EFFECT OF TREASURY BILL RATES ON STOCK MARKET RETURNS OF COMPANIES LISTED IN THE NAIROBI SECURITIES EXCHANGE

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DECLARATION

I declare this research project is my original work and has not been presented for award of degree in any other university.

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This research project has been presented for examination with my approval as the University Supervisor

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DEDICATION

To my father for all the sacrifices in making education a priority in my life.

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ABSTRACT

A country's monetary policy dictates the amount of cash available for government expenditure or repayment of external debt. A reduction in money supply would trigger open market operations that enables the government to obtain the cash that it requires and one of the securities that can be used is Treasury Bills. Theoretically, Treasury bills are considered lucrative for risk averse investors hence being a competing security to the stock market. The aim of this paper was to understand the impact of Treasury bill rate on stock return of companies listed in the NSE. The research design employed was descriptive correlation design. Population was made up of companies trading at the NSE for duration of 4 years (January 2015 to December 2018). A sample of 20 companies that make up the NSE-20 index was purposively chosen and data used was secondary. Multiple linear regression carried out on the data to comprehend the relation between the variables. The study controlled for effect of exchange rates and inflation rate. Tests of significance were carried out on the data. The study noted that Treasury bill rate had a negative influence on stock market returns. Exchange rate was noted to have a positive influence on stock market returns. It was also noted that inflation rate had a negative effect on stock market returns. The coefficient of determination was found to be 24%. Analysis of variance identified Treasury bill rate, exchange rate and inflation rate collectively significantly influenced stock market returns at the 5% level of significance. The study reached the conclusion that Treasury bill rate and stock market return for listed firms are significantly inversely related and are competing investment products. It also concluded that increases exchange rate caused stock returns to increase significantly. Further, the study concluded that increase in inflation rate caused stock market returns to decrease but the decrease was not significant. Finally it was concluded that variation in T-bill rate, exchange rate and consumer price index explained 24% of the variation in stock market return. The study recommended that investors and portfolio managers should tilt their portfolio allocation towards stocks when there is an expectation of T-bill rate to go down and toward T-bill when there is an expectation of T-bill rate to rise. The study also recommended increasing exposure to the stock market when exchange rates are rising as the stock market is expected to perform better in these periods. In addition the study recommends selling of stocks when the inflation rate is expected to be rising to avoid loss in expected returns. Finally, the study recommended higher T-bill rate by the Central banks' monetary policy when seeking to reduce liquidity in the market. Further research may focus on investigating the mechanism through which Central Bank monetary policy is transmitted to the stock market. Researchers may also seek to evaluate the role of monetary policy in securities market development especially for developing economies.

ABBREVIATIONS AND ACRONYMS

APT	Arbitrage Pricing Theory
CAPM	Capital Asset Pricing Model
CBK	Central Bank of Kenya
EMH	Efficient Market Hypothesis
GARCH	Generalized Autoregressive Conditional Heteroscedasticity
KNBS	Kenya National Bureau of Statistics
NASI	NSE All Share Index
NSE	Nairobi Securities Exchange
SPSS	Statistical Package for Social Sciences
T-bill	Treasury bill

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

A Treasury bill is a government security issued via the Central Bank on behalf of the Treasury. Investment in Treasury bills carry minimal risk and a certain return as they are banked by the government. Investment on stocks on the other hand carries larger risk as stock prices could go up or down depending on financial performance of the listed firm. Rational investors demand a high return when the risk expected from a particular security is high (Markowitz, 1952). Investors therefore have a choice to make between the risk free and low return Treasury Bills and risky but high return stocks. This brings about a competing relationship between the two securities. Treasury bills however, contribute towards domestic debt of a country and in the long term have an effect of crowding out investments and therefore increasing cost of borrowing for corporate firms. This has a net effect of depleting returns acquired by the firms (Fayed, 2013).

This study was supported by three theories. Sharpe (1964) and Lintner (1965) brought about Capital Asset Pricing Model (CAPM) enabling equating of risk with return such that required return could be obtained by simply adding the risk free rate and the market risk premium. The efficiency of the stock market was further analyzed by Fama (1965) who introduced the Efficient Market Hypothesis (EMH). EMH postulated a market is efficient if investors do not have an unfair advantage over each other when it comes to information on the performance of stocks with share prices automatically adjusting to any new information. Ross (1976) further contributed to existing theory with the introduction

of Arbitrage pricing theory (APT) being an upgrade on CAPM in that it took into account not one variable (changes in market as was the case with CAPM), but also other macroeconomic factors in the determination of return.

A stock market is a medium which connects investors and listed firms and allows for the transaction of stocks. The Nairobi Securities Exchange (NSE) is the stock market in Kenya solely responsible for stock transactions and therefore influences how the economy functions as it assumes a critical job in improving capital development and distribution (Kirui, Wawire & Onono, 2014). The stock market is heavily dependent on variables that determine its performance of which include money supply, interest rate and inflation (Fama & French, 1989). There also exist competing investment opportunities such as Treasury bill rates which are preferred by risk averse investors. This can have a negative impact on the stock market growth as investments in stocks are reduced (Maghyereh, 2002).

1.1.1 Treasury Bill Rate

The Monetary policy of a country is controlled by the Central Bank via Open market operations (Sargent & Smith, 1987). This is whereby government securities such as Treasury Bills are sold or purchased depending on the monetary policy at the time. Treasury bills have maturities of up to a year and therefore considered short term and have zero default risk as they are backed by the government via the Central Bank of Kenya (CBK). Financial institutions form a large part of the investors for Treasury bill largely due to the fact that such securities are quite costly. The minimum face value in Kenya is a million. The investors do not earn interest on Treasury Bills but instead they

purchase the same at a discounted rate. At maturity, the security is then redeemed at par value. Therefore the benefit obtained by the investor would be the par value less the discounted rate at which Treasury bill was purchased.

The government through CBK controls the monetary policy depending on the liquidity requirements at a given time. It does this through the tools such as Treasury bills. A need to reduce money supply will lead to an increase in T-Bill rate to make the security attractive to the investors and this is known as contractionary policy.A need to increase money supply leads to a reduction in rates and thus making it unattractive to invest in Treasury Bills (Kangogo, 2012). The interest rate set by the Commercial banks is also dependent on the T-bill rate as it acts as a guide for the banks (Otieno, Ngugu & Wawire, 2017). This has an effect on the cost of borrowing for firms since a high T-bill rate reduces the cash available for commercial banks due to the investment in Treasury bills. This leads to an increase in lending rate as there are few funds available to give (Fayed, 2013). Therefore any change in T-bill rate would alert investors over the cost of borrowing and thus effect an investment decision (Kamara, 1994). Treasury bill rates are an essential part of the CAPM model as they form the risk free element in the formula to arrive at the expected return.

1.1.2 Stock Market Returns

Stock market returns are earnings obtained through either purchasing or disposing of shares in the securities exchange or can be referred to as dividends attained once declared by the firm in which the investor has an ownership of stocks (Mugambi & Okech, 2016).

The secondary market is the medium through which shares are sold or purchased resulting into a positive or negative return. The change in share price is attributed to market risks driven by the forces of demand and supply and therefore any change in price could alert the investors in making investment decision (Aggarwal, 2010). Measurement of stock market returns can be obtained using a share market index. An index is considered to be an accurate depiction of the entire market performance as noted by Olson (2005).

Dividends declared by a firm have a significant bearing on the stock market returns. Firms that declare large amounts of dividends tend to attract investors and therefore increase the demand for a firms stock as posited by Gordon and Lintner (1959). Their bird in hand theory stated that an investor would pay more for shares which pay a high dividend at present rather than future capital gains. The signaling effect of declaration of dividends can also impact share price. Demand of shares would increase when a firm declares dividends as it is a sign of the good financial health of a firm and thus leads to rise in share price. A decline of dividends is a sign of poor financial health and therefore resulting in fall in share price (Ross, 1979). There are other variables beyond the control of the company which have a bearing on the stock returns and include rates of interest, inflation and exchange (Liu and Shretha, 2008).

1.1.3 Treasury Bill Rates and Stock Market Returns

The Central Bank controls the amount of money in circulation at any given time using either expansionary or contractionary policies and this has a bearing on the cost of capital of a firm. Expansionary policies result in a high liquidity whreby cash is readily available

for firms at a low cost. Such a policy involves adjusting monetary policy tools such as Treasury bill rates whereby during expansionary policy the rates low, commercial banks have cash to lend and this lowers the borrowing cost for firms (Yi, 2014). A low cost of borrowing reduces the finance cost of a firm and therefore has a positive impact on a firms profitability (Bisoon, Seetanha, Bhattu, Gopy & Seetah, 2016).

Contractionary monetary policy results in absorbing cash from the market via selling of Treasury bills to the commercial banks. The government makes the Treasury bill rates attractive by increasing the rates such that the commercial banks are inclined towards purchasing them. This leads to a reduction in the amount of money available to lend out to firms and making it costly for the firms to obtain little funds available. This has the net impact of reducing profitability of the firms and thus the returns available for the shareholders (Fayed, 2013). Furthermore, rational investors would opt to obtain a higher return for a given level of risk resulting in a choice between risk free Treasury bills which provide lower returns or a high risk stock which provides a higher return. Therefore any shift upwards in T-bill rate could shift an investor's focus away from stocks. This therefore is an indication of a competing relationship between Treasury bills and stock market (Maghyereh, 2002).

