EFFECT OF SELECTED MACROECONOMIC VARIABLES ON TRADE BALANCE IN KENYA

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DECLARATION

I hereby declare that this research project is my own original work and to the best of my knowledge has never been presented for any award in any other college, university or institution for any award.

Signature: _____ Date: _____

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

Signature…… Date.....

DR. Christine Nanjala

University supervisor

DEDICATION

I hereby dedicate this research project to my family members who have stood by me all along.

ACKNOWLEDGEMENT

First, I thank the Almighty Father in Heaven for seeing me through and providing me with the necessary perseverance while carrying out this research project. I am grateful to my supervisor Dr. Christine Nanjala for her tireless and relentless support that he offered me in the process of carrying out this research project. I must admit that his invaluable guidance, encouragement, suggestions and positive criticisms are the ones that have led to the success of this research task

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ABBREVIATIONS

GDP	Gross Domestic Product
BOP	Balance of Payment
BOT	Balance of Trade
CBK	Central Bank of Kenya
CIRP	Covered interest rate parity
UCIRP	Uncovered interest rate parity
APPP	Absolute purchasing power parity
RPPP	Relative purchasing power parity
VAR	Vector Auto Regression
USA	United States of America
UK	United Kingdom
PACF	Partial Auto Correlation Function
ACF	Auto Correlation Function
KRA	Kenya Revenue Authority
AR	Auto regressive
ARMA	Auto Regressive moving average
MA	Moving Average

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ABSTRACT

The subject of Trade Balance has drawn much attention and focus in recent years. The balance of payments records transactions that flow in and out of the country. Research has shown that macroeconomic variables including exchange rate, inflation and interest rate highly influence trade Balance.The study aimed at determining the effect of selected macroeconomic factors on the trade balance in Kenya. The specific objectives were to find out the effects of interest rate, exchange rate as well as inflation on trade balance in Kenya. The study was conducted in Kenya involving macroeconomic data between 1985 -2015. Data collected was purely secondary. The study adopted interest rate parity theory, purchasing power parity theory as well as balance of payment theory in articulating the synthesized concept under the study. The research design was descriptive in nature. The findings of the study was presented using graphs, professional tables as well as charts which was analyzed through time series regression analysis method and was enhanced by use of Eviews 9. The study found that real exchange rate and interest rate positively affects the balance of trade while inflation has a negative effect on the balance of trade. The finding is thereby important to the central bank, the Kenyan government, citizens as well as the scholars and academicians.

Keywords: Balance of trade, inflation, interest rate, exchange rate.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The concept of Trade Balance is believed to have originated from Mercantilism and balance of trade doctrines in early 1500 to 1800. Mercantilists had the belief that they could increase the power and wealth of merchants through accumulation of specific items such as and hence imports and exports were the main focus. (Pitchford, 1995)

David Hume (1752) was however, silver, gold and other precious metals, which were used as a form of exchange during trade. There focus therefore was directed towards maintaining a surplus in the balance of trade and therefore imports were not considered important owing to their nature of outflow of the commodities. As a result, there was controlled foreign trade where exports were subsidized and taxes were imposed on all imports.

He opposed to this method of maintaining a surplus and argued that this is not achievable in absence of capital inflows. He argues that general price levels in domestic economy and abroad is determined by quantity theory of money under the classical assumptions. As a result, corresponding outflow of species would continue until the price level return to its original level and thereby returning of trade balance back to zero. Therefore, the Trade Balance process is a self-adjusting process.

For a long time, the subject of the interaction between macroeconomic variables and trade balance has been a subject under a lot of review and attention. This is because other studies have established that there is a significant relationship between balance of trade with some specific macro-economic variables in specific countries. Since the balance of trade is influenced by the prevailing economic status, there exist

uncertainties towards various stake holders. This therefore has prompted many scholars to pay much attention to the topic of balance of trade. (Zhang, 1999).

The changes in macroeconomic variables are highly determined by how balance of trade performs. When variations takes place and cause imbalances in the balance of trade, the internal balance of the economy is also affected. For instance, trade balance constitutes a critical part of the current account, which also constitutes an important aspect of Balance of Payment.

