EFFECT OF MACRO ECONOMIC VARIABLES ON FOREIGN EXCHANGE RATE IN KENYA

BY

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DECLARATION

I declare that this management research project is my authentic work and has not been submitted for the award of any degree in any other university or institution of learning other than the University of Nairobi.

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DEDICATION

I wish devote this research work to my companions, family and co- workers at work for their support and trust on me.

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ABBREVIATION AND ACRONYMS

ANOVA   : Analysis of variance
ARDL   : Auto Regression Distributed Lag
BOP   : Balance of payments
CBK   : Central Bank of Kenya
CPI   : Consumer Price Index
GARCH   : Autoregressive Conditional Heteroskedasticity
GBP   : Great Britain Pounds
IFE   : International Fisher Effect
IMF   : International Monetary Funds
KNBS   : Kenya National Bureau of statistic
PPP   : Purchasing Power Parity
TY   : Toda Yamamoto
USD   : United States Dollar
VAR   : Vector Autoregressive

ABSTRACT

Foreign exchange rate is a major economic growth and development pillar of any economy. Foreign exchange market refers to the intercontinental market, where currencies are merchandised virtually around the globe. Increase in interest rate means devaluation of local currency due to low investment level associated with high cost of acquiring finance. Low investment level means low production of goods and services in local country thus low inflow of foreign currency due to low export level causing high demand level for foreign exchange rate. The main objective of this study was to determine the effect of macro-economic variables on foreign exchange rates in Kenya. Specifically, the study sought to investigate the effect of inflation, political instability, broad money supply, interest rate and GDP growth rate covering a period of 10 years from January 2010 to December 2019.Descriptive analysis was used to determine mean, maximum, minimum and standard deviation of the variables to know the general characteristics of the variables over the period of study. Data analysis was performed using SPSS version 25.0 and STATA version 15.0 software. Several diagnostic tests were employed on the model such as tolerance and variance inflation factor to determine if the independent variable have strong correlation where multicollinearity, was absence. Normality test was employed using a Histogram and result concluded present of normal distribution. Heteroskedasticity test was done using white test where result concluded no heteroskedasticity in the model. Regression analysis was done and the results established that 14.7% variance in exchange rate could be accounted for in the model by exchange rate using the Adjusted R^2. From the regression the result shows a negative significant relationship between inflation and exchange rate, positive significant relationship between interest rates and GDP growth rate and exchange rate. The study found that interest rate was the most important macroeconomic variable that determine the level of foreign investment and hence exchange rate it had highest determining power over other variables by 61.81%. However, the findings did not find any significant relationship between broad money supply and exchange rate. Political stability index was also found to be a significant factor influencing exchange rate. The study concluded that a unit increase in inflation lead to significant decrease of 45.7 percent in exchange rate. Also, a unit change in interest rate results to significant change of 61.8% in exchange rate and finally a unit change in GBD result to 43.9% increase in exchange rate. From the study it is recommended the government to have close monitoring of macro-economic factor since they are determinant of foreign exchange rate through monetary and fiscal policies.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Foreign exchange rates is a major economic growth and development pillar of any economy (Taiwo& Adesola, 2013). Foreign exchange market refers to the intercontinental market, where currencies are merchandised virtually around the clock (Ngari, 2011). Foreign exchange is the level of local currency which is required in order to purchase foreign currency such as EUR, GBP or any other currency apart from local currency. It is ascertained that the fluctuations in exchange rates have direct implications in the firm's financial decision making, profitability and to the general economy as a whole (Frankel & Rose 2002). Due to fluctuations foreign exchange rate decisions should be closely monitored due to riskiness and sensitivity involved. Exchange rate has several effects in the economy such as price of imports, export, profitability level and cost of raw material (Bergen, 2010). Also, Kanamori (2016) in his study found out that economic variables of a country have the determining power on foreign exchange rate.

Interest rate theory, international fishers' effect, monetary model of exchange and Purchasing power parity theory are the principal theories that explain the interrelationship between inflation, interest rate, GDP and foreign exchange rate. Interest rate theory proposed that for exchange rate to be at par, variance between interest rate of two countries should be compensated by difference between future and spot interest rate (Morasan & Zubas, 2015). The international Fisher effect model proposed that nations having higher interest rate lose value with raising interest rate when compared with its trading parties to show the expect inflation rate (Ebiringa & Anyaugo, 2014). Purchasing power parity theory proposes that for exchange rate to be at equilibrium, there

purchasing power between the two countries should be equal (Shalisha & Ho, 2012). Frenkel and Bilson (1976) developed exchange rate monetary model which postulate that foreign exchange rate is ascertained by movement of funds or assets into the foreign exchange market. In this theory it explains exchange rate is determined through balance of supply and demand level of countries' currencies.

Kenyan economy has been negatively impacted due to the variations and rapid movement of foreign exchange rate. In 1966, Kenya adapted fixed exchange rate system until the multiparty system and after collapse of the foreign exchange market became an important element where they adapted floating system. The rate of GBP has recorded high variation in the last ten year with highest rate reaching 165.05 in 2011 and 2015 and an average rate 131.00 and lowest rate at 120.90 in 2009 and 2019. On the other hand, interest rate was 18 in 2012, 8.4 in 2014, 10.8 in 2016, 10 in 2018 and 8.5 in 2019. GDP rate has been having upward and down trend in the last ten year. In 2010 it was 8.4 %, 4.60% in 2012, 5.40% in 2014, 5.90% in 2016, and 6.30% in 2019. Inflation rate observed in 2010 was 3.97, 9.64 in 2012, 6.88 in 2014, 6.30 in 2016, 4.70 in 2018 and 5.20 in 2019. From the above data it shows there is fluctuation in economic variable which in term affect foreign exchange rate thus forcing regulatory authorities to intervene in the market. With the intervention from regulatory authority in 2013 exchange rate has been seen fluctuating this brought the motivation on what are the major influencing macro-economic variable that have high power of determination on foreign exchange rate. Another motivation is that most of foreign exchange traders have been incurring losses due to fact that high fluctuation observed during the period under study thus need to determine what happened during the period in term of movement of macroeconomic variables.

1.1.1 Macro Economic Variables

Macroeconomics variable includes inflation, unemployment level, level of saving, GDP, investment level, interest rate which are key indicators in determining economic performance and it affect countries economy in general rather than individual consumer thus should be closely monitored by business, government, and economy consumer (Khalid *et al.*, 2012). These variables plays a paramount role in foreign exchange rate determination as increase in one variable affect other factors which finally affect exchange rate position of the country. Interest rate is compensation or reward borrower pays for money from lending institution or compensation for borrowed asset (Crowley, 2007). Inflation rate is increase in value of manufactured products and services for specific period of one year measured using consumer price index. On the other hand, GDP is the monetary value of full manufactured goods and services over a specified period of time. It gives and overview picture of size and growth rate of countries economy.

Monetary, fiscal and legal policies are economic tools used government to control and standardize price stability of local goods and services in the country's economy (Morosan & Zubas, 2015). It assists government to control demand and supply for money in the economy as failure to control may cause the economy to collapse. That is, the increase in inflation rate means low purchasing powers of consumer and also the borrowers for the fund they lent out (Ceccheti, 2009). Also, government uses these economic variables to sweeten and lure foreign investments into the economy such as high-interest rates policies on the investments impacting on the exchange rate positively. Foreign exchange traders such as commercial bank, importers and forex dealers use economic variables to price forward exchange rate by use of interest rate parity concept to predetermine future rate of exchange between two currencies while taking into account trade

premium and discount (Sharma & Singh, 2011).

Macro-Economic variables plays important role in countries as they are used to mobilize economic resources and ensure appropriate utilization for growth and economic development. Interest rate can be classified as long term or short-term, long-term interest rate indicates economic position of a countries while short term is controlled by monetary authorities such as central bank through interest capping policies (Samuel & Teddy, 2014). GDP on the other hand measures economic performance of a country and growth rate in several industries such as real estate, manufacturing, banking and agribusiness. GDP of a country increase if exported domestic goods and services exceed imported goods and services. The difference between import and export level result in trade deficit or trade surplus. Other economic variable such as inflation measures level of price changes of goods and service that the locals buys over a period of time either quarterly or annually. Its show how the purchasing power of consumer changes in term of goods and services bought over a specified period of time.

1.1.2 Foreign Exchange Rate

Foreign exchange rate is the amount of local currency required to acquire foreign currency such as dollar, pound, euro, riyal, Dirham, Swiss Franc it shows ratio of local currency in relation to the foreign currencies. Foreign exchange rate is categorized into nominal and real exchange rate. There are two main classifications for foreign exchange rate that is nominal exchange rate and fixed exchange rate. Nominal exchange rate takes into consideration inflation whereas fixed exchange rate inflation has not been considered, (Copeland, 1989:4, Lothian, and Taylor, 1997). Some countries adapted flexible exchange rate which most of the time is ascertained by demand

and supply forces rather than affecting foreign currency reserves of the country in exchange rate determination such as New Zealand, Kenya and Canada. Another exchange rate system is fixed where currencies is fixed compared to another currency i.e., it does not change with change in economic variable or by changes in forces of demand and supply e.g., Qatar Dirham, UAE dirham, Oman riyal, krone or Saudi Arabia Riyal.

The significance of foreign exchange rate is that it assists government to achieve market equilibrium between demand and supply by changing or moving exchange rate rather than using foreign reserve level for countries adapting flexible exchange rate. This allows economy to be more flexible in their monetary policy without having direct effect on balance of payment. Ndugu (2001) explained that Flexible exchange rate system has several advantages as it reduces level of central bank intervention and also rapid movement in foreign currency reserves as result of demand and supply forces of foreign exchange market. Fixed exchange rate help keep currency within a narrow band also help exporter and importer to be more certain in their foreign trade while assist government in maintain low inflation.

1.1.3 Macro Economic Variables and Foreign Exchange Rate

Changes in economic variable cause oscillation in foreign exchange rate. Furman and Stiglitz (1999) claimed that high-interest rates result to high bankruptcy cost and also high level of cash outflows to foreign countries experiencing exchange rate instability taking effect due to high demand for foreign currency. On the contrary low-interest rate attract foreign investment resulting to huge foreign cash inflows which stabilize local currency and reduce inflationary pressure of the country due to increased supply of foreign currency which also affect other economic variable

such as GDP which will increase due to trade surplus as a result of increased production of goods and services. High foreign capital inflows imply increase in supply of foreign currency thus affecting the foreign exchange rate value positively and appreciating the local currency there by assist in country to face harsh economic condition. During high inflation consumer spending increases to the level where demand exceed supply level causing low interest rate and finally resulting to high foreign currency inflow thus stability in foreign exchange rate.