There have been few empirical studies undertaken to establish the association between the two variables. Kamal (2018) analyzed this relationship and the impact that Treasury bill rates had on share returns in Egypt and found that the two variables were inversely related. In the study, Kamal (2018) noted that a decline in interest rates over a given

period corresponded with an increase in share returns. Addo and Sunzuoye (2013) analyzed the share market performance in Ghana and how it was effected by interest rates as well as T-bill rates. The study noted that T-bill rate in conjunction with lending rate had a joint negative impact on share returns. However it was noted that when analyzed independently, the influence of T-bill rate over the share market was negligible. Locally, Mutoko (2006) analyzed the relationship and found T-bill rate had a notable influence on the financial market.

1.1.4 Nairobi Securities Exchange

The Nairobi Securities Exchange (NSE) was established in 1954. It was later registered as a private company in 1991 and self-listed in 2014 (NSE, 2019). It was initially called The Nairobi Stock Exchange with the change in name coming in the year 2011 in order to reflect trading in securities apart from stock and included debt instruments as well as derivatives. However formal derivative market dealing in trading of futures only implemented in the year 2019. The stakeholders at the NSE include listed firms, brokers and investment banks with transactions taking place on instruments such as bonds and shares (Muituri, 2014). As at 2019, a total of 67 firms traded at the NSE garnering a trade volume of five million dollars (NSE, 2019). The Nairobi Security Exchange is overseen by the Capital Market Authority which has been entrusted with the overall duty of approving any securities listing as well as public offers traded and issued.

The NSE has three major indices which provide an indication of stock market performance and include NSE 20 share index, NSE 25 Share Index and the NSE All Share Index (NASI). The NASI is the overall measure of market performance and focuses

on how all the listed firms in the NSE have performed. The NSE 20 and NSE 25 share indices represent performance of top 20 and 25 companies respectively derived on trading activity. Stock market indices have been used to measure performance in several empirical studies both internationally (Kamal, 2018), Bisoon et al (2016), Ado and Sunzoye (2013), Alam and Uddin (2009) and locally (Mutoko, 2006), Oriwo (2010), Muriuki (2014) and Oyugi (2015).

1.2 Research Problem

The major purchasers of treasury bills are financial institutions. These institutions facilitate provision of funds both to individual and corporate firms. Therefore when commercial banks invest in treasury bills the amount left with the banks to lend is significantly reduced hence hampering development of the economy (Girmens and Guillard, 2003). This is known as the crowding out effect and is brought about when domestic borrowing increases significantly. Hence the amount of funding available for the private sector is minimal and expensive to access due to a rise in real rate of interest. This leads to increasing the cost of capital for the firms and therefore translates to reduced profits (Fayed, 2013).

There had been a steep rise in total debt of Kenya between the years 2015 and 2018 from KSh 2.4 trillion to 5.2 trillion. A considerable portion of this debt was attributed to domestic debt generated by securities such as Treasury bills. The domestic debt increased in similar manner as total debt − from 1.3 trillion in 2015 to 2.5 trillion in 2018. The portion of debt attributed to Treasury bills was thirty five percent which was an indication of significance attached to Treasury bill rates in capital as well as money markets. The

share market performance represented by the NSE 20 index experienced a steep decline between the years 2015 and 2018. The NSE 20 index was at 5,212.11 in January 2015 and 2,833.84 in December 2019 – a reduction of 46%. Therefore, the decline in NSE performance can be attributed to the rise in borrowing.

There have been very few studies undertaken to understand the impact of T-bills on share market return with numerous studies focusing on the influence of interest rate on return. Gunasekarage, Anirut and Powar (2004) analyzed the influence of economic variables on share market of Sri Lanka. The study found that T-bills had a notable negative impact on share return. Ado and Sunzoye (2013) analysed the influence of lending rate and T-bill rate on Ghana share market. It was noted that T-bill rates had a negligible impact on share returns. Nevertheless, when analyzed jointly with interest rates, the impact on returns was much more noticeable. Kamal (2018) noted that a combination interest rate and T-bill rate had a negative relation with stock returns. Therefore the study findings of Addo and Sunzuoye (2013) and Kamal (2018) contradicted the findings of Gunasekarage et al (2004).

Locally, Mutoko (2006) carried out a research which looked at the association of the T-bill rate with share market return and noted a negative association. Oriwo (2010) analysed the extent to which securities market in Kenya was influenced by economic variables and found that a unit change in T-bill rate had an inverse effect on stock returns. Muriuki (2014) examined the impact of rates of inflation and interest on share market performance. The study noted positive association between interest rate and share returns. Therefore there is a lack of conclusive evidence on impact of economic variables on stock

market returns as noted by the international and local studies. The empirical research undertaken in Kenya has been done prior to the huge rise in government borrowing which is the period under study (2015-2018) and therefore there is a gap for more research to ascertain the impact of this borrowing on the financial market. The research study therefore emphasizes on the contemporary situation facing the stock market in Kenya and poses the question: What is the effect of Treasury bill Rate on Stock market returns?

1.3 Research Objective

To establish the effect of Treasury bill rate on stock returns of firms listed in the Nairobi Securities Exchange.

1.4 Value of the Study

It will facilitate regulators to re-evaluate the monetary policy such that the adverse effects are not translated to the Kenyan share market. It will therefore inform the regulatory authority on the impact of increased domestic debt. Study findings will consequently assist the Central Bank to ensure fluctuations in stock market returns are minimized to enable growth of the stock market.

The study will benefit Finance Managers employed by various firm which trade at the NSE. The results of the study will enable them to be proactive whenever a change in Treasury bill rate is noted hence helping in their quest of shareholder wealth maximization. The study will assist investors in identifying a competing relationship between Treasury bill rate and stock market and therefore inform them of the best investment option.

Lastly, it will add to the existing literature pertaining to the topic of economic variables and impact on stock market and therefore a source of knowledge for scholars. Importantly, it will add to the limited research that had been undertaken on T-bill rates and their impact on stock market returns. The study will also identify various limitations as well as gaps in research that will act as guidance for scholars in their quest for further research on similar areas of finance.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter highlights theories supporting the study and past research executed on T-bill rate and share market return. It therefore includes theoretical review, factors that determine returns, review of empirical literature, conceptual framework and a summary.

2.2. Theoretical Review

The section explains the theories which support the study and they include; Efficient Market Hypothesis (EMH), Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT).

2.2.1 Efficient Market Hypothesis

An efficient market consists of rational investors who can predict movement in security prices and these prices have already been adjusted for with current information and that there is no cost attached to that information (Fama, 1965). The share price would therefore have been automatically adjusted hence investors would find it hard to gain an upper hand and make abnormal gains. A market that exhibits the weak form has securities whose prices only reflect past price movements and therefore making it difficult to predict future prices accurately. A market in which securities take into account all information which is effectively accessible to the public, is referred to as having semi strong efficiency. The strong form is one whereby stock prices have been adjusted for all information which is available to the public as well as one which is private. EMH

therefore provides an emphasis on how fast information regarding Treasury bill rate is taken up by investors who then act accordingly to maximize returns.

However there are instances when the stock markets due to market anomalies, produce abnormal returns such as the case of January effect and Monday effect. This is whereby the month of January experiences higher returns than the other months as noted by Rozeff and Kinney (1976). Monday effect is whereby returns on Monday are much lower compared to other days (French, 1980). Furthermore the EMH assumes rationality in the thinking of investors and that access to information is open to everyone. It also assumes that all investors have similar expectations. However research done by Stiglitz (1980) and Malkiel (1950) noted a tendency of investors to be irrational in arriving at decisions. Stiglitz (1980) also noted that market agents would be rendered ineffective as they would be unable to make use of information that has already been affected into the stock. However, EMH formed a solid premise for empirical research with studies undertaken to discover the influence of economic variables on share prices. Fama (1981) noted that macro-economic variables and share returns were positively correlated. EMH therefore is relevant as it provide an emphasis on how fast information regarding Treasury bill rate is taken up by investors who then act accordingly to maximize returns.

2.2.2 Capital Asset Pricing Model

The model was established by Sharpe (1964), Lintner (1965) and Mossin (1966). They based the theory on previous research done by Markowitz (1952) who came up with Modern Portfolio Theory (MPT). MPT states that diversification is an important tool in

reducing market risk such that a well-diversified portfolio comprising of risky assets and a risk free asset could enable an investor to achieve optimal returns. The theory assumes that all investors have the ability to think rationally with regards to choice in securities as well as having a dislike for risky investments. Therefore an investor, when given a choice between two risky assets, will select one which will provide him with maximum gain. However, not all risks can be diversified such as market risk and therefore a need for a model that determines the risks that are related to return. The CAPM model therefore provided the answer and it stated that expected return can be arrived at by adding the risk free rate and market risk premium with the risk free rate represented by a State security such as T-bill rate.

The CAPM model has been an important tool for managers and investors to assess whether their investment will be profitable or not. The model simplifies the investment decision through comparison of expected return with required return. Therefore when expected return falls below required return, investors can forgo the decision to invest in the security. The model was applicable for the study as it enables a choice between Treasury bills and shares as these are competing assets when risk and return are taken into consideration (Mutoko, 2006). However, CAPM is built on numerous unrealistic assumptions which comprise of: investors being rational and make logical decisions regarding their investment, investors can borrow in addition to lending at risk free rate, have a dislike for risky investment. The model was criticized by French and Fama (1992) who noted an existence of other determinants of share prices which include company size as well as book to market equity. They also noted that Beta was not a dependable

measure of Sytematic risk. Subrahmanyam (1998) noted that when small and large firms were compared, returns of firms considered small in size were found to be relatively higher than returns of large firms after risk adjustment.