From activities of imports and exports, the internal economies are strengthened since international trade plays a big role. As results, other markets such as monetary, financial, commodity and labor markets are affected by other activities. Because of increased deficit in trade balance owing to imports that exceed exports, domestic inflation consequently increases. Domestic inflation in this case is caused by increased domestic price levels. The balance in the current account is not only affected by trade balance but also other elements of current accounts have an effect on the local economy. These elements include elements such as transfer of services and balance of services.

The remittances of aid for both foreign and local workers constitute the current transfers. The current transfers help in maintaining liquidity, which is necessary for development of the economic plans and projects that help in production. Further liquidity ensures that the needs of customers are met which consequently affects growth.

The global financial crisis of 2008 and the subsequent decline in economic growth has prompted the need for a greater emphasis on maintaining enough supply of money in the economy to deal with the continued trade of balance deficits. However, many

developing countries have continued to hold a deficit balance of payment account and have many challenges in undertaking monetary actions, which present pressing challenges for monetary authorities (Umer, Muhammad, Sulaiman, Abro, Asif, Ali and Ghazali 2010).

Many developing countries' interest is to have a stable balance of payment account, which in turn has an enabling impact on the macroeconomic policies within the country. Among developing countries including Kenya, there has been a consistent trend of deficit in the current account. This is a worrying trend since there are various benefits associated with maintaining a surplus, which include; promotion of international trade, which in turn leads to rapid economic growth. (Komiya, 1969)

A current account deficit has been has been found to have a negative effect on growth of an economy. (Sahin & Mucuk, 2014).

Nyoni & Musisinyani (2017) showed evidence of the relationship between the growth of the economy and a surplus in the current account. They also investigated other related variables that result from the efforts put across to manage and prevent current account deficit. The variables included External debt, FDI, Financial assistant from foreign Countries. They also confirmed that the variables affect economic performance positively. Nyoni and Musisinyani advocated for revised policy mechanisms that will assist in strengthening and increasing the confidence of the investors to increase foreign inflows and the ability to absorb more capacity by a country and consequently manage growth.

Of Importance is in understanding the cause of current account deficit in order to know how to eliminate the deficit. The Us Current deficit that occurred in the 1980s is believed to have occurred as a result of macroeconomic policy mix pursued in the

United States and its major trading partners. Due to the anti-inflation stance of the U.S, the monetary policy caused the rise in Interest rates as well as the dollar rate. The strength of the dollar was incapable of resolving the current Account deficit due to the existing recession, which caused a decline in the demand for imports. As a result, there was a major current account deficit between the years 1983 and 1984, which was because of the restriction from the monetary policies as well as the growing debts from the developing countries. The increased deficit meant that the foreigners were financing a great budget of the U.S government.

It is imperative therefore to ensure there is proper management and sustainability of a balance of payment, which promotes the growth of a country. There exist various factors that cause a ds-equilibrium in the balance of trade including decline in export trade, huge external debts, reduced or low level foreign direct Investments, misuse of funds from external funding, increased domestic borrowing, distortion of prices leading to inflation and poor trading terms. (Komiya, 1969)

One of the reasons for the emergence of the balance of trade deficit in the early 80's was the increase in interest rates in the United States. The early 1980s experienced higher nominal interest rates. Nominal interest refers to the ordinary interest rates as quoted by financial institutions coupled with higher real interest rates, which refer to nominal interest rates when adjusted for inflation. The interest rate is one of the major determinants of the exchange rate. The exchange rate, in turn, is the value of the U.S. dollar in relation to the currencies of other countries, which is often expressed as the value of one U.S. dollar in terms of the number of units of the currency of another nation.

Different economists have given different points of view regarding trade deficit and whether it is beneficial. While some researchers think, it is of importance for the economy as improves GDP and creates employment opportunities in a country. Others look at it as bad for economic growth. Most economists are in tandem that the inflow of capital contributes to economic growth. Although these are interlinked with each other. Capital inflow is the secret to reducing trade deficit since it leads to improved confidence by investors and consequently improved investments as well as productivity.

