0.00%	-0.89%
				-171	0.81%	-2.54%		-171	0.00%	-1.12%
				-172	-5.41%	-2.44%		-172	0.00%	-1.07%
				-173	-6.01%	-2.67%		-173	-0.39%	-1.17%
				-174	18.80%	-1.96%		-174	1.47%	-0.86%

				-175	-0.60%	-1.46%		-175	-0.67%	-0.64%
				-176	-3.76%	-2.88%		-176	-0.90%	-1.26%
				-177	0.00%	-1.79%		-177	0.00%	-0.78%
				-178	-3.82%	-3.15%		-178	5.79%	-1.38%
				-179	-2.15%	-1.71%		-179	2.13%	-0.75%
				-180	-0.89%	-1.90%		-180	0.19%	-0.83%