2.2.3 Arbitrage Pricing Theory

The arbitrage pricing theory (APT) state that various macro-economic variables when combined will have an impact on return of financial asset (Ross, 1976). Therefore unlike CAPM model, it takes note of more than one variable in order to analyze stock return. The APT model has assumptions such as capital market being perfectly competitive and an inherent investor preference for wealth. However, it does have similar assumptions as CAPM which comprise of investors having same expectation and a risk free rate applied to lend and borrow (Sharpe, Alexander & Bailey, 1995).

Fama and French (1980) noted that the theory was applicable when analyzing stock returns. They opined that macro-economic variables tended to have an impact on stock returns. These results were supported by research carried out later by Amarasinghe (2015) who utilized macro-economic variables as a proxy for the undefined variable in the model and hence indicating that returns could be determined by equating the variables in the model. This gives credence to the fact that stock market returns can be determined by economic variables and in this study the variable being T-bill rate.

2.3 Determinants of Stock Market Returns

The factors that influence stock market returns include inflation rate, exchange rate, interest rate and money supply.

2.3.1 Inflation Rate

Inflation is the constant rise in price of basic commodities as well as services over a given time period (Shiblee 2009). It is the consistent upsurge in prices which has an effect of raising the cost of living and therefore making it difficult for people to afford basic commodities resulting decline in quality of life (Hussain & Malik, 2011). According to Bernanke (2005) inflation is initiated by large amounts of money in circulation in comparison to the available products and services that a country can manage to produce.

Fama (1981) noted that a decline in economy brought about by inflation resulted in companies selling off their stocks. This had a consequential effect of a fall in price of shares in the market. This was further examined by Sloman & Kevin (2007) who noted that profitability was reduced during a period of high inflation as operations cost significantly hiked up and therefore stock returns were reduced. However further studies carried out by Oriwo (2010) and Oyugi (2015) noted a positive association.

2.3.2 Exchange Rate

Mishkin and Eakins (2009) opined that exchange rate is one currency price quoted in relation to another. It can either be fixed by the Central bank or it could be floating such that demand and supply forces dictate the rate. Floating exchange rates combined with a

rise in international trade has resulted to exchange rate volatility. Exchange rate volatility is therefore relative frequency with which the price of one currency shifts either upward or downward over a short space of time (Karolyi, 2001).

Exchange rate fluctuation is a determinant of the competitive nature of firms which rely heavily on foreign trade. When the exchange rate fluctuates such that a country's currency becomes weak, it becomes expensive to import leading to a rise in production cost, reduction in profitability and therefore fall in stock price. However firms relying on exports find it easier to transact as foreign firms find the products to be cheaper leading to increased sales, a rise in profitability as well as stock value (Dombusch & Fisher, 1980). Therefore depreciation of a currency is favourable for the export industry but has a negative impact on the import industry. Songole (2012) found that exchange rate and stock market returns were negatively related while Kimura (2017) noted a weak positive association.

2.3.3 Interest Rate

This is the rate paid by a borrower for funds obtained from the lender and can be referred to as either lending rate, borrowing rate or cost of capital (Allam and Udin, 2009). Interest rate has a direct impact to a company's cost of capital. When interest rates increase, finance cost of a firm increases which results in a decline in profitability. This has a subsequent effect of diminishing returns to be provided to shareholders in form of dividends. The signaling effect of reduction or no dividends would lead to a fall in demand of the firms share hence impacting negatively on stock price (Ross, 1979).

Studies carried out by Aggrawal (2010), Amarasinghe (2015) and Allam and Udin (2009) discovered that interest rates had a great influence on returns of shares such that a rise in rates on interest were followed by a decline in returns whereas a drop in interest rate were accompanied by a sharp hike in share returns. However a study undertaken by Muriuki (2014) established that interest rate and share return were positively associated.

2.3.4 Money Supply

Money supply is the aggregate sum of currency under circulation at any one time. A rise in money supply has a favorable impact on profitability of firms. There is an increased disposable income in the hands of people which leads to increased spending. This has a net effect of increasing sales of a firms products, a rise in profitability and thus share prices. However a reduction in money supply would mean commercial banks have less to lend to investors and therefore reduced investment in the stock market (Shiblee, 2009). The law of demand dictates that whenever demand of a product increases, prices shift upwards and a decrease in demand causes prices to shift downwards. Therefore reduced investment brings about a reduction in share prices hence impacting negatively on the share market.

A period of high liquidity results in people having disposable income to spend on products generating sales for a firm and therefore increase profitability. Commercial banks would also have sufficient cash to lend hence low borrowing cost for firms. A contractionary policy results in reduction of money supply and therefore investors have less funds for investment in stocks. The fall in demand of shares results in fall in security

prices (Bisoon et al, 2016). Bisoon et al (2016) found that money supply and share returns were positively associated such that a rise in money supply had a corresponding effect of increasing stock returns.

2.4. Empirical Review

Kamal (2018) examined the influence of T-bill rate and lending rate on return of the Egyptian security market utilizing econometric models. The study made use of descriptive research design. The period under study was 2004-2007 and research focused on secondary data from the stock market. The result of the data analysis showed that a rise in both lending rates and T-bill rates was followed by a fall in share returns. This led to the conclusion that T-bill rate and lending rate effected returns of the share market in combination rather than individually. The researcher recommended that Egyptian authorities needed to amend their monetary policies as well as fiscal policies in order to keep interest rates low and therefore attract investors. This would have an effect of lowering the cost of production and thus shifting the focus from investing in risk free securities which would otherwise give lower returns.

Bisoon et al (2016) analyzed the influence that monetary policy had on share markets. The study was done on five countries for the duration 2004-2014. Data analysis tools used for the study included panel regression as well as panel correlation models. The findings of the analysis showed that money supply was a major contributor to performance of stock such that for every 1% change in supply corresponded to a large hike in stock returns by 38.94%. The study noted a surge in money supply resulted in a fall in lending rates which then forced firms to calculate value of shares at a lower

discount rate Therefore it was concluded that expansionary policy and stock returns were positively related.

Gunasekarage, Anirut and Power (2004) analyzed the stock market of Sri Lanka with the aim of identifying any effects that were brought about as a result of economic variables. The factors analyzed during the research included exchange rate, monetary policy and T-bill rate. The researchers opined that T-bill rates were a fair representation for interest rates and share price index was utilized in the research to measure performance of shares. The study focused the period 1985-2001. The Vector Error Correlation was utilized during data analysis which indicated T-bill rate had a far greater influence on share price when in comparison to the other independent variables under study. The researchers recommended that there was a need to incorporate other variables such as long term interest rate for future research.

Addo and Sunzuoye (2013) conducted a research in Ghana with the variables of the research being lending rate and T-bill rate and the impact that they had on the Ghana share market. The period under study was 1995-2001. The data acquired from multiple regression analysis indicated a negligible association between T-bill rate and capital market. However a positive association was noted when lending rate and T-bill rate were considered in understanding the relation with stock market. They recommended that policy makers needed to act with caution when trying to effect the economy via interest rates or Treasury bill rates as it could have a negative consequence of hindering financial market performance.

Allam and Udin (2009) examined the association between interest rate and stock return for fifteen nations. The fifteen countries chosen were a mix of developing and developed nations. The design utilized for this study was descriptive. The data collection focused on secondary data for the fifteen countries with bank deposit rate being representative of interest rates while the stock index was taken as a representative of share returns. The data was collected monthly over the duration 1988-2003. The study utilized the panel regression method for analyzing data collected. The results revealed existence of an inverse association between the variables. The researchers recommended that controlled interest rates were an advantage for countries that wished to attract investors to their respective stock markets.

Oyugi (2015) analyzed the extent to which the Nairobi Securities Exchange (NSE) was influenced by inflation. The study focused on the period of 17 years between the years 2000 and 2016 and utilized a descriptive design. Secondary data pertaining to stock returns and inflation rate was used during analyses. The study used a sample of top 20 performing firms denoted by the NSE 20 index. The results of regression analyses indicated a positive association was noted between the variables, it was negligible. The study was of the recommendation that a stable macro-economic environment was paramount to achieve a healthy stock market.

Otieno, Ngugy and Wawire (20I7) analyzed the extent to which the Nairobi Securities Exchange (NSE) was influenced by macro-economic variables. The independent factors examined included Treasury bills and lending rate. The study employed a descriptive

design for the study. The information on share prices was acquired from the NSE and data for T-bills and lending rate from the CBK for the duration 1993-2015. The sample used was the NSE 20 index as it was found to be a representative for all the companies listed. The method employed for analysis was Autoregressive Fractionally Integrated Moving Average Model which indicated fractional intergration of the variables. The study noted an inverse relation between T-Bill rate and stock returns resulting in the conclusion that Treasury bills and shares were competing securities.

Mutoko (2006) investigated the association of T-bill rate and share market return. A descriptive design was used with data obtained from secondary sources for the duration 1996-2011. The data for T-bill rates was acquired from the CBK. The sample comprised of NSE 20 index. The study sought to understand behavior of stock returns by looking at previous period's volatility. The results of the GARCH analysis indicated that an upsurge in T-bill rates resulted in a drop in share market return. The study was of the recommendation that debt strategy employed by the government needed to take into consideration the adverse effects on the NSE.

Oriwo (2010) determined the extent to which securities market in Kenya was influenced by economic variables. The economic variable comprised of inflation, T-bill rate and lending rate. The study was carried out using NSE all share index being representation of share returns for all 58 firms listed at the time with monthly data collected between 2008 and 2012. Co integration analysis was then used as an analysis tool on the data collected. The results revealed a weak positive association between inflation rate and price of

stocks. However, the findings also indicated that the 91 day T-bill and stock return were inversely related. Investors were noted to be attracted towards investing in Treasury bills when there was a rise in T-bill rate. This revealed that Treasury bills and stocks competed with the limited resources available for the investors. The study was of the recommendation that careful monitoring of macro-economic variables was essential for optimum functioning of the stock market.