Hanushek (2013) examined the relationship between economic growth and trade balance. He attempted to bring evidence that there exists a long term significant relationship between the Gross Domestic Product (GDP), imports and exports of ten American Countries. Further, Thirwall (2000) using different countries as a target population confirm that the determining factors for economic growth are trade. He adds that through trade, resources are allocated in a fair manner in a country and consequently brings about liberty while at the same time improving the growth and good performance of the economy. This wall also confirms that in comparison, the volume of exports for developing countries are generally higher compared to the volume of exports of the developing countries since the developing countries tend to export primary goods.

Ashok Parikh (2004) examined the effects of trade liberalization on economic growth as an element of trade balance. He also looked at the effects of this liberalization on investment and current accounts of about 42 developing countries among them African countries. He provides compelling evidence that trade liberalization promotes faster economic growth of imports but a slower growth in exports.

Ahmad (2012) further puts more emphasis on the value of exports to a country. Ahmad uses Cobb-Douglas production function in his model and provides evidence that when exports increase, a subsequent increased in Gross Domestic Production occurs averaging about 0.81 percent. He advocates for an improvement in the agricultural sector as the main exporting areas of the economy. He concludes by saying that an increase in exports has a tendency to improve economic growth in any country.

Sulaiman Mohammad (2010) examined the real causes of trade deficit in Pakistan which has faced trade deficit for the longest time. Notably trade deficit has been found to affect the economy negatively. While examining the short term ad Log term effects of the trade deficit, Mohammad revealed that various elements including Foreign Domestic Investments, Consumption by local citizens, income from outside the country and also the real effective exchange rate had a positive significant influence on trade deficit and consequently trade balance.

Najid Ahmad (2012) looks at separate elements including growth of population, unequal distribution of income in the country, rapid growth in the population of a country as well as liberalization in trade with reference to Pakistan. Ahmad reveals that there is an insignificant negative relationship between trade liberalization and the growth in the economy. He however explains that trade liberalization is critical for a country since it is one of the major tools used for poverty reduction.

He argues that trade liberalization is the backbone of economic growth due to its ability to reduce poverty. Najid Ahmad (2012) also highlight an important aspect and confirm that apart from trade liberalization, Foreign Direct Investments also form a critical part for the growth of an economy.

Most scholars have additionally argued that Foreign Direct Investment is a very important source for funding. Further it's proven that Foreign Direct Investment (FDI) is related with economic growth in Pakistan. Therefore it is ideal for policy makers to attract foreign investors and adopt policies that will be meeting the needs of a country.

Sekmen (2018) confirms equilibrium between current account deficits and economic growth in Turkey. The results of his study allude to a positive relation between current account deficits and economic growth in the short run and no relation in the long run. He says short run dependency is not harmful but in long run it can be harmful for the prosperity of the country.

Kenya's trade deficit has been persistent since the 1960's which was as a result of continuous decline in performance of the trade account. This has prompted a serious probe into the reasons for the continued persistent trade deficit. For example, there was a sharp decline of the trade deficit in 2019 to 23.2 Billion shillings from 98.3 Billion shillings for the same period in the year 2018.This however represented a smaller decline compared to other years and was attributable to imports which declined to 132.8 billion representing Eleven point four percent. The main decline in imports included; manufactured goods, machinery, transport equipment, fluids, minerals, lubricants as well as chemicals. (CBK Report, 2019)

A country's balance of payments (BOP) is a record of inflows from foreign countries as well as outflows from the country and adopts a book keeping method of record keeping. All the transactions form a basis or direction of how funds are moving between and among nations.

Along with BOP, balance of trade (BOT) and exchange rates are amongst the most important factors that play a vital role in examining the economic equilibrium of a

country. Mostly trade oriented factors affect exchange rate and devalued exchange rate lower the purchasing power of that nation. BOP also has a strong relationship with the exchange rate. In Pakistan it is important for the investors to invest from the debt to increase the investment in the country.(Sakakibara, 1975)

Other researchers have defined Balance of trade of a nation as the difference between the exports and imports in a given country, in this regard, where the exports supersedes imports a country is said to have a balance of trade surplus while excess imports leads to balance of trade deficit (Sahu, 1992). In contrast, balance of payment is a broader concept that involves all transactions relating to goods, services and assets of a country with the rest of the World (Glenday & Ndii, 2002). According to Makin (2004), balance of payment (BOP) indicates the net inflows and outflows of foreign currencies resulting from international trade in goods and services.