The impact of changes in inflation, money supply, interest rate has caused exchange rate volatility and instability (Mahmud, Bashir & Ali, 2015). Increase in interest rate has seen exchange rate taking two positions either depreciating or appreciating position of local currency. High interest rate means high returns from foreign investment thus luring foreign currency inflow from foreigner's investment increasing supply level of foreign currency thus low foreign exchange rate. Also, high interest rate has caused depreciating of local currency since cost of acquiring finance is high thus low production level of exported goods and services which intern reduce supply level of foreign currency thus high exchange rate. The relationship of exchange rate and economic variables have created complicated situation since an increase in interest rate causes an increase in inflation rate which reduce purchasing power of local consumers thus low need for foreign currency therefore low exchange rate (Elbanna & Yunis, 2008). An increase in GBP triggers increase in interest rate which increase cost of borrowing, reduces disposable income which reduce inflationary pressure causing appreciation in exchange rate.

1.1.4 Foreign Exchange Rate in Kenya

Foreign exchange rate has major role in an economy from stock market, agriculture, foreign

exchange market, and importation and exportation sectors. Kenya used the fixed exchange rate system until 1982 where it gradually adapted crawling peg between1983 to 1993 were it finally adapted floating exchange rate system (Musyoki & Pundo, 2012). Kenyan exchange rate has been seen fluctuating over the pound for the past ten year. In 2011 the average rate for GBP KES was 160.07 and till December 2019 where it attained rate of 125.20. For GBP the rate has been having upward and down ward from 2010 having average rate of 134.5960 till date having inconsistent pattern. This fluctuation and volatility of exchange rate have been associated with the inflation, interest rate, Gross Domestic Product and other economic variables of a country.

Kenya has been experiencing stable inflation rate with the exception of some years such as 2012 where the inflation rate was high attaining percentage of 9.38 % which was caused by poor performance in agricultural sector, high oil prices resulting to depreciation of Kenyan shilling (Mbaya,2013).According to CBK 2016 report Kenyan shilling was depreciating at a rate of 14% and 11% comparative to GBP and USD which as a result in changes or movement in economic variables such as National Gross Domestic Product, lending interest rate and general inflation rate in Kenya. In 2016 Kenya shilling value depreciated due to high inflation rate experienced in the country. And it also recorded lowest value compared to pound and other foreign exchange currency.

1.2 Research Problem

Changes in economic variables have triggered and caused foreign exchange rate volatility and fluctuation of a country. Increase in interest rate means devaluation of local currency due to low investment level associated with high cost of acquiring finance. Low investment level means low

production of goods and services in local country thus low inflow of foreign currency due to low export level causing high demand level for foreign exchange rate. Foreign exchange rate and inflation tend to co move in long run meaning increase in foreign exchange rate directly affect inflation through high cost of foreign imported goods into the country. GDP affects international money dealing thus should be closely monitored. It has not shown a direct but strong relationship has been observed. Decrease in GDP means national economy is not performing in term of low production, export level, low level of employment thus these scares away foreign investment into the country leading to high demand of foreign exchange currency finally causing devaluation for local currency.

Kenya has been experiencing fluctuation of foreign exchange rate which has resulted to increase in commodity prices, petroleum price, high cost of living which has made it difficult to manage economic policies. Kenya shilling has been seen fluctuating against GBP. In 2017 January GBP/KES traded at rate of 123.992 while on mid-march 122.995 and on December it traded at a rate of 136.793. This fluctuation came as a result of political stability and other economic condition of the country during the election time. Most of the foreign investors during the period were moving their investment out of the country thus resulting to increase in demand for foreign currency making Kenya shilling depreciate its value in the international economy (CBK, 2018). Kenya has used economic variables as monetary tool to stabilize exchange rate fluctuation such as interest rate capping, increase in importation taxes in order to control fluctuation of exchange rate. These policies have not been having much effect of controlling exchange rate fluctuation experienced from 2010 to 2019.

However, past studies do agree that there is relationship between economic variables and foreign exchange rate. For example, Maana, Kamau and Kisimguh (2015) found out that exchange rate of Kenyan shilling alongside with other east African currency have been experiencing volatility contributed by macroeconomic variable including interest rate, inflation rate, GDP, high and importation bill. This volatility has made it difficult for traders, bank and forex bureaus to predict the movement in foreign exchange rate increasing the probability of incurring loss causing low return at the end of business. Such fluctuation affects economic movement of the country such as investment, exportation and importation.

Ebiringa and Anyaugo (2014) investigated the relationship between inflation, interest rate on foreign exchange rate. The results established that there existed a positive strong correlation between inflation and foreign exchange rate whereas there was negative correlation between foreign exchange rate and interest rate. Shahbaz *et al.,* (2012) established foreign exchange rate variability had a negative effect on several macro- economic parameters for instance on investment in the long run. Musyoki, Pokhariyal and Pundo (2012) studied on real exchange rates equilibrium and misalignment in Kenya where they established that most of the time actual real exchange rate was above its equilibrium market value and country international competitiveness deteriorated over the study period. Their result concluded that higher levels of interest rates results to higher profitability level and higher levels of export and imports leads to higher profitability of commercial banks in Kenya.

Mbaya (2013) examined interest rate effect on foreign exchange rate stability and concluded that there is positive strong correlation (r=0,675, p= 0.001) between the rate of inflation and the

prevailing foreign exchange rate in the country. Kibiy and Nasieku (2016) examined what caused foreign exchange rate instability of Kenyan shillings and from there result they found out that foreign debt had a positive moderate correlation on the prevailing exchange rate in the country. Whilst, the findings from the same study established a negative moderate correlation between exchange rate and money supply. From the studies sampled it clearly shows that most studies focused on inflation or interest rate and the impact on foreign exchange rate. It's also clear show that from previous studies they focused on USD as exchange rate measure which in Kenya has been experiencing upward trend from 2000 to date compared to Pound which has been experiencing upward and down ward fluctuation during the study periods conducted by previous researchers creating a conceptual gap. This study explores the combined effect of economic variables on foreign exchange rate using GBP as foreign exchange rate measure. This will assist answer what is the effect of economic variables on foreign exchange rate?

1.3. Research Objectives

The main objective of this study was to establish the effects of macro-economic variables on the exchange rate. Specifically, the study sought

  i.   To investigate the effect of inflation on foreign exchange rate
  ii.   To ascertain the effect of interest rate on foreign exchange rate
  iii. To examine the effect of GDP on foreign exchange rate
  iv.   To determine the relationship between political stability index and foreign exchange rate
  v.   To establish the relationship between broad money supply on foreign exchange rate

1.4 Value of the Study

The study shall provide an insight to government, foreign exchange market participant and will add value to previous theory developed by early scholar. This study will assist in determining the extent to which the theories are applicable to the current economic problem and situation and will help build knowledge on the inflation rate, the GDP, and interest rate on how they affect exchange rate market in Kenya and rest of the whole world. It can also be used to build on other future researches.

Foreign exchange market player will use the result to know trading technique to adopt given specific economic conditions. The findings of this study will benefit players in the Kenyan financial markets such as commercial bank, Forex bureaus, importer and exporters in monitoring the behavior of foreign exchange rates using the local interest rates. This will help them from incurring unnecessary loses during their business undertaking and they will be able to know the trading technique to adopt given a prevailing economic condition.

Government and regulatory bodies will use the finding of the study in developing policies such as monetary and fiscal policies. It will help the regulatory bodies to know control to be put in place during different economic phases. It will also help law makes come up with law that protect investor from exploitation thus motivating local and foreign investment into the country.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter is divided into five parts as follows theoretical review, determinant of foreign exchange rate, empirical review, literature review summary and conceptual framework.

2.2 Theoretical Review

This part will explore several theories which will be used to guide in the research. Purchasing power parity theory developed by Cassel in 1918, Interest rate theory developed by Keynes in 1923, balance of payment theory developed by Polak in 1971, Monetary approach theory to exchange rate by Bilson in 1979.

2.2.1 Purchasing Power Parity Theorem

Gustav Cassel in the year 1918 is recognized as the proponent for this theory during the gold standard period of exchange rate. It also called inflation theory. Cassel (1918) postulated that without inflation there will be no need to examine over and undervalued foreign currency. In this theory it states that two currencies are at equilibrium state when a receptacle of goods and services taking into account exchange rate is priced similarly in both trading countries. The study tried to compare different nation's currencies by looking at the "basket of goods" method. Foreign exchange rate is the dependent variable and will behave accordingly to the prices of goods and services between two countries. From argument it resulted to formation of the Law of one price. Which states that price of a goods and services of a one country should be same or slightly different in any currency when exchange rate has been taken into account. According to Cassel (1923) the purchasing power-parity theory is an operational theory and has two propositions. Firstly,

proposition state that monetary factors are the paramount long-run exchange rate determinants under a flexible or floating exchange-rate system. Secondly is that tariffs and restrictions to trade, transport expenditures, capital flows, and expectations are random deviations aside. General this theory postulate that the main determinant of foreign exchange rate are monetary factors and the secondary factors such as level of income, saving level wage rate.

Fluctuations in exchange rates affect the rate return of mega corporations and increases exchange rate risk to enterprises and financial institutions. This theory has faced support and criticism in equal measures from several studies previously conducted. A steady exchange rate may assist organizations and financial institutions in accessing investment performance, financing decisions and hedging strategy and thus reducing their operational exposures (Nieh& Wang, 2005; Rahman & Hossain, 2003). This theory was criticized as it assumes existence of direct connection between the foreign exchange rate and the purchasing powers of two currencies which in real scenario, there is no such explicit relationship exist between the currency purchasing power and the rate of exchange. This is because the theory overlooks factors such as Balance of Payment situation, speculation and tariffs. Another objection against the purchasing power parity theory is the measuring element price- indices used for measuring every nation currency rate. Nurkse (1947) criticized Purchasing Power Parity for considering only the price variation as the determining factors of foreign exchange rate. This theory also ignored and overlooked income and expenditure variation and changes that have been influencing the exchange rate. This theory is relevance since it used to compare different currencies through the use of basket of goods approach. However, this theory helps in understanding the reasons for the fluctuations of inflation rate in the country.