Muriuki (2014) analyzed the extent to which the Nairobi Securities Exchange (NSE) was influenced by rates of inflation and interest. The study utilized a descriptive design. The period under study was 2009-2013 and data was acquired from secondary sources. The sample comprised of NSE 20 index. The study employed an ordinary least squares regression model for purposes of analyses. The results indicated an inverse association between inflation rate and share return but a strong positive association between interest rate and share return. The paper was of the recommendation that policy makers needed to make interest rates favorable so as to encourage borrowing as well as reviewing monetary policies in order to avoid inflation.

Kimura (2017) explored the effectiveness of exchange rate volatility on the Kenyan securities market. Research design employed was descriptive and was carried out over the period 2007-2016. The analysis tools employed were multiple regression model and correlation analysis. The study used the NSE 20 share index to represent share market which was the dependent variable. The independent variable included exchange rate, inflation rate and interest rate. The study found the independent variables could only

explain a 14.22% change in returns. The result of the analysis also revealed that when exchange rate volatility increased, it led to a rise in stock return. Interest rate and inflation rate were noted to be negatively associated to returns of the share market. It was recommended that since exchange rate was insignificant, the government should shift its focus on employing alternative policies to assist sectors that are not affected by depreciation of the currency.

2.6 Summary of the Literature Review and Research Gap

The literature review therefore highlighted the key theories that coincide with this study as well as previous studies that were undertaken on the subject. The key determinants of share return has also been examined in the chapter. Various researchers have tried to identify the impact that each determinant has had on stock returns with studies carried out both globally and locally. The available literature points to contradictions and lack of clarity on the influence of economic variable on share market return. Kamal (2018), Ado and Sunzoye (2013) found that T-bill rates did not influence stock market returns when taken independently of interest rate. However Gunasekarage et al (2004) found that T-bill rates had a significant influence on share return. Studies done by Mutoko (2006) and Oriwo (2010) found that T-bill rates were inversely associated to share market returns. Allam and Udin (2009) established that share returns and interest rates were inversely related. Muriuki (2014) found that interest rate and stock return were positively associated. Therefore there is a lack of conclusive evidence over the influence of interest rate and T-bill rates on stock market returns.

2.5 Conceptual Framework

This provides an overall view of how the variables under study are associated to each other. The independent variable in the study was the T-bill rate. The stock market returns being the dependent variable was arrived at using the 20 share index. The study also incorporated control variables which included exchange rate and inflation rate. The relationship is summarized as displayed in figure 2.1:

Figure 2.1: Conceptual Model

Independent Variable   **Dependent Variable**

| T-Bill Rate |

| Stock Market Returns

(20 share Index) |

Control Variables

| Inflation Rate

Exchange Rate |
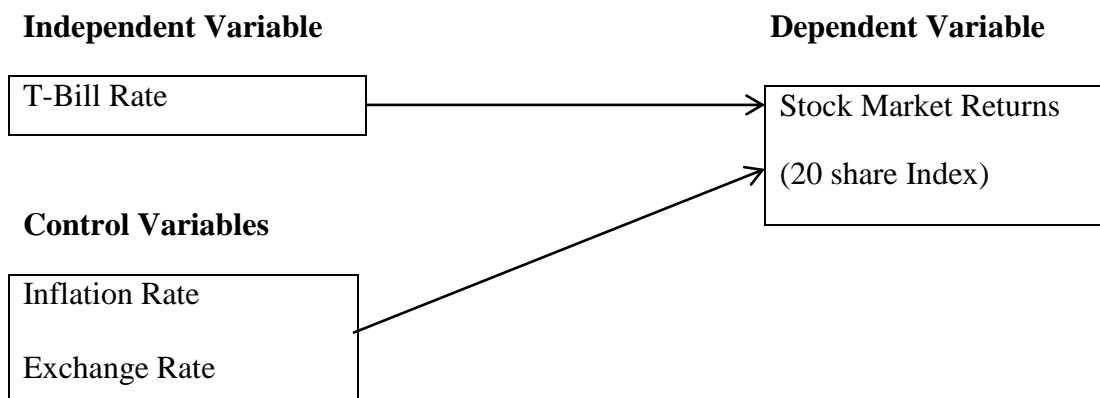
Source: Researcher 2020

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This part explained way in which study was undertaken and methodology employed. It elaborated on the design used for the study, the census or population as well as the sample being focused on, methods employed for collection and analysis of data.

3.2 Research Design

The study utilized a descriptive correlation design that assisted in determining the association if any which can be found between the T-bill rate and the share market returns. The design was chosen for the study since it attempts to observe the variables in the study without manipulating them. A number of researchers such as Kamal (2008), Alam and Uddin (2009 and Mutoko (2006) have employed this design in their study when determining the effect various factors on share returns.

3.3 Population of Study

The study was based on companies trading at the NSE in the period January 2015 to December 2018 and therefore this formed the population. The population of the NSE as at December 2018 comprised of 67 firms.

3.4 Sample of Study

A sample is a subgroup which is an accurate representation of the whole population (Trochim, 2005). An index is considered to be an accurate depiction of the entire market performance (Olson, 2005). The NSE 20 index was the sample chosen for the study. A

number of studies employed the NSE 20 index as their sample and include Mutoko (2006), Muriuki (2014) and Oyugi (2015).

3.5 Data Collection

The study solely borrowed data from secondary sources as it was readily available. The NSE website formed the source of data for share market performance whereby the NSE 20 share index was employed to detect stock market returns. Data for 91 day T-bill rates was acquired from the CBK. The data utilized in the study related to the period January 2015 to December 2018.

3.6 Data Analysis

Multiple regression was undertaken on the quantitative data collected so as to corroborate presence of a linear association between the variables under study. Correlation technique was employed in order to ascertain if the relationship is positive or negative and denoted by the correlation coefficient. Descriptive statistics was used on the data which includes mean, frequency and percentage will be calculated for each variable.

The analytical model for the analysis:

Model $Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + u$

Whereby:

Y = Stock returns obtained via NSE 20 share index

X_1 = Monthly change in the 91 day T-bill rate

X_2 = Monthly change in the Dollar-Kenya shilling exchange rate.

X_3 = Monthly inflation rate measured by consumer price index

b_0 = Constant

$b_1 - b_3$ = Slope for variables $X_1 - X_3$

u = the error value

3.6.1 Operationalization of Variables

Table 3.1: Operationalization of Variables

Variable	Indicator	Measurement	Source
Treasury bill rate	Monthly change in the 91 day Treasury bill rate	$\frac{Rate_t - Rate_{t-1}}{Rate_{t-1}} \times 100$	Mutoko (2006), Addo and Sunzuoye (2013).
Exchange rate	Monthly change in the USD exchange rate	$\frac{Rate_t - Rate_{t-1}}{Rate_{t-1}} \times 100$	Songole (2012)
Inflation rate	Monthly change in CPI	$\frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} \times 100$	Muriuki (2014)
Stock market return	Monthly return on the NSE 20 share index	$\frac{Return_t - Return_{t-1}}{Return_{t-1}} \times 100$	Otieno, Ngugy and Wawire (20I7)

3.6.2 Test of Significance

This test was executed at confidence level of 95% and 5% level of significance. The F test was utilized to ascertain whether there exists a correlation at 5% level of significance. The t test on the other hand was used to measure significance of relation between variables under study.

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3.6.3 Diagnostic Tests

Diagnostic tests was carried out on the data obtained and included linearity, normality, multicollinearity, autocorrelation and heteroscedasticity so as to ascertain that the data set does not violate regression assumptions. Normality was tested using a histogram and a P-P plot (Cook and Weisberg, 2002) and a scatter plot for testing heteroscedasticity (O'Connor, 2000). Autocorrelation tested using Durbin Watson statistic and multicolinearity examined via Variance Iinflation Factor and tolerance limits (Menard, 1995)

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This segment presented the result of data analysis. It started by performing a diagnostic analysis to evaluate the validity of regression assumptions followed by descriptive analysis then correlation analysis. The section looked at regression analysis result and interpretation of these results. Data was analyzed using Eviews7 and SPSS version 20.

4.2 Diagnostic Tests

Diagnostic analysis tests whether regression assumptions are violated. The tests performed here include: residual normality, linearity, heteroscedasticity and test for multicollinearity.