The international monetary fund (2000) indicates that BOP is a development tool used in accounting for the transactions of a country and is used in establishing diplomatic agreements, collaborations and ties. It can therefore be asserted that BOT is a narrower scope within the Balance of Payment (BOP) where According to Anderson (2008), international trade has received much significance from scholars especially due to their contributions to the economic growth (GDP) of a country.

Macroeconomic variables are factors in the economy that are independent of income, they affect the economy as a whole (Khalid, 2012). He also suggested that the macro economic variables act as indicators of what is currently trending in the economy. In addition, Sharma and Singh (2011), also indicated that the macro economic variables are felt on income, employment levels, output, investment as well as international finance.

1.1.1 Macroeconomic variables

The study is grounded in the determination of the effect of macroeconomic variables on the trade balance in Kenya. These variables include, consumer price inflation, lending interest rate as well as real exchange rate.

Macroeconomics variables (MEV) originate from macroeconomics which is the study of how the economy responds when all the factors are in place including production, household income as well as the rate of employment compared to other economies of the same nature. (Karl, 2009).These factors also include a country's GDP which is a measure of economic growth, the rates of interest and also the rates inflation. Chen, Roll and Ross (1986) maintains that these macroeconomic factors are significant in explaining firm 2 performance (profitability) and subsequent returns to investors.

Branson (1979) further points that real exchange rates are affected by activities that take place in the current account. The time series model in his study was an indication that adjustments need to be done to counter the effect of the change (Oladipupo, 2011).Simon (1997) found that exchange rate and current account have direct and positive relationship with inflation and both exchange rate and current account are very critical since they negatively affect the small economies.

Schnatz (1998) points out that the worsening situations of a local economy like low GDP, inflation, interest and exchange rate results in poor performance in the banking sector which also affects other areas of the economy.

Further Heffernan (1996) puts forward the idea that macroeconomic factors are made worse by regulations imposed on banks. The effect of macroeconomic factors in other sectors of the economy will always affect the banking sector and what goes on in the banking sector will affect the other sectors of the economy.

Pathan and Masih (2013) expand on the topic of macroeconomics and they consider it as an area which analyses the different aspects of an economy including; how decisions are made regarding the economy in entirety, the overall performance of the economy, how the various aspects of the economy have been structured as well as the behavior of market participants. The economies relate not only the national economy but also regional as well as the global economy. Macroeconomics combines different aspects such as the rate of unemployment in a country, various indices and also gross national production in explaining the performance of an economy.

Pathan and Masih formulated a model that shows how various elements of the economy such as national consumption, national production and output, national income, savings and investments, the rate of inflation and trade integrate in the economy and how the same elements relate to each other. While macroeconomics covers a wide area of research, there are two main aspects that define macroeconomics; one is that the field of macroeconomics tries to explain the various factors that cause variations in the balance of trade in the economy in the short run. Secondly, Macroecomics also explains factors that cultivate the growth of an economy in the long run such as the rise of a national income.

The results of these models provide a good basis for the government to use in developing and analyzing the existing economic policies. This study specifically intends to have a closer look at the relationship between the following Macroeconomic variables; interest rate, inflation rate (CPI), currency exchange rate fluctuations on the balance of payment.

Crowley (2007) argues that interest rate is the value paid in return when a borrower requests for a loan to pay in advance or on any assets that have been borrowed.

Ng'etich (2011) defines interest rates as the market price that is indicative of the actual changes taking place in the stocks market. The price is derived from the increase in the purchasing power of individuals and households. This price incorporates the future inflation. Further, inflation is regarded as a means through which capital is allocated over a period of time. Ng'etich concludes that interest rates are drivers of savings since increased interest rates means high returns for investors. Interest rate is the cost of borrowing in a given economy. The difference in interest between home country and foreign country leads to capital mobility (Mundell, 1963) which helps in unveiling the effect of interest on balance of trade.