2.2.2 Balance of Payment Theory

Polak, Mundell and Johnson (1973) developed balanced of payment theory in university of Chicago around 1971 to 1973. This theory held that a change in a country's national income will cause adjustment to country's current account. Therefore, the adjustment of foreign exchange rate is done to a new position so as to attain a different new balance of payments equilibrium levels. Balance of payments take into consideration all the receipts and payments for the locals with foreign nations. Polak, Mundell and Johnson (1971) claimed the total national income minus national expenditure should be similar to savings and investments as well as the difference between imports and exports. This means that foreign exchange grossly affected by balance of payments position for every country. When the nation is in deficit simply means that demand for foreign currency is greater than the supply of foreign currency. It shows that the foreign exchange rate is affected majorly by the balance of payments position of a country.

A deficit balance of payments position of a country means a situation in which the demand for foreign exchange currency is more than the supply level of foreign currency of it at a given rate of exchange meaning that more foreign currency will be in demand which will finally force the value of local currency to depreciate due shifting in equilibrium position (Kanamori& Zhao, 2006). Increase in demand for foreign currency is mostly caused by foreign goods and services increased demand such as high level of importation compared to export level, shifting of foreign investment away of the country. Contrary, surplus position arise when supply of foreign currency exceed demand for foreign currency. The increased supply of foreign exchange arises as a result exportation of local goods and services to foreign country in exchange of foreign currency and also when the level of foreign export is more than level of importation. Surplus position is also

caused by high inward remittance by Diaspora working if foreign countries. Thus result to increase in money supply of foreign currency in economy resulting to depreciation of foreign currency value and appreciation of local currency. This theory was relevant in this study since it helps explain the variation in currency exchange rate.

2.2.3 Interest Rate Theory

Keynes (1923) developed interest rate theory which shows that the returns of an asset play a paramount role in foreign exchange rate variation and fluctuation. It stated that at equilibrium for the two nations should be the same as the differences in spot and forward exchange rate. Spot rate in a contract thus very useful in making investment decision. In other word at equilibrium point, interest rate differential between local and foreign currency and forward price of currency are equal. The theory of interest theory is covered in two section uncovered interest rate theory and covered interest theory. In a free capital flow condition, covered interest rate theory claims that the interest rate differential of a domestic asset and a substitute foreign asset are equal to forward premium of a foreign currency.

Uncovered interest rate theory claims that interest rate differential between two trading countries equal to relative change in foreign exchange rate over a given period of time. This theory assumes that country charging high interest rate will experience local currency depreciation relative to foreign currency. This theory will assist in accessing the relationship between the interest rate and exchange rate. It also assists government and regulatory bodies in determining the optimum interest rate of country and also avoids foreign exchange rate fluctuations. Interest rate theory was useful in this study since it helped in understanding the seasonal variation in changes in the

prevailing interests rates and why Monetary Policy Committee keep changing interest rates in the country.

2.2.4 The Monetary Approach to Exchange Rate theory

This theory was developed by Bilson in 1979.The theory claimed that the exchange rate is ascertained through having a balance between demand and supply for national currency. This can be created by creating favorable environment to support investment like increasing interest rates, stable and consistent economic growth and political stability. Bilson argues that to induce the demand for money is a matter of checking at income level, price levels of goods and services as well as the interest rate factor. This theory however makes several assumptions including the fact that foreign exchange market is at equilibrium. It is the role of central bank to use it monetary instruments to increase the supply of money which intern increases rise in price levels.

Expansion of money supply and reduction of interest rate affect financial market and exchange rate in domestic economy. Interest rate reduction will result to an increase in foreign investment this will likely result in depreciation of domestic currency as deficit foreign currency position will be attained also local production of goods and services decreases due to low return on the finance and financial institutions. This theory has been having shortcoming such as generally failed to explain the changes in the exchange rates of major currencies such as dollar, pound and euro during the currency floatation period since 1973. Also, it has given little importance to trade over money supply in determination of foreign exchange rate. Another shortfall for this theory is that foreign investment and domestic investments are perfect substitute.

2.3 Determinants of Foreign Exchange Rate

This section covers the determining factors of foreign exchange rate such as such as macro-economic variables, Broad money supply and demand level, and political stability.

2.3.1 Macro Economic Variables

The economic variables in the study include inflation rate, Gross Domestic product and inflation rate. Interest rate differentiation will result to fluctuations in foreign exchange rate. Increase in interest rate in local country relative to other foreign country will see inflow of foreign investment which in turn increase supply of foreign currency in the local economy and lowering demand level as a result Kenya Shilling will appreciate and foreign currency will depreciate due to change in equilibrium position of the country. A decrease in interest rate will result in more outgoing foreign investment which will force demand for foreign currency to increase and thus depreciation in local currency and appreciation in foreign currency.

The other economic variable includes inflation. It occurs when Kenya shillings are excess in the economy compared to its demand. This means that price of Kenyan goods will rise compared to foreign goods and services for example pound. This will cause local consumer to shift their preference for foreign goods resulting to foreign currency demand increase. Thus, higher inflation rate in Kenya compared to foreign country will also increase foreign export to Kenya and will cause reduction in Kenyan export to foreign country. This wills finally lead to shifting of new equilibrium foreign exchange rate. Generally, a country with high inflation rate will experience depreciation of its local currency compared to country will low inflation rate.

An increase in countries Gross Domestic Product means that there is economy growth implying that higher wage rate and increased demand in the economy. If Kenya Gross Domestic Product increases, inflation rate will also increase as a result high demand in the economy meaning that foreigners will not be buying local products which will be expensive to buy. Demand for export will decrease and domestic consumer will be looking to buy foreign goods. Increase in importation will depreciate local currency and make exporting country experience appreciation in value of its currency.

2.3.2 Money Supply and Demand Level

The level of supply of money in the economy is known as supply level. When supply of foreign currency exceed demand caused by foreign investment, international trade and also international tourism this makes the domestic currency appreciates in value. The excess supply over demand will force shifting of equilibrium position to higher position indicating increase in value for the domestic currency relative to foreign currency. Demand and supply levels are crucial factors in determining foreign exchange rate as they give the position the exchange rate and also assist trader in determining when and how to trade using data of demand and supply level. A country gets supply of foreign currency through foreign investment, Diaspora remittance, government loans and grants.

Vlador and Yanchev (2015) claimed that in the long run inflation development affects money growth as supported by theory of money. In other word when the supply of domestic currency increases or in surplus this will cause the local currency to depreciate in value over the foreign currency. The level of demand and supply are closely monitored by the central bank as it helps

reduce inflation level due to oversupply of money in the economy. This can be done through increase in bank deposit with central bank in case of excess money supply in the economy.

2.3.3 Political Stability

Political risk is caused by political instability faced by a country which affect foreign exchange rate of a country negatively. It higher power in determination of levels of exchange rate, economic growth, level of investment. During high political risk time exchange rate keeps on fluctuating showing existence of determination of the exchange rate. Recently in Kenya during election period and post-election violence exchange rate were observed going up making the domestic currency depreciate in its value thus making cost of living high as Kenyan mostly import raw material for production after foreign investors shifted away their investment. Also during political instability period most foreign investor shift their investment to other area fearing loss of their capital investment thus making high outflows of foreign currency causing the demand to increase resulting depreciation of domestic currency.

2.4 Empirical Review

Liu and Fung (2009) explored the impact of the foreign exchange rate movement on manufacturing firms in different industries from 1992 to 2000 in Taiwan. The authors Liu and Fung established that these organizations encountered the largest depreciation of their currency during the Asian crisis period. They also found out that industries with the largest consequences were electronics, machinery and communication although they encountered the smallest real depreciation. Muller and Verschoor (2009) showed that trade and service companies were sensitive to an exchange rate crisis. Cozzi and Toporowski (2006) stated in that Malaysia tradable industries were in a good

position than non-tradable industries during the economic crisis. This has shown that foreign exchange risk level depends on the industry the organization operates

Arize, Osang and Slottie (2000) used an error correction model and Johansen's multivariate model for short run and long run dynamics respectively to investigate and analyze real foreign exchange rate volatility on the exports of developed countries. Their study period covered was between 1973 to 1996 using quarterly data series. Their study result showed a significant negative correlation of volatility on trade flows. Calderon (2004) sampled 7 countries between 174 to 2003 to investigates the issue of trade openness and conclude that volatility of real exchange rates has less impact, if a country adopts more open trade policies. Sing (2008) examined US trade and found out that existence of J-curve for Chile, Uruguay and Ecuador and found lack of support for Colombia, Argentina, Mexico, Peru and Brazil. The result suggested that depreciation alone in order to rectify imbalances in trade in not applicable to all nations. The study used seven South American trading countries for a period of 20 or 30 years.

Elhendawy (2017) examines the volatility transmission in Egypt between the price of the foreign exchange market and stock markets. GARCH model was employed in the study and the period covered was between January 2003 to June 2016. The results presented a significant (sig. <0.005) negative correlation between exchange rate and stock market prices. Study also found out that one percent increase in stock market will cause fall of exchange rate by 0.03percent. This result shows consistency of portfolio balance approach. He observed that fluctuation in one month impact exchange rate in four month and the impact is felt until twelve months.

Shingil and Panshak (2017) investigated the direct relationship in effective exchange rate and GDP for Turkey using time series data for time span of 1970 to 2015. The study Granger non-causality and auto regression distributed lag model (ARDL) tests to achieve the research objective. Study result shows that in the short run economic growth is negatively affected by real exchange rate. On the other hand; in long run it exerts significant positive correlation on economic growth. They also found a uni-directional causality running from GDP growth rate to real exchange rate. They concluded that Turkish economy depends on import and it is important to maintain strong exchange rate which in the long run positively impact economic growth.

Immaculate and Kwadzo (2016) did a study in Uganda testing on the exchange rate and how it has affected trade balance between the years 1990 to 2015 by the use of regression model as well as granger causality test. The findings revealed that there was a negative impact of exchange rate volatility and trade balance in Uganda. Moreover, the author also discovered that the relationship between trade balance and exchange rate was moderate positive correlation. Recommendation of the study was Uganda government to stimulate exchange rate stability by foreign private investments.

Musyok, Pohariyal and Pundo (2012) investigated real exchange rate readjustment in Kenya. Their study period was from June 1993 to December 2009. They used error correction technique and Johansen Co integration based on Vector Autoregressive (VAR) and single-equation to test their sampled data. Commercial bank was used as population and used secondary data from CBK in their analysis and from their analysis they found out that actual exchange rate was above

equilibrium value and also they found out that Kenyan shilling was deteriorating during the study period which was caused by increased in level of importation than exportation level.