4.2.1 Normality of Residuals

In order to perform hypothesis tests and the model parameters, it is required that the residuals of the regression model follow a normal distribution. The study made use of a histogram to indicate whether the distribution of residuals followed a normal distribution. For normally distributed residuals, the histogram has a bell shape.
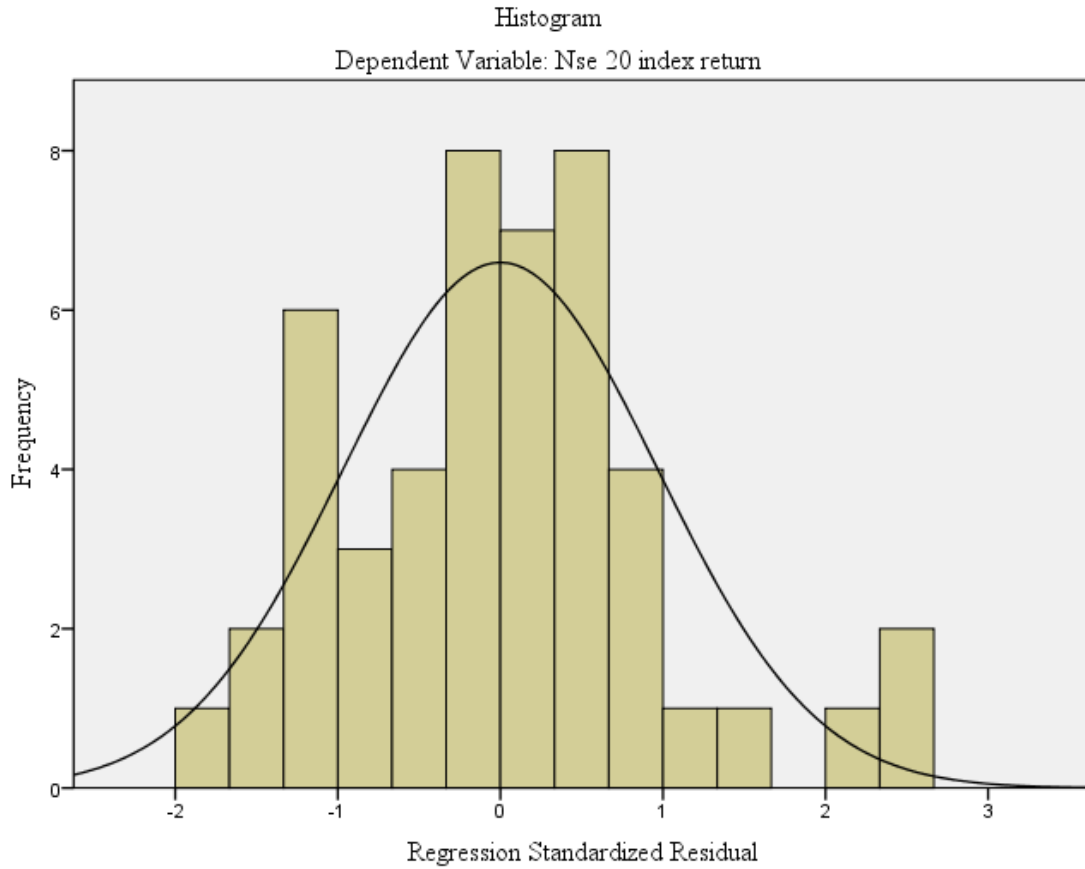
Figure 4.1: Histogram of Residuals

Figure 4.1 displays the histogram of the residuals. The histogram indicates the distribution of residuals is fairly normally distributed.

Table 4.1: Jarque-Bera Statistic

Sample 1	48
Mean	8.66e-16
Median	0.012446
Maximum	0.3873381
Minimum	-0.280854
Std. deviation	0.146180
Skewness	-0.571704
Kurtosis	3.395042
Jarque-Bera	2.865901
Probability	0.238604

(Research data, 2020)

Departure from normality can be evaluated using skewness and kurtosis based on sample data set. Skewness as an indicator of symmetry can either be positive or negative. Skewness of Zero is an indicaton that the distribution is perfect or normal. Kurtosis measures peakedness of a frequency distribution with kurtosis of 3 an indication of it being normal. Skewness close to zero and kurtosis close to three can be said to be approximately normally distributed (Carter, Griffiths & Lim, 2011).

Brooks (2008) point that evaluation of whether coefficient of skewness and kurtosis are close to zero or three respectively is subject to bias and recommends the Jarque-Bera test of normality. The test is computed on the basis of the coefficients of skewness and

kurtosis of a distribution. It is used to test the null hypothesis of normally distributed residuals which will be rejected if p<0.05.

Table 4.1 shows a coefficient of skewness -0.571 and a coefficient of kurtosis of 3.39. These coefficients do not differ substantially from zero and three respectively and the distribution can be said to be approximately normal. The Jarque-Bera statistic was determined as 2.866 with a p of 0.238. Since the p>0.05, the null hypothesis that residuals are normally distributed is not rejected.
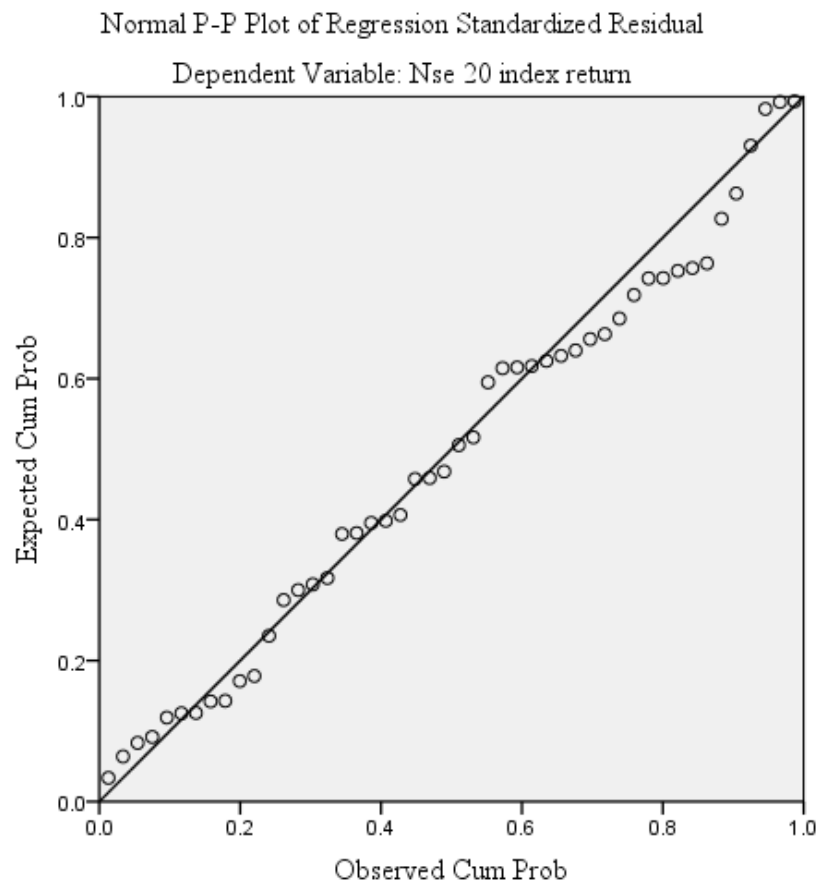
Figure 4.2: P-P Plot

Figure 4.2 shows the dots as being distributed near the diagonal line. If the scatter closely follows a 45 degree line, the residuals are normally distributed. Since the dots closely match the diagonal line, the model fulfills the normality test.

4.2.2 Test for Heteroscedasticity

Regression analysis assumes the variance of error term does not change over time. This implies that the errors are homoscedastic (Wooldridge, 2016). A graph of the residuals is used to observe the distribution of the residuals. The existence of systematically changing variability of the residuals over sample period indicates possible occurrence of heteroscedasticity.
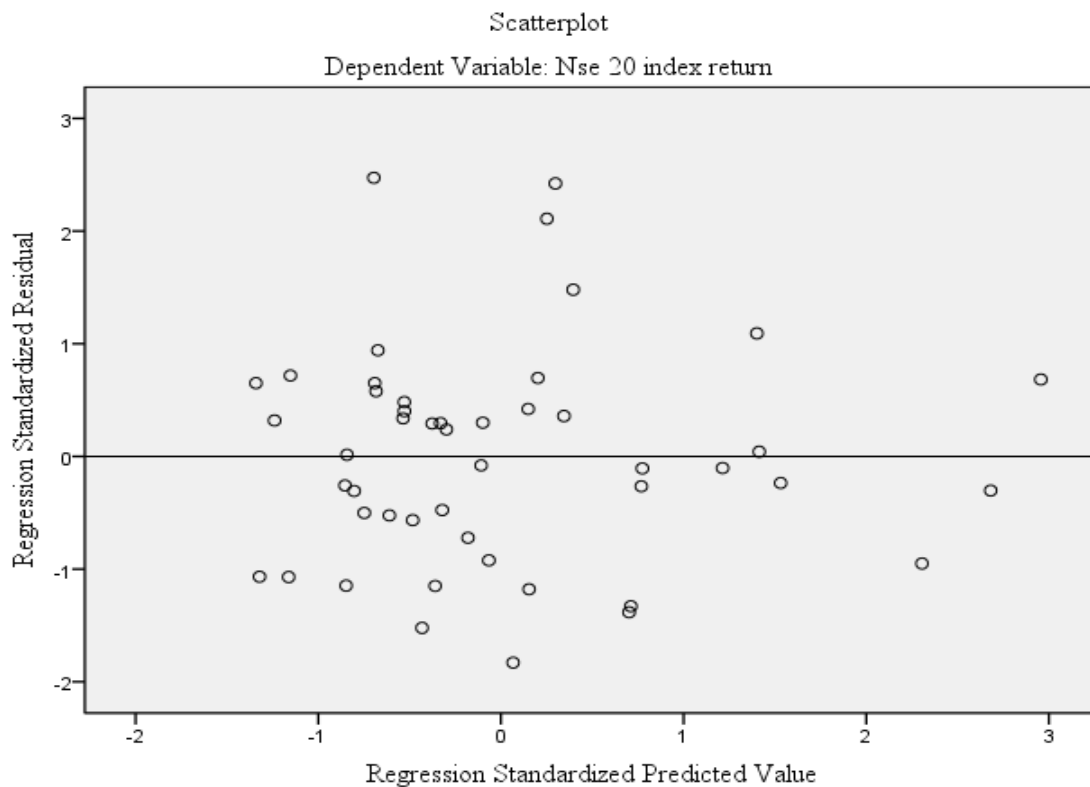
Figure 4.3: Scatter Plot

In graph 4.3 it is observed that there is a random spread of residual around zero without a systematically changing pattern over the sample period. This indicates that the problem of heteroscedasticity does not arise.