Hossainn and Islam (2013) define inflation as a continuous appreciation of price levels in general. Bashir et al (2014) defines inflation as a tool that measures the general variations in price levels depending on the level of price index. One of the indices used is the Consumer Price Index (CPI) which looks at the average price that customers are willing to accept when transacting. When the Consumer Price Index is high, then it implies a high inflation. The effect of high inflation is the tendency to reduce the purchasing ability of consumers as well as spending. This consequently reduces the Gross Domestic Product. Though Inflation does not pose a negative consequence on the economy, persistent inflation may be a sign that the existing macroeconomic variables are not stable.

According to Melberg (1992), inflation is the persistent increase in the prices of general commodities in a given economy. Any given economy should depict price stability where the prices increase at low and predicable rate, any deviation from what is termed as low rate and predictable level amount to inflation.

Inflation is the continuous escalation of prices of general commodities (Joshi and Little, 1999), stipulates that inflation rates not only creates internal problems to a country but also spill over to the international trade. The effect of inflation on international trade is influenced by among other factors is among other factors, the fluctuations in prices as well as the value of the local currency which then influences the imports and exports. Practically, when inflation rates in a country are high, individuals will prefer to buy foreign goods and thus increase the level of imports assuming there are no trade barriers.

Harvey et al (2012) defines exchange rate as the value of one currency expressed in terms of another currency. It is the value for which the currency of one country can be exchanged for another. It has been found that exchange rates tend to vary from time to time and on a daily basis even though most of them are fixed by way of agreements.

Solakoglu (2005) argues that one of the ways of effectively carrying out valuation of a firm and managing risks is through understanding the effect that the foreign exchange risk has. Ii et al. (2009) pointed out the benefit of effective management of exchange rate risk exposure within the US insurance industry since insurance business is prone to foreign exchange exposure.

Exchange rate is the ratio of a countries currency as traded against that of another country (Arize & Igwe 2017). According to Gali and Monacelli (2005), changing one currency against that of foreign currencies causes balance of trade to fluctuate, for example a currency of a given country as compared to foreign currencies in the international trade, it will lead to increase in export and thus increase the balance of trade (Kandil, 2009).

1.1.2 Macroeconomic variables and Trade balance

Macroeconomic is the study of the economy wholesomely. That is it focuses on the behavior of an entire economy-the "big picture" which can be regional, national or international. Elly and Oriwo (2013) argue that macroeconomic environment is the overall aspects and working of national economy, such as income, output, and interrelationship among diverse economic sector. Conducive macroeconomic environment promotes the economic growth of the country. Macroeconomic variables are defined as those variables that are independent from the income levels. They are factors that greatly influence the economic growth. They deal with the performance, structure, behavior, and decision-making of an economy as a whole, rather than individual markets. These variables affect output, national income, unemployment, consumption, inflation, savings, investment, international trade and international finance. Macroeconomic variables are indicators or main signposts signaling the current trends in the economy. Some of the macroeconomic variables include Gross Domestic Product (GDP), unemployment, inflation and exchange rates. In contrast, microeconomics primarily focuses on the actions of individual agents, such as firms and consumers and how their behavior determines prices and quantities in specific markets. That is, microeconomic studies individual components, whereas macroeconomics studies the economy as a whole. (Mishkin, 2004).

According to Bergen (2010), current account deficits, interest rates, differential inflation, differential interest rate, terms of trade, political stability among others are all macro variables. The study will dwell on three among the many macroeconomic variables which include: interest rate, inflation as well as exchange rate.

Ramsey (2015), asserts that exchange rate is significant in shaping the international market as it fixes the prices of goods and services. Allen (2004), added that foreign

exchange rate determines the quantum and direction of international trade, on average a country's economic performance will be measured by the power of the local currency against the foreign currencies(Arize, 2000).

The three macroeconomic variables; Interest rates, inflation and exchange rates are all highly correlated. When there is a change in interest rates, The Central Banks responds by taking measures that cause an adjustment in both inflation and exchange rates. Further, a change in interest rates influences inflation as well as the value of commodities. Higher interest rates provide borrowers in an economy a higher return compared to borrowers in other countries. Consequently, higher interest rates attract foreign capital and leads to an increase in exchange rate.