Oude (2013) studied the impact of foreign exchange rate fluctuation on gross domestic product in Kenya covering a period from 2008 to 2012. His target population used secondary data on annual average figure for inflation, GDP, export level, and import level and government expenditure in his period of study. He tested using regression analysis and ANOVA analysis using GDP being independent variable while real exchange rate, inflation, exports and import being dependent variables. Results showed that an increase in a unit of export will lead to a 30.7 percent decrease in Gross Domestic Product and an increase in one unit of government expenditure will lead to increase of GDP by 1.848. Oudu(2013) concluded that there is a negative correlation between Gross domestic Product and foreign exchange rate fluctuation.

2.5 Summary of Literature review and Research Gaps

From the literature review conducted studies have come up with different view on foreign exchange rate and economic variables relationship and movement. Oudu (2013) found a negative relationship between GDP and foreign exchange rate. Increase in GBP causes increase in exchange rate. Immaculate and Kwadzo (2016) found out that trade balance had positive correlation with exchange rate volatility and suggested foreign exchange rate stability should be triggered by attracting more foreign investment which will increase supply of foreign currency. Shingil and Panshak (2017) found a uni-directional causality running from Gross Domestic Product growth rate to real exchange rate. They concluded that economy depends on imports level and it is important to maintain strong exchange rate which would impact economic growth positively. Also found that in the short run real exchange rate negatively affects economic growth.

A number of studies have been reviewed. From the previous research conducted some have found existence of negative correlation between exchange rate and economic variable. These variables should be used by policy makers in controlling economic condition of a country (Shahbaz, 2012) and on the other hand Ebiringa and Anyaugo (2014) found existence of long run positive relationship between inflation and foreign exchange rate while interest rate showed negative correlation between interest rate and foreign exchange rate which was insignificant to explaining exchange rate movement. This argument calls for more research to assist in determining correlation and behavior between foreign exchange rate and economic variables in Kenya.

From the studies reviewed it clearly show that many studies have focused on interest rate or inflation without taking into account other economic variables such as GDP, money supply, demand for money. In this study it will use GDP as independent variable and as it has been seen to have much effect in the previous studies. The research gap identified is that studies have concentrated on USD dollar which has been seen as increasing over the years this call for use of GBP as it has been experiencing high level of fluctuation rather than USD. The study also seeks to fill the research gap using the entire major economic variable such as interest rate, inflation and GDP at the same time which was not used in many studies as a whole.

2.6 Conceptual Framework

This is a pictorial diagram which shows the relationship between economic variables under study. It will also help increase understanding of the variable and how they interconnect with each other. In the study it will comprise three variables dependent, independent and control variables. The independent variable in the study is economic variables which consist of inflation rate, interest

rate, Gross domestic product while dependent variable will be foreign exchange rate. The figure

2.1 below illustrates the conceptual framework for the study.

Independent variables Dependent variable

```
┌─────────────────────────────┐
│  Inflation rate             │
│                             │              ┌──────────────────────────────┐
│  Interest rate              │              │                              │
│                             │─────────────▶│   Foreign Exchange Rate      │
│  Gross Domestic Product     │              │                              │
│                             │              └──────────────────────────────┘
└─────────────────────────────┘

Control Variables

┌─────────────────────────────┐
│  Political stability        │
│                             │
│  Broad money                │
│                             │
└─────────────────────────────┘
```
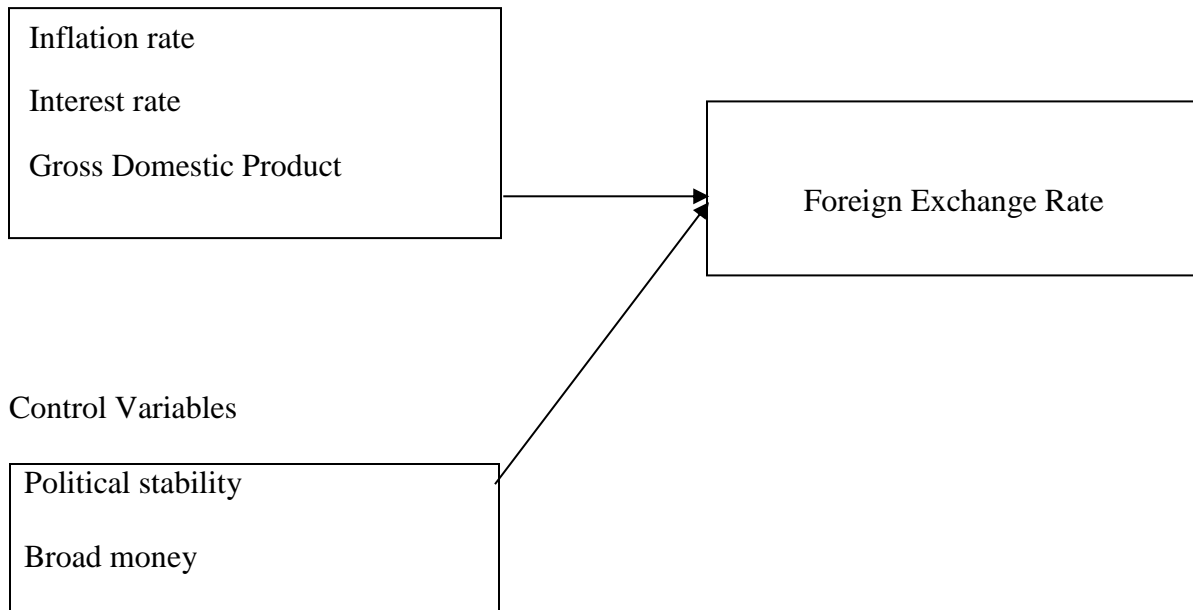
Figure 2.1: Conceptual framework

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section expounds on the research design used, target population, samples to be used, instruments and data analysis techniques used to meet the research objective of this study. It also comprised analytical model and statistical significance tests used to test the model employed.

3.2 Research Design

Orotho (2003) defines research design as the blueprint of the study and help researcher conducts his study to achieve his objective. It provides guidance on how to conduct the project and help give answers to research questions. To analyze the effect of economic variable on foreign exchange rate descriptive longitudinal research design was employed. Descriptive longitudinal research design is most applicable due to explaining nature of the dependent and independent variable and also it helps understand the phenomenon under study therefore it gives overview of a particular time (Troachim, 2008).

3.3 Data Collection

This research covered January 2010 to December 2019. Secondary data was used such as quarterly weighted interest rate, inflation rate, quarterly GDP rates was used from KNBS and CBK of Kenya archives. Inflation was measured using inflation rate, interest rate was measured using quarterly lending rates, quarterly GDP rate were obtained from KNBS while political stability was measured using stability index from KNBS. Exchange rate was acquired from CBK for the period under study using exchange rate of GBP against Kenya shillings.

3.4 Data Analysis

Both descriptive and inferential analysis was used in this analysis to describe the variables and tests any significant association between the variables. In this study, foreign exchange rate was used as dependent variable while interest rate, inflation and GDP, political stability index, broad money supply were used as independent variable to test the causality and correlation. This was presented in an analytical model mentioned below.

EX = B0 +B1R+B2GDP+ B3PS+ B4MD+ B5inflationR + e

Where:

EX   is the quarterly average value of Kenyan shilling to GBP

IR f   is the quarterly average lending rate

GDP   is the quarterly average gross domestic product rate

PS   is quarterly political stability index

Inflation is quarterly inflation rate

MD   is quarterly demand level for money

B1-B   is coefficient of regression

3.5 Operationalization of the Study Variables

This study comprised of two types of variable independent variables, dependent variables. Independent variable consists of inflation rate, interest rate and GDP while control variable consist of change in demand for foreign currency and political stability index and exchange rate to be dependent variable as per table below.

Table 3.1 Operation of Variables

Variables	Measures	Empirical reference
Foreign exchange rate	Quarterly Value of KES To GBP	Kiruga (2015) ,Akwabi (2015)
Gross domestic product	Quarterly GDP Rate	Oudu (2013), Shingil and Panshak (2017).

Interest rate	Quarterly Interest Rate	Kiruga (2015)
Inflation rate	Quarterly Inflation Rate	Akwabi (2015) ,Kiruga (2015)
Broad money supply	Quarterly Broad Money Supply Level Of GBP	Muchiri (2015)
Political stability	Quarterly Political Stability Index	Gregory Clare and Ira N. Gang (2010)

3.6 Test of significance

To ensure that test of significance performed and conducted coefficient of determination was used. This enabled to know how change in variables caused general change in exchange rate. The study used t-tests, Anova and F statistics to tests for significance.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

The study presents analysis and discussion and findings on the effects of macro-economic variables on the exchange rate on the economy in Kenya from the year 2010 to 2019. The chapter specifically analyzed descriptive statistics, various trend analysis over the period, partial correlation, and multiple regression analysis.

4.2 Descriptive Statistics

Descriptive analysis was run to understand the general characteristics of the key variables in the study that is exchange rate, interest rate, GDP growth rate, Inflation rate, Political stability index and broad money supply.

Table 4.1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Exchange rate	40	118.63	157.50	136.6467	8.21466	.289	.374	-.011	.733
interest rate	40	12.40	20.13	15.3855	2.08529	.409	.374	-.730	.733
GDP	40	3.34	8.13	5.0093	1.10466	1.419	.374	2.458	.733
INFLATION	40	4.40	16.00	7.1308	2.60392	2.015	.374	3.895	.733
Political stability index	40	-.35	-.27	-.3102	.02166	.034	.374	-1.268	.733
broad money supply	40	969197.0	2892345.0	1953103.625	613887.9171	-.081	.374	-1.364	.733
Valid N	40								

Source: CBK Data (2021)

Minimum quarterly exchange rate KES to GBP was 118.63 and maximum was 157.5 with mean exchange rate over the 10 years period of 136.6 and standard deviation of 8.214. Interest rates, minimum interest rate over the period was 12.4 and maximum was 20.13, mean 15.385 and

standard deviation of 2.085. Inflation rate was low as 4.4 and highest inflation rate 16.0. Mean of

inflation was 7.13 and standard deviation of 2.60. The minimum GDP growth rate was 3.34 and

maximum was 8.13. The mean of GDP growth rate is 5.0093 and standard deviation of 1.104. The

minimum political stability index -0.34 and maximum of -0.27 and mean -0.3050 and standard

deviation of 0.021. Broad money supply minimum 969,197.0 and maximum of 2,876,979. The

mean for broad money supply was 1,945,918.5 and standard deviation of 628,525.06.

4.3 Trend Analysis on macro-economic variables

This sub section presents the trend analysis on each and every variable in the study. It includes

foreign exchange rate, Country inflation rate, GDP growth rate, political stability, interest rate and

Money supply.