A more formal test of Heteroscedasticity is the White's test. The null hypothesis was that the variance of the error term is constant. The test is F and Chi-square distributed with 2 degrees of freedom. If $p < 0.05$, the null hypothesis of homoscedastic errors will be rejected (Brooks, 2008).

Table 4.2: White test for heteroscedasticity

Heteroskedasticity Test: White			
F-statistic	0.625541	Prob. F(9,37)	0.7677
Obs*R-squared	6.207002	Prob. Chi-Square(9)	0.7190
Scaled explained SS	6.221660	Prob. Chi-Square(9)	0.7175

(Research data, 2020)

Table 4.2 indicates test statistics for White test of heteroscedasticity. The F-statistic, Chi-square and scaled explained SS had p-values of 0.7677, 0.7190 and 0.7175. As p is noted to be lower than 0.05, hypothesis of homoscedastic residuals isn't rejected.

4.2.3 Test for Autocorrelation

Autocorrelation occur when error term are correlated. Assumption of no serial correlation is proven using a significance level of 5%. The boundary values of Durbin Watson statistic is used to make a decision on the rejection of this assumption. If the Durbin Watson statistic obtained from the data is within the lower (DL) and upper (DU) limit for

the critical value for the statistic, the hypothesis that residual are not correlated will be rejected (Brooks, 2008).

Table 4.3 Durbin Watson Statistic

Model	Durbin-Watson
1	2.104[a]

(Research data, 2020)

The Durbin Watson statistic reported in Table 4.3 is 2.104. Since 2.104 is not with the DU (1.67) and DL (1.42) the assumption of no serial correlation is accepted at 5% level of significance. Therefore errors terms are not serially correlated.

4.2.4 Test for Multicollinearity

Multicollinearity occur if correlation is noted among independent variables. Test for collinearity was performed utilizing variance inflation factor-VIF and tolerance levels. If the VIF for any variable exceed 10 or the tolerance level is less than 0.2, it is indicative of multicollinearity.

Table 4.4 Collinearity Statistics

	Collinearity Statistics	
	Tolerance	VIF
T-bill rate	.975	1.025
Exchange rate	.972	1.029
Consumer price index	.994	1.006

(Research data, 2020)

Table 4.4 showed that VIF were all less than the maximum acceptance of 10 and the tolerance levels were higher than minimum acceptable level of 0.2. Thus there was no multicollinearity issue in the regression model.

4.2.5 Test for linearity

The relation among variables is expected to be linear and was tested using Ramsey Reset test. The test has a t, F and likelihood ratio statistics. If the assumption of linearity is to be upheld, the three statistics should not be significant (Brooks, 2008).

Table 4.5 Ramsey RESET test

	Value	df	Probability
t-statistic	0.341623	42	0.7343
F-statistic	0.116706	(1, 42)	0.7343
Likelihood ratio	0.130418	1	0.7180

(Research data, 2020)

Table 4.5 shows the statistics Ramsey RESET test. The p-value for t-statistics is 0.7343, F-statistic is 0.7343 and likelihood ratio is 0.7180. Since the $p > 0.05$, the outcome is insignificant and therefore the test failed in rejecting the assumption of linearity at 5% significance.

Diagnostic analysis indicated that assumptions underlying of regression analysis were upheld and the regression equation was correctly specified. Regression analysis was therefore suitable to apply on the data.

4.3 Descriptive Statistics

Descriptive statistics was employed to indicate average values of variables of the study and the dispersion around those averages.

Table 4.6 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
NSE 20 index return	48	-13.13	8.60	-1.227	5.062
T-bill rate	48	-17.99	5.79	-.615	3.564
Exchange rate	48	-2.36	6.24	.248	1.274
Consumer price index	48	.00	11.70	6.159	1.850
Valid N (listwise)	48				

(Research data, 2020)

In Table 4.6 N=48 specifies the number of observations that made the sample period. The study used sample of four years each with twelve observations. The return on the NSE 20 index was -1.227% and standard deviation being 5.062%. Mean change in T- bills rate was -0.615% and standard deviation 3.564%. Mean change in exchange was obtained as 0.248% and standard 1.274%. Consumer price index averaged 6.159% having a standard deviation of 1.85%.

4.4 Correlation Analysis

Correlation measures inclination of variable to co-vary in similar or inverse direction. Coefficient of correlation is a statistical computation of the nature and the strength of relation between variables. A coefficient of +1 shows a perfect positive correlation, -1 an indication of perfectly negative correlation and 0 being no correlation (Brooks, 2008). Intermediate values can be interpreted as showing strong or weak correlation. Anderson,

Sweeney and Williams (2011) argue that there are no hard rules for scaling correlation but provides general rules of thumb guidelines. Correlation coefficient less than 0.3 an indication of weak correlation, between 0.3 and 0.5 indicate moderate correlation and above 0.5 show strong correlation. This study relied on Karl Pearson correlation measure.

Table 4.7: Correlations Matrix

		Nse 20 index return	T-bill rate	Exchange rate	Consumer price index
Nse 20 index return	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	48			
T-bill rate	Pearson Correlation	-.388**	1		
	Sig. (2-tailed)	.006			
	N	48	48		
Exchange rate	Pearson Correlation	.261	-.084	1	
	Sig. (2-tailed)	.073	.571		
	N	48	48	48	
Consumer price index	Pearson Correlation	.063	.231	.068	1
	Sig. (2-tailed)	.673	.115	.648	
	N	48	48	48	48

(Research data, 2020)

Table 4.7 provides correlation coefficients between the variables. The correlation coefficient between NSE-20 index and T-bill was noted to be -0.388 having p-value of 0.006. This showed that NSE 20 index return had a moderate negative correlation with Treasury bill return. Since p-value 0.006<0.05, the result was significant at the 5% significance level. The NSE-20 share index return and exchange rate had a correlation of 0.261 and p of 0.073. This indicated that the NSE 20 index return had a weak positive

correlation with exchange rate. The correlation wasn't significant as p of 0.073 was higher than 0.05. CPI and NSE 20 index return had coefficient of correlation 0.063 having p of 0.673. The correlation between NSE 20 index and CPI was positive but weak. However the correlation was insignificant because p-value 0.673 is more than 0.05.

4.5 Regression Analysis

To establish the impact of T-bill rate on stock market returns, the NSE-20 index was regressed on T-bill rate, rate of exchange and inflation rate.

Table 4.8 Model Summary

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	.490[a]	.240	.188	.15430	2.104

(Research data, 2020)

The coefficient of determination R-square is an indicator of the predictive power of independent variables. It measures degree of variation in dependent variable is as a result of variation in independent variable. It is the ratio of regression sum of square to total sum of squares (Brooks, 2008). Anderson et al (2011) notes that in multiple linear regressions the explanatory power of the regression is reduced marginally as additional independent variables are included. This reduced explanatory power is expressed by the adjusted R-square, which is adjusted for the degrees of freedom lost when additional independent variables are included in the regression. Anderson et al (2011) provides general guidelines for interpreting the model. R square and adjusted R less than 0.30

indicates low explanatory power, between 0.3 and 0.49 indicates reasonable explanatory power and 0.50 or more indicate high explanatory power.

From Table 4.8, coefficient of determination was calculated as 0.240. This result indicated that variation in T-bills rate, exchange rate and inflation rate explained 24% of variation in return on return on the market. The adjusted R^2 of 0.188 showed that variation in independent variables explained 18.8% of variation in returns to the NSE 20 index after adjusting for the degrees of freedom. Variation in T-bill rate, exchange rate and CPI had low explanatory power on variation in stock market returns.

Table 4.9 Analysis of Variance

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	.331	3	.110	4.637	.007[b]
Residual	1.048	44	.024		
Total	1.379	47			

(Research data, 2020)

Analysis of variance compares variances from two sources; variance due to regression model and variance due to the error term. The more important statistic resulting from this analysis is the F ratio. F ratio is the ratio of mean sum of square due to regression and the mean sum of square due to errors (Anderson et al, 2011). Analysis of variance is used to evaluate whether the slope coefficients are jointly insignificant. It is used to test the hypothesis $\beta_1=\beta_2=\beta_3\ldots\ldots=\beta_n=0$. The higher the value of F statistic the greater the probability that the hypothesis of insignificant slope coefficients is be rejected. The hypothesis is rejected if the p-value is less than 0.05 for the test (Burns and Burns, 2008).

Analysis of variance in Table 4.9 indicated the adequacy of the regression equation. The proportion of explained variation the unexplained variation adjusted for the degrees of freedom showed an F-ratio of 4.637 with a significance probability of 0.007. As the significance probability 0.007 is lower than 0.05, the hypothesis that independent variables are jointly insignificant was rejected. The regression coefficients were thus jointly significant.

Table 4.10: Regression Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	0.739	.0260		28.420	.000
T-bill rate	-.100	.032	.426	-3.137	.003
Exchange rate	.041	.018	.301	2.272	.028
Consumer price index	-.005	.013	-.056	-.413	.682

(Research data, 2020)

Table 4.10 indicates coefficients of regression analysis. The regression had constant value of 0.739 having a p-value of 0.000. This implied that if T-bill rate, exchange rate and CPI were zero, NSE 20 share index would return 0.739. This return would be significant at the as the p-value 0.000 is under 0.05. T-bill rate had a regression coefficient of -0.100 having a p of 0.003. Therefore T-bill rate had an inverse effect on returns. A unit rise in T-bill rate would lead to market return declining by 0.1 units all else the same. The effect was significant because p-value 0.003< 0.05.