The impact of higher interest rates is always controlled. However, if inflation in one country is overly high in comparison to other countries, or in cases where other determining factors cause a decline in the value of a currency. A reverse relationship exists for declining interest rates -that is, lower interest rates tend to decrease exchange rates (Charef & Ayachi, 2018).

Karfakis and Kim (1995) used an Australian exchange rate data and confirmed that a resultant current account deficit which determines the Balance of Payment is linked to exchange rate depreciation, and an increase in interest rates. A lot of other literature provides compelling evidence those current account deficits reduces local wealth, and may lead to extremely high exchange rates.

A fall in the real value of currency was also reported by (Engel & Flood, 1985),(Obstfeld & Rogoff, 1995)and (Dornbusch & Fisher, 2003). There has been a massive increase in the rate at which the rate of international Capital inflows has decreased into the developing countries. One of the major concerns is the unexpected

outflow of capital since this significantly influences the exchange rates. These outflow of capital has taken place in various countries including; Mexico, Eastern Asia and Brazil. The consequences of the capital flow is manifested in the exchange rates, local production, current account balances as well as capital balances.

Interest rate is the cost of borrowing in a given economy. It can have both positive and negative effects on international trade. If interest rate in the domestic market increases, then it will deter investment which will result to reduced exports and therefore the country will be forced to undertake huge imports to supplement the deficit in the local demand for goods and services and thus negatively influence the balance of trade in a country (Allen 2004).

Several empirical studies have examined the effect of macroeconomic variables on the current account balance. Among the variables is the credit expansion ability of banks. Brissimis et al (2010) confirmed that there were reduced savings by individuals as a result of the financial independence experienced in the 1990's.Further domestic debt as confirmed by Kueh(2015) has significantly affected the balance of trade in developed countries such as Europe. Kueh(2015) further established a significant long run relationship between macroeconomic variables and Balance of trade. Using panel data regression, for twenty eight European Countries, he confirmed a regression coefficient that implied that a slight increase in fiscal balance would worsen the deficit.

Kariuki (2009) carried out an analysis to find out the elements that constitute the current account balance in Kenya. In his study, he selected elements like fiscal balance, economic growth, and the ability of traders to remain open, whether the terms of trade are fair, macro-economic stability, foreign Direct Investment (FDI) and

dependency ratio but also considered a dummy variable. This was to take care of external shocks such as mismanagement of coffee boom that was experienced between the year 1976 and 1977 as well as the breaking up of East African Community. The period under consideration was from 1970 to 2006.The results of his findings indicated that good terms of trade has a high positive and significant effect on the current account deficit in Kenya during the period of study. Other factors that affected the current account balance positively included economic growth, fiscal balance and the real exchange rate. The supply of money however had a negative but significant influence on the current account balance in Kenya followed by dependency ratio and foreign direct investment respectively.

Even though different scholars have embraced a number of different methods, the various studies conducted have mostly arrived at the same common determinants of current account balance. These factors include; economic growth, real effective exchange rate, the development stage of a country, the level of foreign reserves, the real interest rate and fiscal balance.

1.1.3 Trade Balance and Trade Deficit

Balance of trade can be defined as a situation where exports exceed exports of visible goods. Contrary, trade deficit can be defined as imports exceeding exports. Balance of trade plays an important part in contributing to national income accounting. Balance of trade can be explained by nation and by product. The deficit balance of trade may be as a result of either one product or one commodity. To manage a trade balance deficit, various economic policies such as the Industrial policy and trade policy must be put in place. In cases where the trade deficit is caused from the trading

relationship, then dialogues can be held and also proactive measures may help to avoid a trade deficit.

It can therefore be argued that all the factors which affect the exports and imports have an indirect relationship on balance of trade. For example, competitiveness in prices may directly improve the balance of trade especially where there is a decline in prices and increased volume of business. Therefore, it can be argued that depreciation or devaluation of local currency can lead to better and improved balance of trade. As a result, the real prices of goods and services may have a downward trend and consequently encourage more imports from foreign countries. (increase export demand).On the other hand, the decrease in prices of goods may also lead to decreased demand in imported goods and services in the event that the prices of goods and services increase.