4.3.1 Trend Analysis for GDP growth rate from 2010 to 2019
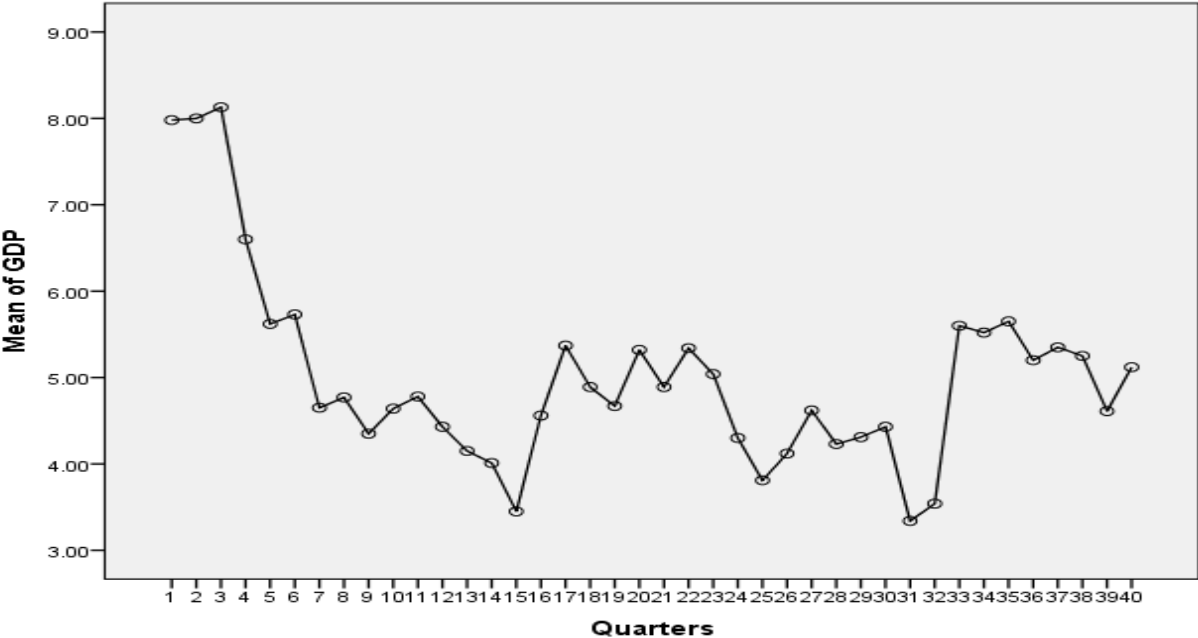
Figure 4.1: Trend Analysis for GDP growth Rate from 2010 to 2019

The figure shows trend analysis from the year 2010 to 2014 consistent decline in GDP growth rate.

There was slight recovery from 2015 but it remained inconsistent dropping low again in 2018 and

recovery in 2019. The inconsistency in growth rate in GDP was mainly due to poor economic performance attributed to seasonal variation production of goods and services within the country.

4.3.2 Trend Analysis of Inflation Rate

Trend analysis of inflation rate was analyzed from 2010 to 2019. The findings presented in figure 4.2. The results showed that inflation rate in 2010 started declining from 6.9 to drop of 4.4 at the end of 2010. Ten there was slight increase from December 2010 to June 2011 then steady increase and the highest inflation was at the peak in January 2012 when it moved to 16% and steadily declined thereafter with the control of other macroeconomic parameters in the economy.
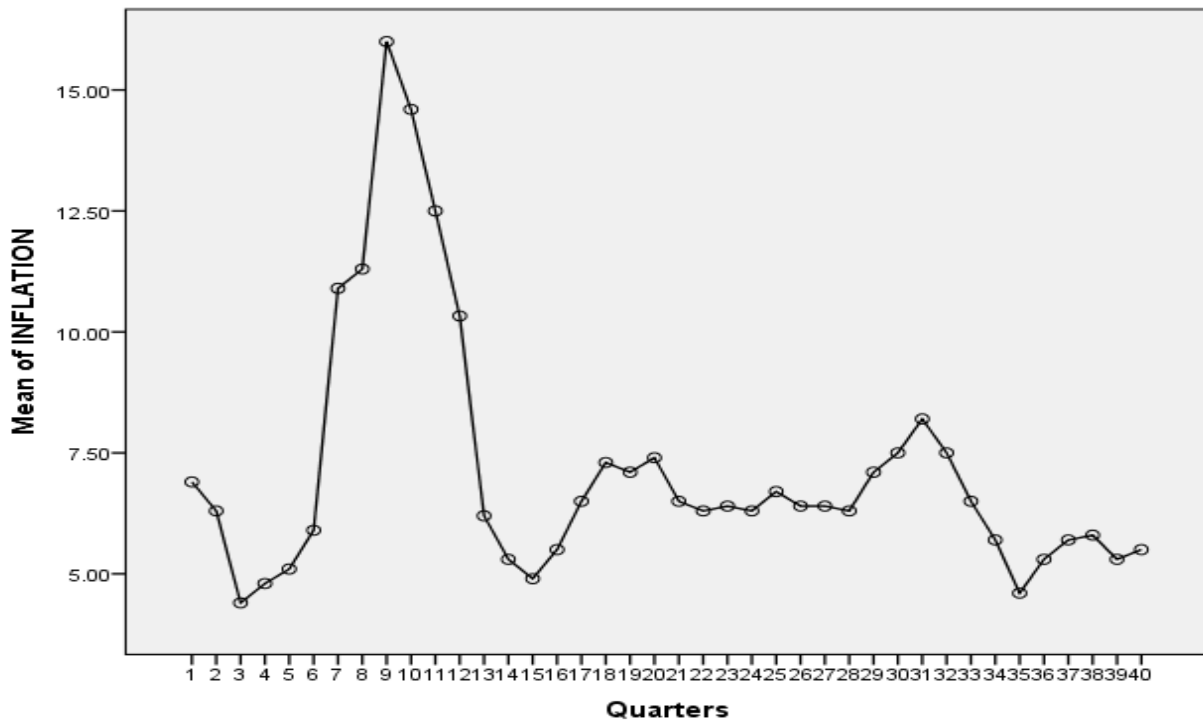
Figure 4.2: Trend Analysis for quarterly inflation rate from 2010 to 2019.

30

4.3.3 Trend Analysis of interest Rates over 2010 to 2019

Figure show interest rates had slight decline from 2010 and began increasing in June 2011. This increase in interest rate was due to monetary and fiscal measures of central bank. Between 2011 and 2013, the interest rate reached its peak. Then due to tightening of monetary policy of the central bank through MPC the interests' rate consistently declined to 2019 with swings here and there but on the downward trend.
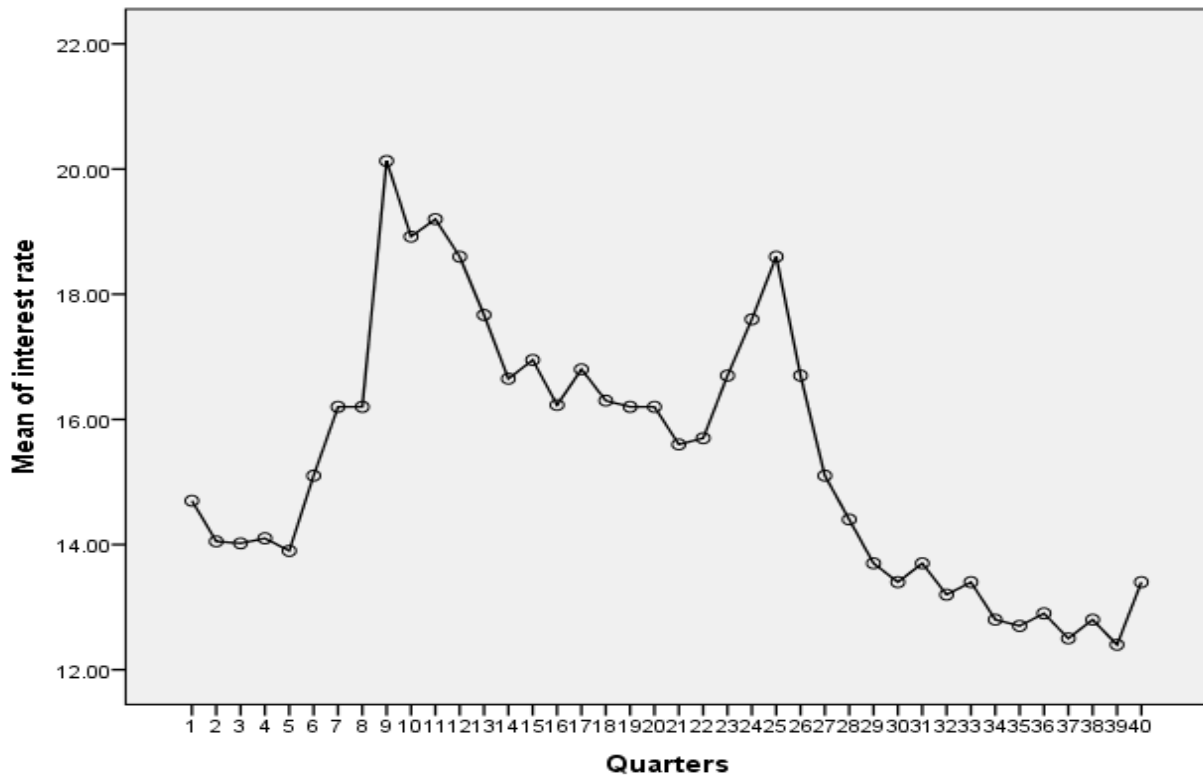
Figure 4:3 Trend Analysis of Interest Rates over 2010 to 2019

Interest rates from 2010 was at low as 14.9% and declined slightly to 14% by the close of mid 2011 in the month of June. The steadily increased to above 20 percent in 2013. The rise could have been associated with central bank regulation to spur economic growth through more investment in the economy. There was decline to 2016 as low as 15% which was a great boost to borrowers and

consistently the rate went low to 2019. Low interest rates signify larger purchasers and increased

leading or improved liquidity in the nation.