From Table 4.10 the slope coefficient for exchange rate was obtained as 0.041 with a significance probability of 0.028. This implies exchange rate had a positive impact on returns. A unit change in exchange rate is followed by a shift in same direction of stock market returns by 0.041. This impact is further proven as the significance probability 0.028 is under 0.05.

As per Table 4.10, the regression coefficient for CPI was -0.005 with p-value of 0.682. This pointed that changes in CPI negatively affected stock market returns. A unit rise in inflation rate would result in stock market returns declining by 0.005. The effect was however insignificant as the p-value 0.682 is in excess of 0.05.

The resulting regression equation was:

$$Y = 0.739 - 0.10X_1 + 0.041X_2 + 0.005X_3$$

4.6 Discussion of Findings

This study aimed at evaluating the influence of T-bill rate on stock market returns for firms traded at NSE. Stock market returns was denoted by the NSE-20 share index and was regressed on the T-bill rate. Exchange rate (represented by ksh and usd) and inflation rate (denoted by Consumer price index) were control variables. Karl Pearson Correlation was utilized to establish level of correlation between the study variables.

The Pearson correlation coefficient indicated a moderate negative association between T-Bill rate and stock market return (p=-0.388, p>0.006). This showed that result was significant at 5% significance as p-value 0.006<0.05. These findings concurred with

Otieno et al (2017), Oriwo (2010) and Mutoko (2006) that a rise in Treasury bill rate was associated with a fall in returns of shares. However it contradicts the findings of Ado and Sunzoye (2013) which documented a positive impact of T-bill rate on share returns.

The Pearson correlation coefficient indicated that the NSE 20 index return had a weak positive correlation with exchange rate ($p = 0.261$, $p<0.073$). This implied that exchange rate have a weak positive relation with stock market returns even though relation was not significant. This concurs with study done by Kimura (2017) which noted that exchange rate was positively rated to stock market return. The correlation coefficient indicated that NSE 20 index had a weak positive association with inflation rate ($p = 0.063$, $p<0.673$). This means that even though the relation is a positive one, it is not significant to explain any change in stock market returns. The findings concur with the studies carried out by Oriwo (2010) and Oyugi (2015) who found that inflation rate had weak positive association with stock market returns.

The outcome of regression analysis indicated that T-Bill rate, exchange rate and inflation rate explain 24% of variation in returns to the NSE 20 index. This implies that there exist other variables that are responsible for 76% of change in stock market returns. The analysis of variance as per table 4.9 revealed F-ratio of 4.637 that is more than critical value. Hence regression model used for the study was appropriate to predict changes in stock market returns. Therefore this concurs with the Arbitrage Pricing Theory which stated that several macro-economic variables through a linear combination have an impact on return of a financial asset.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This section summarized the findings of the study, made conclusions thereof and recommendations. It also highlighted various factors that limited the study and areas that could be focused on for further research.

5.2 Summary of Findings

This study set out to examine the effect of Treasury bill rate on stock market returns for companies traded at NSE. The research controlled for the consequence of exchange rates and inflation rate. Correlation analysis indicated that stock market return and T-bill rate were moderately negatively correlated and the correlation was significant as since p value was less than 0.05. It was also noted that T-bill rate negatively affected stock market return as per regression analysis. The effect was significant as $p<0.05$.

The study found that returns at the NSE and exchange rate indicate a weak positive correlation. The correlation was insignificant as $p>0.05$. Regression analysis revealed that exchange rate and stock returns were positively associated. The effect was significant indicated by $p<0.05$. The study identified that stock market return and inflation rate had a negative weak correlation. The correlation was insignificant at 5% significance. Regression analysis indicated that inflation effect on stock market return was negative. The relation was however insignificant at 5% significance.

The coefficient of determination R^2 of 24% indicated that T-bill rate, exchange rate and inflation rate had low explanatory power on stock market return. Analysis of variance showed that jointly T-bill rate, exchange rate and inflation rate significantly influenced stock market return at 5% level of significance.

5.3 Conclusions of the Study

It was concluded in light of the results of data analysis that stock market return and T-bill rate was inversely related. Increases in T-bill rate led to decrease in stock returns for firms quoted at NSE. Thus stocks and T-bill are competing investment instruments. The information contained in treasury bills rate is therefore important in signaling the direction of the shares market. The study also concluded that increases exchange rate caused a hike in stock market returns of NSE companies. Hence investing in currencies market would complement investing in stock market.

Additionally, it was concluded that a rise in costs indicated by inflation rate had a negligible influence on returns. Further the study concluded that variation in T-bill rate, exchange rate and inflation rate explained a moderate 24% of the variation in stock market returns of listed companies. It was concluded that variation in T-bill rate, exchange rate and inflation rate significantly explained variation in stock market return.

5.4 Recommendations of the Study

The study results have implications for investors, portfolio managers and regulators. Based on the finding that T-bill rate has an inverse association with stock market return, this study recommends that investors and portfolio managers can increase their returns by

tilting their portfolio holding towards stocks when the T-bill rate is anticipated to be falling and from stocks to T-bills when the T-bill rate is predicted to increase. The study recommended that investors and portfolio managers should hold more stocks in their portfolio when exchange rate increases as this would be expected to result in significantly higher stock returns. To avoid loss in value, investors should sell their investment in stocks when consumer price index is expected to be rising and invest more in stock market when inflation rate is expected to be falling.

Also regulators can rely on information contained in changes in T-bills rate, exchange rate and inflation rate to predict stock market direction. Central bank's open market operation via treasury bills can be expected to be effective in reducing excess liquidity in the market as investors would be expected to sell their positions in stocks and invest in T-bills. The study therefore recommends offering higher Treasury bill rate. The study also recommends that to facilitate higher stock market return, regulators should adopt initiatives that ensure price stability thus ensuring lower consumer price index.

5.5 Limitations of the Study

The study covered the period 2015-2018 - a duration of 4 years. Therefore there is a possibility that study findings might change if a longer duration was considered. Furthermore there have been changes in government policy in the year 2019 such as scrapping off interest capping which could have a bearing on the results of the study. The cost of obtaining raw data especially on NSE 20 index was quite high hence limiting the study scope.

The research relied on secondary data and therefore it was assumed to be accurate. However secondary data can have quality issues especially when there has been an error in data input at the source. The secondary data collected was historical and may not be a correct representation of the contemporary or future situation facing the stock market.

5.6 Suggestions for Further Research

Future studies may focus on the relation of Central Bank's rate and firm returns at the NSE. Also researchers may explore the contribution of monetary policy in securities market development especially for developing economies. Further research may also evaluate the influence of monetary policy tools like discount lending on stock market performance. Researcher may also examine the influence of other macroeconomic factors comprising of money supply and lending rate on performance of the NSE. Such studies may assess the influence of macroeconomic volatility on stock returns taking into account shocks caused by economic cycles.

The study relied heavily on secondary data running the risk of inaccuracies. Further research can include other data gathering tools such as questionnaires and interviews with managers of listed companies. Further research can also be carried over a larger span of more than 4 years which provides a more accurate position. The study also focused solely on the NSE and therefore further research can be done on other East African markets.

REFERENCES

Addo, A. and Sunzuoye, F. (2013). The impact of Treasury bill rate and interest rate on the stock market returns: Case of Ghana Stock Exchange. *European Journal of Business and Economics*, *8*(2), 98-107.

Aggrawal, G. (2010). A study of exchange rates movement and stock market volatility. *International Journal of Business and Management*, *5*(12), 67-73

Agus, H. D and Mcgowan, C. (2011). Stock price and exchange rate causality: The case of four Asian countries. *Journal of Natural and Social Sciences, 2*(3), 3012-3017.

Allam, M. and Udin, M. (2009). Relationship between interest rate and stock price: Empirical evidence from developed and developing Countries. *International Journal of Business and Management*, *4*(3), 47-57.

Anderson, D., Sweeney, D. and Williams,T.(2011). Statistics for Business and Economics. 11th Ed. South-Western, Cengage Learning. Toronto, Canada.

Amarasinghe, A.A. (2015). Dynamic relationship between interest rate and stock Price: Empirical evidence from Colombo Stock Exchange. *International Journal of Business and Social Science*, *5*(7), 92-97.

Bernanke, B. S. (2005). Inflation in Latin America - A New Era, *Remarks at the Stanford Institute for Economic Policy Research Economic Summit.*

Bisoon, R., Seetanah, B., Bhattu-Babajee, R., Gopy-Ramdhany, N. and Seetah, K. (2016). Monetary policy impact on stock return: Evidence from growing stock markets. *Theoretical Economics Letters*, *06*(05), 1186-1195.

Burns,R. B., and Burns R.A. (2008). Business Research Methods and Statistics Using SPSS. Sage Publications. New Delhi, India.

Brooks, C. (2008). *Introductory econometrics for finance*. 2nd Ed. Cambridge University Press, Singapore.

Carter, R. H., Griffiths, W. and Lim, G. (2011). Principles of Econometrics. 4th ed. John Wiley and Sons. United States of America

Central Bank of Kenya (2019) website https://www.centralbank.go.ke/ retrieved July 19, 2019

Coleman, A. K., and Tetty, K. F.A. (2008). Impact of macroeconomic variables on Ghana stock exchange. *Journal of Risk and Finance*, *14*(6), 365-378.