Owing to occurrence of real depreciation, the result is an improvement in the balance of trade. The assumption made is that the average of exports and imports are elastic in nature as far as real depreciation is concerned. This mechanism is known as Marshall Lerner condition and J-curve phenomena. It is also said that balance of trade is a key component of national income accounting. Surplus in the balance of trade improves with Gross National Product while the deficit of balance of trade causes a decline on the Gross National Product. While the Balance of trade highly affects the size of multiplier as explained by the traditional Keynesian approach.

For a long time, it was believed that trade deficit was a negative concept. However; a trade deficit has various benefits to a country. It raises the standard of living of a resident of a country. This means that the people of that country will obtain access to a variety of goods and services for more affordable price. Trade deficit also have the

advantage of reducing the bad effects of inflation, since the products tend to have a lower price. A trade deficit also exhibits a resident's confidence and shows that the residents are wealthy enough to buy more than the country produces.

Various factors have been thought to be the causes of trade deficit. Among the causes is the failure by a country to have adequate resources that meet its needs. Its however known that deeper causes of trade deficit exist; one it is believed that it is the funding from other countries in form of loans advanced to a certain country that cause trade deficit. The funds are then utilized in purchasing imports. It can therefore be argued that a trade deficit automatically translates into a current account deficit. This phenomenon has been confirmed by other scholars such as Friedman who provide evidence that a large deficit characterized by increased imports compared to its exports, is an indication that a country's currency is more strong and therefore desired more.

The citizens of a country with a strong currency therefore have the benefit of a widened selection among the various competing goods and services that have lower and affordable prices which they would otherwise not have.

When a country has a currency that is weak, and in a case where such a country experiences a surplus. Milton Friedman considers a trade deficit as a chance that is availed to consumers to obtain more goods at much lower and affordable prices. On the other hand, a trade surplus is an indication that goods and services were exported at the expense of local consumers while at the same time being charged exorbitant prices for the goods. (Muhammad, 2010)

Previous studies done in developing countries indicate that developing countries are highly characterized by a trade deficit. The deficit is believed to occur as a result of

adoption of poor strategies that these countries have continued to use while carrying out reforms in the economic sector. Further it has been confirmed that majority of the developing countries have got high dependency on local products for their exports while at the same time highly depend on imports of manufactured goods. This causes high trade deficits in the economies.

Kenya being a developing Country has experienced the trade deficits and to cater for this trade deficits, Kenya and also other developing countries have embarked on implementation of new economic policies that are geared towards improving the trade balance as well as economic development.

Since its Independence in 1963, statistics indicate that the value of Kenya's Imports have consistently exceeded the value of its exports consequently causing a huge trade deficit. The challenge in Kenya has therefore been in finding ways of dealing with the persistent trade deficit. The main challenges have existed in deciding on the best inflation rate, exchange rate and foreign direct investment policies that will be suitable and that will promote economic growth and stability. To achieve this goal, several major reforms have been carried out in regard to the balance of trade systems.

Therefore the balance of payment has a significant influence on the capital, current and the financial inflows.

1.2 Statement of the problem

The growth of the country is hugely dependent on the flow of goods and services in and outside the country, Kenya has been recording a deficit in the balance of trade from as early as 1998, this is a clear indication that the country has been importing more than it exports, this however have bitter consequences on the value of the local currency as compared to foreign currencies and thus deteriorates the economic growth

of the country through the high cost of doing business with foreign countries (Obadan &Elizabeth 2007).

Statistics show that in May 2018, Kenya recorded a deficit of Kes 116,274 M, the average BOT in Kenya for the last 2 decades starting 1998 to 2018 is Kes - 42502.47 M reaching an all-time high of Kes -2175 M in June of 1998 and the worst was recorded in September 2014 where BOT was Kes - 119463 M (CBK, 2018).