4.3.4 Trend Analysis of Political Stability Index from 2010 to 2019

The study analyzed the trend quarterly analysis for the last 10 years on political stability index
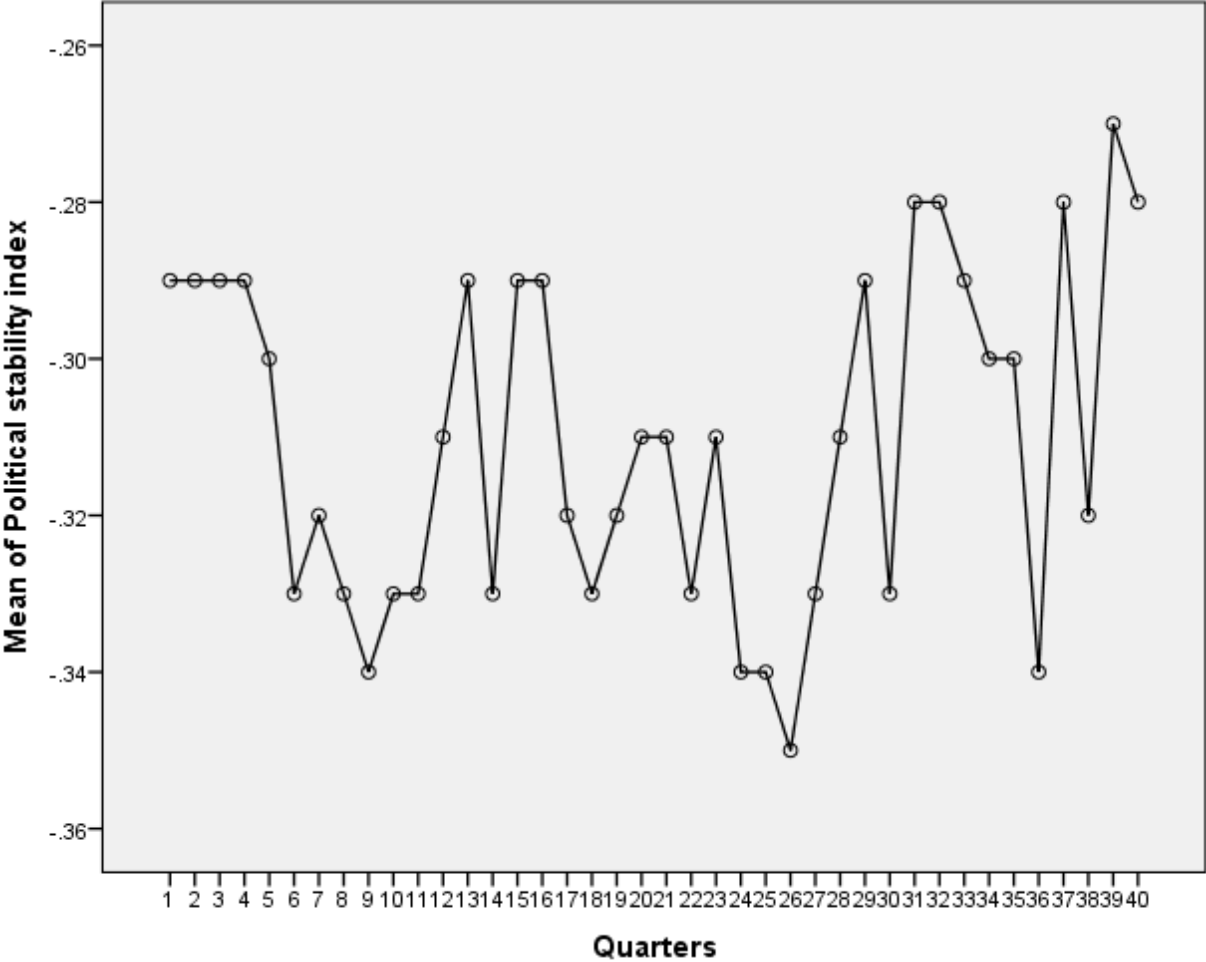
Figure 4.4 Trend Analysis for Political Stability Index

The analysis of the trend of political stability index is important since it affects exchange rate.

Stable political environmental associated with improved valuation of a currency alternatively

unstable political environment associated with devalued currency as few people willing to invest

in such economy. In 2010 Kenya had constant stability index of -0.29 and deteriorated during election period in 2012 reaching -0.34 and then improved again 2013 first quarter recording a stability index of -0.29. Same has been fluctuating and the worst was observed in 2017 where it recorded a poor stability index of -0.35.

4.3.4 Trend Analysis of Broad Money Supply from 2010 to 2019
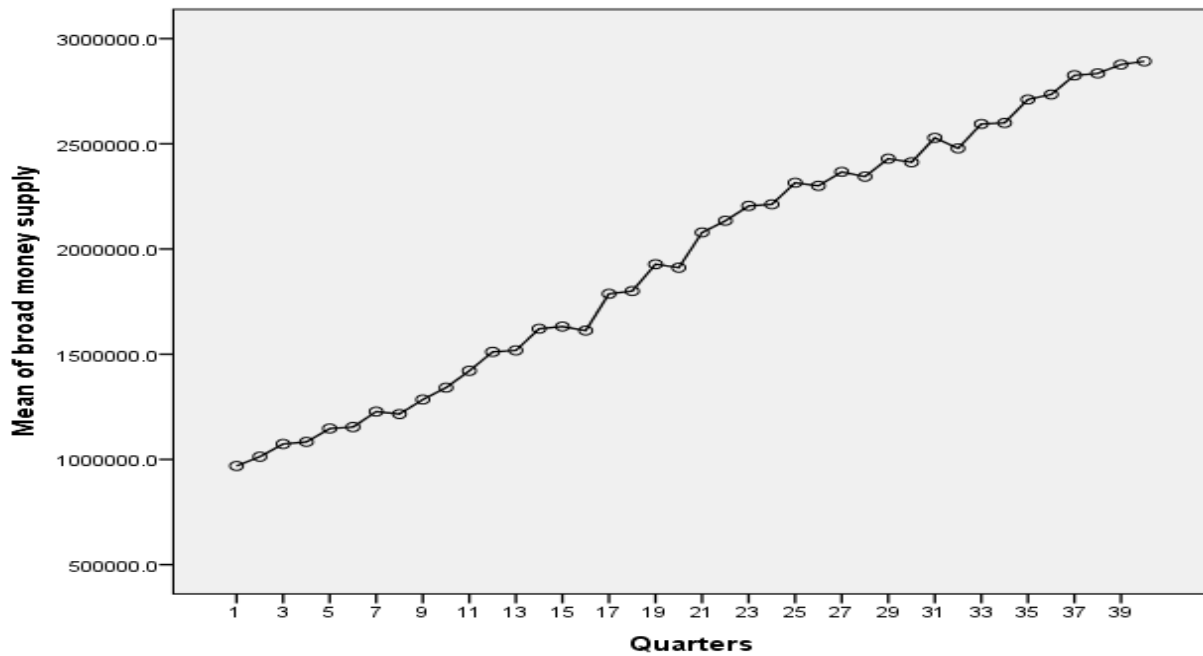
Figure 4.5: Trend analysis on Mean Money Supply

Figure 4.5 shows an upward trend persistent increase from 2010 to 2019.This can be explained by increased number of Kenyan remitting funds to Kenya leading to increase in mean of money supply. The other reason explained by the consistent increase is due to fact that export level keeps increasing in Kenya every year thus increase in broad money supply. The major explaining money supply is in Kenya is due to tourism level and Horticulture and Floriculture. From 2010 to 2018 Tourism has been leading in supply of foreign exchange rate followed by Diaspora remittance and finally Horticulture and Floriculture

4.3.5 Trend Analysis in Exchange Rate from 2010 to 2019

Analysis of trend was performed for exchange rate from the year 2010 to 2019. The results showed in figure.
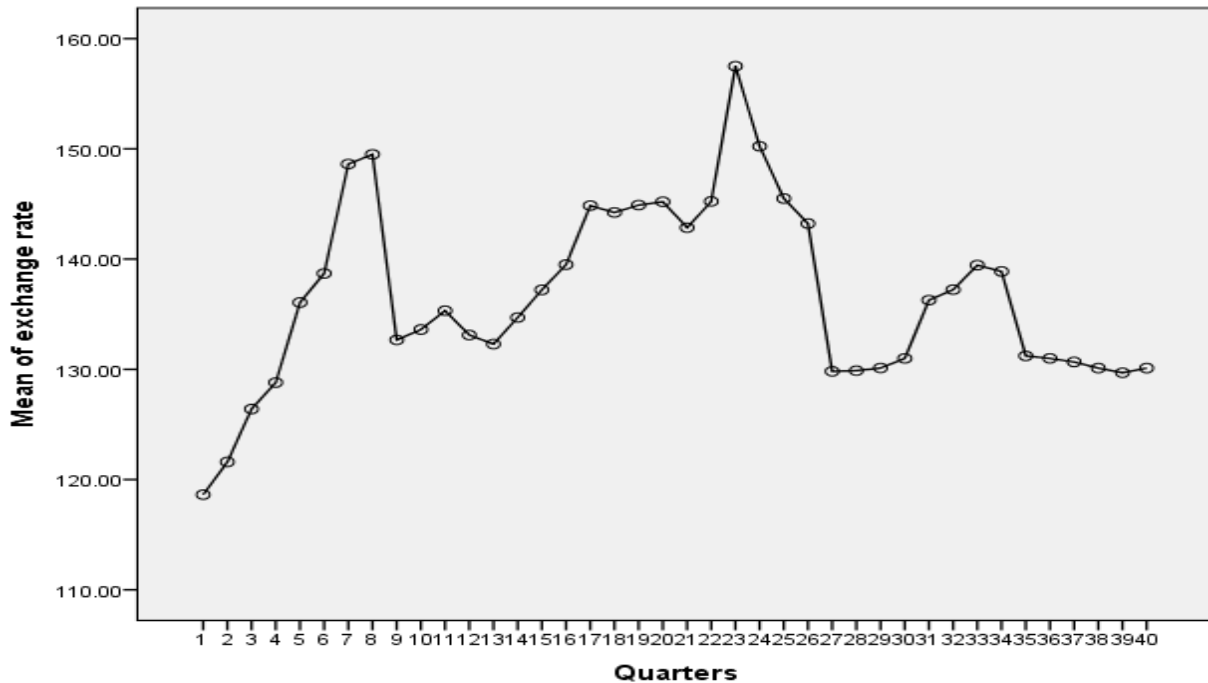
Figure 4.6 Trend Analysis in Exchange Rate from 2010 to 2019

Mean of GBP during the period 2010 to 2011 recording an exchange rate of Kes 150 per GBP then a sharp drop was noted in 2012 and gradually keeps on increasing until 2015 where GBP rate recorded highest exchange rate of Kes 158 per GBP. For the next four quarters until 2017 GBP had a sharp drop and stabilized in 2016 and 2017.

4.4 Diagnostic Tests

Diagnostic tests were performed on the dataset on aspects like tests on unit root and multicollinearity. Time series data ordinarily assumes that the variables are stationary. Time series data said to be stationary when mean, auto-covariance and variance are all independent of time.