Cook, R. D., & Weisberg, S. (2002). Residuals and influence in regression. New York: Chapman & Hall.

Daniel, K. Hirshleifer, D. & Subrahmanyam,A.(1998). Investor psychology and security market under- and overreactions, *Journal of Finance*, *53*(9), 1839–1886.

Dornbusch, R., & Fischer, S. (1980). Exchange rates and the current account. *American Economic Review*, *70*(25), 960–971

Elton, E., Gruber, M., & Blake, C. (1995). Fundamental economic variables, expected returns, and bond fund performance. *The Journal of Finance, 50*(4), 14-23.

Fama, E. F. (1965). Random walks in stock market prices. *Financial Analysts Journal*, *21*(5), 55-59.

Fama, E. and French K. (1993). The cross-section of expected stock returns, *Journal of Finance, 47* (11), 427–465.

Fama (1981). Stock returns, real activity, inflation and money. *American Economic Review*, *71*(2), 545-564.

Fama, E. (1965). The behavior of stock market prices. *Journal of Business*, *38*(10), 34-105

Fayed (2013), Crowding out effect of public borrowing: The case of Egypt, *International Research Journal of Finance and Economics Issue, 10* (3), 25-36.

French, K.R. (1980). Stock returns and the weekend effect. *Journal of Financial Economics, 9*(3), 56-67.

Girmens, G., & Guillard, M. (2003). Privatization and Investment: Crowding-out effect vs financial diversification. *Journal of Business*, *50*(8), 54-75

Grossman, S., & Stiglitz, J. (1980). On the impossibility of informationally efficient markets. *The American Economic Review, 70*(3), 393-408.

Gunasekarage, A., Pisedtasalasai, A., & Power, D. M. (2004). Macroeconomic influence on the stock market: Evidence from an emerging market in South Asia. *Journal of Emerging Market Finance, 3*(3), 285-304

Hussain, S. and Malik, S. (2011). Inflation and economic growth: Evidence from Pakistan. *International Journal of Economics and Finance*, *3*(5) 56-63.

Kamal, A.L.M. (2018), The impact of Treasury bill rate and interest rate on the stock market returns in Egypt, *International Journal of Development and Sustainability*, *9*(4), 604-619

Kamara, A. (1994). Liquidity, taxes, and short-term treasury yields. *The Journal of Financial and Quantitative Analysis, 29(3)*, 403-419

Karolyi, G. A. (2001). Why stock return volatility really matters, *Institutional Investor Journals Series*, *2*(1), 1-16

Kenya National Bureau of Statistics (2019) website https://www.knbs.or.ke retrieved July 19 2019

Kimura K., (2017). The effect of exchange rate volatility on stock market returns at the Nairobi Stock Exchange. *Unpublished master's thesis*. University of Nairobi.

Kirui, E., Wawire, N. H., & Onono, P. O. (2014). Macroeconomic variables, volatility and stock market returns: A Case of Nairobi Securities Exchange, Kenya. *International Journal of Economics and Finance, 6*(8), 231-239.

Kraus, A. and Litzenberger, R. (1973). A state-preference model of optimal financial leverage. *The Journal of Finance*, *28*(4), 911-26.

Liu, M., & Shrestha, K. M. (2008). Analysis of the long- term relationship between macro- economic variables and the Chinese stock market using heteroscedastic cointegration. Managerial Finance, 34(11), 744-755

Maghyereh, A. I. (2002). Causal relations among stock prices and macroeconomic variables in the small, open economy of Jordan. *Research Journal of Finance and Accounting, 7*(10), 39-50.

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance*, 7(1), 77-89.

Menard, S. (1995). *Applied logistic regression analysis*. Sage university paper series on quantitative applications in the social sciences, Thousand Oaks, CA: Sage.

Mishkin, F. & Eakins S. (2009). *Financial markets and institutions*. New York, NY: Pearson Prentice Hall

Modigliani, F.; Miller, M. (1963). Corporate income taxes and the cost of capital: a correction. *American Economic Review*, *53* (3), 433–443.

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica*, *34*(4), 768-777.

Mugambi, M. & Okech, T. C. (2016). Effect of macroeconomic variables on stock returns of listed commercial banks in Kenya. *International Journal of Economics, Commerce and Management, 4* (6), 390-418

Muriuki K., (2014). The effect of inflation and interest rates on stock market returns of firms listed at the Nairobi securities exchange. *Unpublished master's thesis*., University of Nairobi.

Mutoko, R., (2006). Analysing the effect of treasury bill rates on stock market returns using Garch. *Unpublished MBA thesis.* Nairobi. University of Nairobi.

NSE (2019) website https://www.nse.co.ke/media-center/press-release.html retrieved July 19, 2019.

O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instrumentation, and Computers, 32*(5), 396–402.

Ochieng, D. & Oriwo, E. (2012). The relationship between macro-economic variables and stock market performance in Kenya. *Unpublished MBA thesis.* Nairobi. University of Nairobi.

Olson, R.L. (2005). *The handbook for investment committee members: How to make prudent investment decisions for your organization*. New Jersey, NJ: John Wiley & Sons

Olweny, T. & Omondi, K., I. (2011). The Effect of macro-Economic factors on stock return volatility in The Nairobi Stock Exchange, Kenya. Economics and Finance Review, *10*(17), 34 - 48.

Oriwo, E., (2012).The relationship between macro-economic variables and stock market performance in Kenya. *Unpublished MBA thesis.* Nairobi. University of Nairobi.

Otieno, D., Ngugi, R. and Wawire, N. (2017). Effects of interest rate on stock market returns in Kenya. *International Journal of Economics and Finance*, 9(8), 40-47.

Oyugi, S., (2017). Effect of Inflation on Stock Market Returns at Nairobi Security Exchange. *Unpublished MBA thesis.* Nairobi. University of Nairobi.

Rose, P. (1994). *Money and capital markets.* Boston: Irwin.

Ross, S. A. (1976). The arbitrage theory of Capital Asset Pricing. *Journal of Economic Theory*, *13*(7), 341-360.

Rozeff, M.S., Kinney Jr., W.R., (1976). Capital market seasonality: The case of stock returns. *Journal of Financial Economics*, 3(14), 379–402

Sharpe, W. F., Alexander, G. J., & Bailey, J. V. (1995). *Investments.* Englewood Cliffs, NJ: Prentice Hall

Shiblee, L. (2009). The impact of inflation, GDP, unemployment, and money supply on stock prices. *British Journal of Management*, *11*(1), 1-15.

Sloman, J., Hinde, K., & Garratt, D. (2007). *Economics for business*. Harlow, England: Financial Times Prentice Hall.

Trochim, W. M. (2005). Research Methods:The Concise Knowledge Base. Cincinnati: Atomic Dog.

Wooldridge,J.M (2016). Introductory econometrics: A modern approach. 6th Ed. Cengage Learning. New York.

APPENDICES

Data Collection Schedule

Month	NSE 20 index	T-bill rate	CPI	Exchange Rate
1				
2				
3				
48				

Appendix I: Research Data

Month	NSE 20 index	T-bill rate	CPI	Exchange rate
1	5212.11	8.594286	153.433	90.7031
2	5491.37	8.58925	154.1363	91.6944
3	5248.16	8.486	155.8614	91.4139
4	5091.43	8.418	158.6959	92.3917
5	4786.74	8.2565	159.9826	94.6444
6	4906.07	8.2578	160.4552	97.5458
7	4404.72	10.259	160.5702	99.2226
8	4176.59	8.524333	160.9008	101.7743
9	4173.52	9.61325	161.3282	103.9576
10	3868.83	9.411222	162.1306	104.6829
11	4016.18	9.542333	162.9704	101.9657
12	4040.75	9.80925	164.7198	102.1842
13	3773.17	9.35825	165.3664	102.2948
14	3862.24	10.6304	165.0636	102.2708
15	3982.09	8.7185	165.9187	101.6743
16	4009.26	8.9195	167.0664	101.3928
17	3827.8	8.1622	167.9876	100.6942
18	3640.61	7.25	169.7584	100.8444
19	3488.67	7.41	170.8365	101.0861
20	3178.83	8.4798	170.9687	101.3972
21	3243.21	8.05525	171.5557	101.325
22	3229.22	7.804	172.6241	101.2206
23	3247.19	8.192	173.8535	101.4761
24	3186.21	8.4415	175.1788	102.5628
25	2794.27	8.6152	176.9304	103.8589
26	2994.53	8.635	179.9781	102.975
27	3112.52	8.628	182.9766	103.0989
28	3157.58	8.76925	186.2449	103.1478
29	3441.05	7.9575	187.6351	103.3544
30	3607.18	8.3918	185.3869	103.7167
31	3797.53	8.2234	183.5994	103.9194
32	4027.12	8.174	184.7219	102.8111
33	3751.46	8.133	183.6599	103.2222
34	3729.62	8.133	182.5013	103.75
35	3804.69	8.01225	182.08	103.1028
36	3711.94	8.007	183.0541	103.2944
37	3737.27	8.0434	185.47	101.9917
38	3750.75	8.02875	187.9984	101.3833

39	3845.34	8.02075	190.6171	100.8944
40	3735.06	8.0012	193.18	100.335
41	3333.36	7.9575	195.05	101.385
42	3285.73	7.8335	193.31	100.8861
43	3296.68	7.6846	191.59	100.475
44	3203.4	7.63925	192.1	100.6483
45	2875.51	7.64175	194.14	100.9028
46	2810.32	7.5608	192.6	102.0544
47	2797.44	7.35625	192.25	102.5111
48	2833.84	7.3432	193.51	101.8461