According to Gujarati and Porter (2009) non- stationary or non- random behavior of a time series data undermine the model since the result is expected to be inconsistent and spurious.

4.4.1 Test for Multicollinearity

Multicollinearity tests was performed in order to identify if there is a strong correlation among independent variables in the study. In this case, the researcher used Tolerance and Variance Inflation Factor (VIF). Multicollinearity is a serious problem in a time series model, it can prevent running unique least square solutions (Williams, Grajales & Kurkiewicz, 2013). Field (2009) however noted that the problem of multicollinearity is that it inflates the standard errors and result also to inflated confidence intervals and therefore results to unstable estimates of the coefficients for each predictor in the model therefore the results cannot be relied on.

Table 4.2: Multicollinearity

Model	Tolerance	Variance Inflation Factor (VIF)
Interest Rate	0.194	1.143
GDP Growth Rate	0.438	2.285
Inflation Rate	0.562	1.781
Political Stability Index	0.430	2.325
Money Supply	0.360	1.775
Sum of VIF		**9.309**

Source: Data CBK (2021)

The findings established that Interest Rate had a tolerance of 0.194 and VIF of 1.143. GDP growth Rate had a tolerance of 0.438 and VIF of 2.285, Inflation Rate had a tolerance of 0.562 and VIF of 1.781, Political Stability Index had tolerance of 0.43 and VIF of 2.325 and Money Supply had tolerance of 0.36 and VIF of 1.775. According to Field (2009) VIF greater than 10 signify presence of multicollinearity. Therefore, in this case the VIF sum was 9.309 below 10.0 and therefore absence of multicollinearity.

4.4.2 Normality Tests for exchange Rate
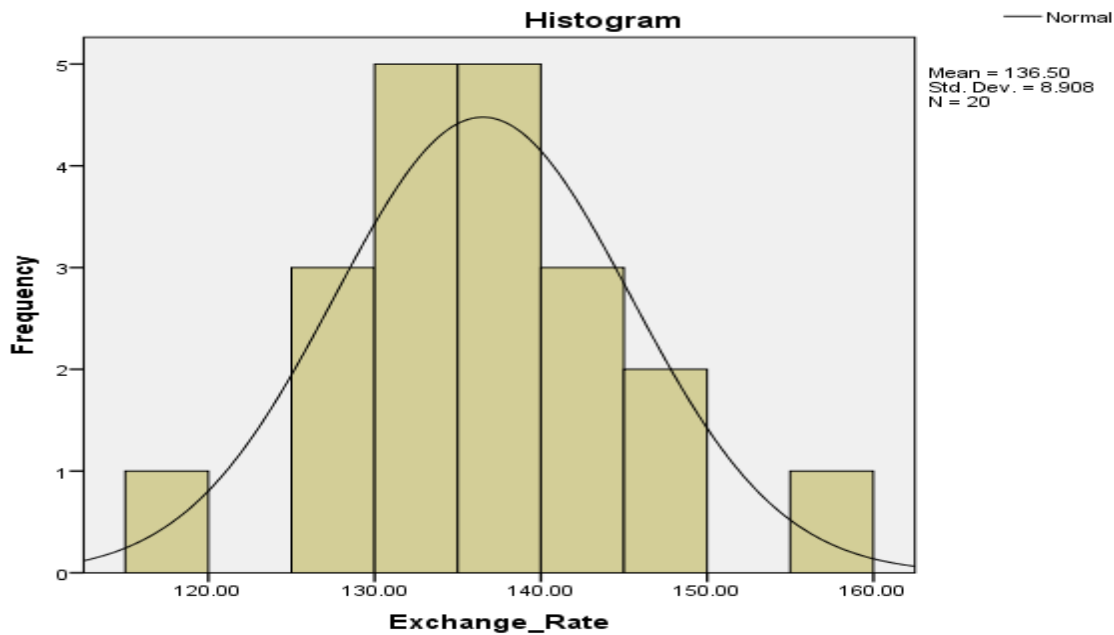
Figure 4.7: Histogram showing normal distribution

The normality test was done using histogram and the results established that there was present of normal distribution.

4.4.3 Heteroskedasticity Test using White's test

Heteroskedasticity test was performed since it's a major concern in regression analysis and Analysis of Variance (ANOVA) since it invalidates significance tests that has assumed same variance on modelling errors.

Null hypothesis Ho: homoscedasticity exists

Alternative hypothesis Ha: heteroskedasticity exist

chi2(39) = 73.00 Prob> chi2 = 0.412 The results show the resulting output, which suggests that the study does not reject the homoscedasticity hypothesis. There is no heteroskedasticity in the model.

4.4.4 Tests of Autocorrelation

The residuals from regression should not be auto correlated and thus the study tested for autocorrelation using Durbin-Watson if autocorrelation is found then it can be corrected by adding lags to the variables

Table 4.3: Tests of Auto Correlation

Model	Durbin-Watson
1	1.639

The results of auto correlation was established Durbin- Watson of 1.639 signifying absence of auto-correlation since it within the range of 1.5 to 2.5. (Stockemer, 2019). If the result is beyond 2.5 that is negative auto correlation and below 1.5 is positive auto-correlation.

4.4.5 Tests of stationary
Table 4.4: Testing for Stationary using Augmented Dickey-Fuller Statistic

Variables	Level Dicker-Fuller statistic	P-value	1st Difference Dicker-Fuller statistic	P-value	Order
Exchange rate	– 2.1794	0.5040	– 4.0259	0.0223	2
Interest rate	– 3.6250	0.0482	– 2.6331	0.3312	2
GDP	– 3.3100	0.0902	– 2.4057	0.0417	2
Inflation	– 3.1885	0.1196	– 2.5290	0.0370	2
Political stability index	– 2.0893	0.0538	– 2.8966	0.0230	2
Broad money supply	– 1.6734	0.0668	– 1.7130	0.0168	2

Source: Author's computation (2021)

Time series property for each variable was examined by the use of Augmented Dickey-Fuller test for the unit root. Once the variables are considered stationary it means therefore that the results generated would not be spurious.

Statistically our null hypothesis dataset is not stationary. Therefore, we reject null hypothesis if $p < 0.05$. However, in the above example the dataset was found to be stationary since p value was

above 0.05. The results show that data sets appear to be stationary throughout, meaning that they hover around a mean without trending in one direction or showing an integrated pattern. However, the sets of data for this research under this scenario are completely stable for the analyses, indicating that the assumption of stationary has not in any way been violated.

4.5 Regression Analysis

The result in table 4.5 established that exchange rate has a linear dependence on all the predictor variables, inflation rate, political stability index, GDP growth rate, interest rate, and money supply. R represents correlation coefficient which measures the strength of all predictors on exchange rate R is 0.61meaning the predictors have a strong predicting power on foreign exchange rate. Therefore, adjusted represents the coefficient of determination which explains the proportion of variance in exchange rate which can be accounted for by including all the independent variables in the model after correcting for the error in the model. Adjusted R Square was 0.147, meaning that 14.7% variance in exchange rate could be accounted for in the model by exchange rate.

Table 4.5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.610[a]	.372	.147	8.22496

a. Predictors: (Constant), Broad Money, Political Index, GDP_grATE, iNFLATION_RATE, Interest Rate

Table 4.6: ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	560.550	5	112.110	1.657	.0010[b]
	Residual	947.100	14	67.650		
	Total	1507.650	19			

a. Dependent Variable: Exchange Rate

b. Predictors: (Constant), Broad Money, Political Index, GDP_grATE, iNFLATION_RATE, Interest Rate.

Analysis of Variance (ANOVA) was used to tests the significance of the model fitness. The results presented in table 4.6 indicates that independent variables significantly predict exchange rate (5, 14) = 1.657, p=0.001 therefore the researcher concluded that the model was fit to be used in determining effect of macro-economic variables on foreign exchange rate.

Table 4.7 Coefficient of Regression

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	87.019	39.860		2.183	.047
	Interest Rate	.618	0.912	.155	.323	.001
	GDP growth R	.439	.314	-.338	1.054	.000
	Inflation_RATE	-.457	-.483	-.274	-.971	003
	Political stability_Index	.571	.423	-433	1.341	.001
	Broad_Money	.452	.000	.082	.233	.119

EX = B0 +B1R+B2GDP+ B3PS+ B4MD+ B5inflationR + e

EX = 87.019 + 0.618IR + 0.439GDP+ 0.571PS-0.457IR+0.452MD

Where:

EX   is the quarterly average value of Kenyan shilling to GBP

IR f   is the quarterly average lending rate

GDP   is the quarterly average gross domestic product rate

PS   is quarterly political stability index

Inflation is quarterly inflation rate

MD   is quarterly demand level for money

B1-B   is coefficient of regression

From the table 4.7 the study discovered a negative significant (P<0.05) relationship between foreign exchange rate and inflation. One unit increase in inflation lead to significant decrease of 45.7 percent in exchange rate. Which means low inflation rate stronger currencies and higher inflation weak currencies. There was a positive significant (P<0.05) relationship between interest rate and exchange rate. One unit increase in interest rate leads to a significant change of 61.8% in the foreign exchange rate. The result also established a positive increase in the relationship between interest rate and exchange rate. Increasing the interest rate attracted more foreign investment and therefore resulting to stronger exchange rate. The study also found a positive significant (0.000) relationship between GDP growth rate and Exchange rate. As the GDP grew there was corresponding observed increase in the exchange rate. One unit increase in GDP growth rate resulted in 43.9% increase in the exchange rate growth. The study also found a positive significant (P<0.05) relationship between political stability index and exchange rate. Stable political stability resulted in increased exchange rate and unstable political stability resulted in weakening of domestic currency. One unit increase in political stability resulted in 57.1% increase in exchange rate. The study however found none significant relationship between broad money supply and exchange rate (P>0.05).

4.6 Discussion of Findings

The study found a negative significant (P<0.05) relationship between exchange rate and inflation. As inflation rate increases the exchange rate weakens for domestic currency to international market. This finding is the similar to the work of Durevall and Sjö (2012) Kiptui (2009) reconfirming the fact that higher rate of inflation results to weaker currencies and higher money spend to purchase a given amount of currency from outside the nation.

The study also found a positive significant ($P<0.05$) relationship between interest rates and exchange rates. As interest rate paid to investment in the nation increases, many foreigners invest in the local market. Higher interest rates attract more foreign investments in the nation. This finding is consistent with the work of Durevall and Sjö (2012) who similarly found a positive relationship between interest rates and exchange rate. The study also found a positive relationship between GDP growth rate and exchange rate. That increased GDP growth rate is as a result of more investment and this enabled the domestic currency gain value in the international market.

This finding is similar to the work of (Ochieng, 2015) who also found a positive relationship GDP and Exchange Rate. Ochieng further stated that GDP influence level of exchange rate, stronger economy attracts more foreign investment which in turn drive exchange rate. The study also found a positive relationship between political stability index and exchange rate. This finding is similar to that of Andre *et al.,* (2013) and Mwega (2014) who found that stable political stability index result to a strong exchange rate of domestic currency in the international market and unstable political stability resulting weakening the Kenya shillings in the international market. The study found insignificant relationship between exchange rate and broad money supply.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter discussed summary of findings, conclusion, recommendations and suggestions for further studies.

5.2 Summary of Findings

Minimum quarterly exchange rate KES to GBP was 118.63 and maximum was 157.5 with mean exchange rate over the 10 years period of 136.6 and standard deviation of 8.214. Interest rates, minimum interest rate over the period was 12.4 and maximum was 20.13, mean 15.385 and standard deviation of 2.085. Inflation rate was low as 4.4 and highest inflation rate 16.0. Mean of inflation was 7.13 and standard deviation of 2.60. The minimum GDP growth rate was 3.34 and maximum was 8.13. The mean of GDP growth rate is 5.0093 and standard deviation of 1.104. The minimum political stability index -0.34 and maximum of -0.27 and mean -0.3050 and standard deviation of 0.021. Broad money supply minimum 969,197.0 and maximum of 2876979. The mean for broad money supply was 1945918.5 and standard deviation of 628525.06.

Trend analysis from the year 2010 to 2014 consistent declined in GDP growth rate. There was slight recovery from 2015 but it remained inconsistent dropping low again in 2018 and recovery in 2019. The inconsistency in growth rate in GDP was mainly due to poor economic performance attributed to seasonal variation production of goods and services within the country. The findings from trend of inflation rate from 2010 to 2019 showed that inflation rate in 2010 started declining

from 6.9 to drop of 4.4 at the end of 2010. Then there was slight increase from December 2010 to June 2011 then steady increase and the highest inflation was at the peak in January 2012 when it moved to 16% and steadily declined thereafter with the control of other macroeconomic parameters in the economy.

The analysis of the trend of political stability index shows an upward and downward swing throughout the 10 years period and similar swing could also be witnessed in the inflation and interest rate. The study found a negative significant ($P<0.05$) relationship between exchange rate and inflation. A unit increase in inflation lead to significant decrease of 45.7 percent in exchange rate. Which means low inflation rate stronger currencies and higher inflation weak currencies. There was a positive significant ($P<0.05$) relationship between interest rate and exchange rate. One unit increase in interest rate leads to a significant change of 61.8% in the exchange rate.

The result also established a positive increase in the relationship between interest rate and exchange rate. Increasing the interest rate attracted more foreign investment and therefore resulting to stronger exchange rate. The study also found a positive significant (0.000) relationship between GDP growth rate and Exchange rate. As the GDP grew there was corresponding observed increase in the exchange rate. One unit increase in GDP growth rate resulted in 43.9% increase in the exchange rate growth. The study also found a positive significant ($P<0.05$) relationship between political stability index and exchange rate. Stable political stability resulted in increased exchange rate and unstable political stability resulted in weakening of domestic currency. One unit increase in political stability resulted in 57.1% increase in exchange rate. The study however found none significant relationship between broad money supply and exchange rate ($P>0.05$).

5.3 Conclusions of the study

The study sought to investigate the effect of inflation on foreign exchange rate. Findings established that there was a negative significant relationship between inflation and currency exchange rate. As inflation increases the value for exchange rate of Kenya shilling against international currencies weakens and as inflation decreases Kenya shillings against startling pound gains more value. A unit increase in inflation lead to significant decrease of 45.7 percent in exchange rate. Therefore, inflation is an important determinant of exchange rate and need to be monitored and controlled for stabilization of an economy. The second objective sought to establish the effect of interest rate on foreign exchange. The results found a positive significant (sig. = 0.001) relationship between interest rate and exchange rate. One unit increase in interest rate led to a significant change of 61.8% in the exchange rate. Interest rate was found to be the strongest predictor of exchange rate.

The third objective of this study sought to establish the effect of GDP on foreign exchange rate. The study found a positive significant (sig. =0.000) relationship between GDP growth rate and Exchange rate. As the GDP grew there was corresponding observed increase in the exchange rate. One unit increase in GDP growth rate resulted in 43.9% increase in the exchange rate growth

The fourth objective sought to establish relationship between political stability index and foreign exchange rate. The study also found a positive significant (sig.0.001) relationship between political stability index and exchange rate. Stable political stability resulted in increased exchange rate and unstable political stability resulted in weakening of domestic currency. One unit increase in political stability resulted in 57.1% increase in exchange rate. The final objective sought to

establish the relationship between broad money supply and foreign exchange rate. The result found a non- significant relationship between exchange rate and broad money.

5.4 Recommendations of the study

Central bank in Kenya should loosen its credit ceilings to allow for credit expansion in the country which in turn will stimulate GDP growth rate. This will result in improving investment efficiency in the country and foster stronger exchange rate. In the first case, policy makers should control inflation. Effective inflation management correlations with rate of exchange rate prevailing in a country. It is of much significance for the central bank to use monetary and fiscal policy to manage inflation so as not to negatively affect exchange rate of Kenya shillings to other currencies across the world. This is correct since exchange rate affect rate of investment into the economy.

The study also found GDP growth rate to have significant contribution on exchange rate. Increasing GDP strengthen currency. This required that policies targeting increasing capital formation to improve GDP growth rate should be implemented since there is direct link of capital formation with GDP. The government should also invest in tax credit subsidies and create tax free zones to attract more investment in low areas which are underdeveloped. Interest rate was found to have significant contribution to exchange rate. Central bank should effectively manage interest rate to spur growth and more investment into the economy to control exchange rate. Political stability can negatively or positively affect exchange rate.

5.5 Limitations of the study

The study only covered few macro-variables inflation rate, GDP growth rate, interest rates, political stability index and broad money supply. The study left other variables like balance of payment, and debt level of a country. The study also relied on secondary data from central bank of Kenya such GBP exchange rate since central bank figures are average trading rate but the real trading traders are the ones traded outside the central bank which could have given more accurate and precise finds.

The research used mean of variables from central bank in the analysis and this could affect the accuracy of the result obtained. The research should also have used exchange rate from banks in Kenya which are most of the time used in trading of foreign exchange rate transaction such as swift remittance, currency conversion and other related transition done by the commercial and forex bureaus. The rate used by central bank has not considered black market transaction which they also believed to have significant effect in the economy assisting traders in sourcing or importing of stock.

5.6 Suggestions for further research.

The study sought to explain the effects of macroeconomic variables on exchange rate in the country. Due time and data unavailability the focus for this study was on five variables, inflation rate, interest rate, GDP growth rate, money supply and political stability index. Therefore, future studies should build on this to expand and include balance of payment, debt level and perhaps adopt mix design where both primary and secondary data are collected and used to draw inferences.

More research to be done using multiple currency rather than one currency this will enable get a more accurate and precise result of effect of foreign exchange on macro-economic variable and the model to comprise as many variables as possible since every factor is deemed to have an effect on movement of foreign exchange rate. The further study will be a guideline and will assist foreign exchange rate stakeholder hedge against adverse movement of foreign exchange rate.

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APPENDIX: RAW DATA

Quarterly	Exchange Rate	Interest Rate	GDP	INFLATION	Political Stability Index	Broad Money Supply
1	118.63	14.7	7.98	6.9	-0.29	969,197.00
2	121.6	14.05	8	6.3	-0.29	1,013,200.00
3	126.4	14.02	8.13	4.4	-0.29	1,073,473.00
4	128.8	14.1	6.6	4.8	-0.29	1,083,451.00
5	136.06	13.9	5.62	5.1	-0.3	1,147,040.00
6	138.7	15.1	5.73	5.9	-0.33	1,154,020.00
7	148.62	16.2	4.65	10.9	-0.32	1,227,584.00
8	149.5	16.2	4.77	11.3	-0.33	1,215,679.00
9	132.67	20.13	4.35	16	-0.34	1,284,637.00
10	133.61	18.92	4.64	14.6	-0.33	1,341,117.00
11	135.32	19.2	4.78	12.5	-0.33	1,421,118.00
12	133.11	18.6	4.43	10.33	-0.31	1,511,223.00
13	132.29	17.67	4.15	6.2	-0.29	1,518,284.00
14	134.7	16.65	4.01	5.3	-0.33	1,621,124.00
15	137.21	16.95	3.45	4.9	-0.29	1,631,669.00
16	139.5	16.23	4.56	5.5	-0.29	1,612,345.00
17	144.85	16.8	5.37	6.5	-0.32	1,787,303.00
18	144.23	16.3	4.89	7.3	-0.33	1,800,113.00
19	144.9	16.2	4.67	7.1	-0.32	1,927,811.00
20	145.2	16.2	5.32	7.4	-0.31	1,911,234.00
21	142.85	15.6	4.89	6.5	-0.31	2,078,581.00
22	145.23	15.7	5.34	6.3	-0.33	2,134,234.00
23	157.5	16.7	5.04	6.4	-0.31	2,204,768.00
24	150.23	17.6	4.3	6.3	-0.34	2,212,334.00
25	145.5	18.6	3.81	6.7	-0.34	2,314,968.00
26	143.22	16.7	4.12	6.4	-0.35	2,300,223.00
27	129.82	15.1	4.62	6.4	-0.33	2,366,614.00
28	129.88	14.4	4.23	6.3	-0.31	2,344,223.00
29	130.12	13.7	4.31	7.1	-0.29	2,429,323.00
30	130.99	13.4	4.43	7.5	-0.33	2,412,323.00
31	136.28	13.7	3.34	8.2	-0.28	2,528,440.00
32	137.23	13.2	3.54	7.5	-0.28	2,478,322.00
33	139.45	13.4	5.6	6.5	-0.29	2,594,552.00
34	138.88	12.8	5.52	5.7	-0.3	2,599,334.00
35	131.22	12.7	5.65	4.6	-0.3	2,710,682.00
36	130.99	12.9	5.2	5.3	-0.34	2,734,599.00
37	130.67	12.5	5.35	5.7	-0.28	2,825,348.00
38	130.11	12.8	5.25	5.8	-0.32	2,834,331.00
39	129.69	12.4	4.61	5.3	-0.27	2,876,979.00
40	130.11	13.4	5.12	5.5	-0.28	2,892,345.00