Previous scholars have however embarked on the macroeconomic factors and how they influence the balance of trade such as a study by Hook (2017), conducted in Malysia on the exchange rate volatility of exports to her trading partners found that the liberalization of capital accounts trends promoted cross border flows and speculations of the currency. Another study by Harvey and Hegerty (2017), on Japan balance of trade and asymmetric effects found that Japan trade balance has improved following the yen depreciation in the global market.

In addition, Ogutu (2014), found a negative relationship between real exchange rate and balance of trade. However, these studies fail to address clearly the effects of other macroeconomic variables such as inflation on the country's trade balance. The current study will therefore fill the gap in knowledge especially on the effects of inflation, exchange rates and interest rate on balance of trade.

1.3 Research objectives

1.3.1 General objectives

The general objective of the study is to determine the effect of selected macroeconomic variables on trade balance in Kenya.

1.3.2 Specific objectives

i. To determine the effect of exchange rate on trade balance in Kenya
ii. To find out the effect of interest rate on trade balance in Kenya
iii. To evaluate the effects of inflation on trade balance in Kenya

1.4 Research questions

i. What is the effect of exchange rate on trade balance in Kenya?
ii. What is the effect of interest rate on trade balance in Kenya?
iii. How does inflation affect trade balance in Kenya?

1.5 Justification of the study

The economic growth of the country has been stagnating for a long time this has led to severe macroeconomic challenges in the country such as unemployment, high rate of interest, high level of inflation whose effect deter progress and development of the country. Slow or no economic growth means poor standards of living for the citizens of a nation, high cost of living and lack of the necessary amenities. These challenges all together fuelled the intent to dwell on the current study (Sharma & Singh, 2011),

1.6 Significance of the study

The study is of great importance to the following groups /individuals

1.6.1 The Government

The government of Kenya is able to get deep insight into the factors affecting the balance of trade and therefore be able to make critical decisions regarding the economic growth of the country through the ministry of finance which is in charge of making economic policies.

1.6.2 Central bank of Kenya

The central bank plays a key role in the management of the economy and therefore the study aid the central bank in getting information pertaining to the effects of the macroeconomic variables being studied on the balance of trade, these variables include interest rate, inflation and foreign exchange rate. They will therefore be able to determine the optimal rate of interest that enhances balance of trade from the recommendation of the study

1.6.3 The Citizens

The citizens are the major beneficiary of the study as the finding is aligned towards promotion and growth of the economy and therefore the citizens enjoy favourable interest rate that is a prerequisite to employment opportunities among other economic aspects.

1.6.4 Researchers and Academicians

The researchers and academicians who are interested in the area under study are able to learn areas of further research as well as in identifying research gaps in order to build their research logic.

1.7 Scope of the study

The study entirely focused on an investigation of the effect of the three selected macroeconomic variables on the balance of trade. This enhanced through gathering the relevant data from World Bank database. The study engaged secondary data from 1985 to 2015 pertaining inflation, exchange rate, interest rate and balance of trade.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter unveils the literature pertaining to the macroeconomic variables on the balance of trade in Kenya; the study adopts balance of payment theory, purchasing power parity as well as interest rate parity. The conceptual framework as well as empirical studies was explored in order to bring clear understanding of the study variables.

2.2 Theoretical Framework

According to Mugenda and Mugenda (2003), theoretical framework is a group of related ideas that provides guidance to a research project or business endeavor. Below are the theories adopted in the study due to their relevance.

2.2.1 Interest Rate Parity

The theory was developed in 1923 by Keynes. The theory of Interest Rate Parity (IRP) advocates that it is impossible for one to make profits as a result of varying interest rates between two countries that are trading or where investors have the opportunity to invest. This, Keynes explains is because, any profits made will eventually reduce owing to the changes in the exchange rates during a certain investment period.

For example, if a three month's interest rate in the United States of America is 12 and also a three months interest rate in the United Kingdom is about 8 percent. There are chances that the investors in UK will aim at getting arbitrage profits and will act by transferring funds to the United States in order to benefit from the high interest rates and consequently a high yield. This however may not happen because the arbitrary

benefit may not be achieved in reality since after the three months, the US dollar may depreciate in value by approximately four percent and therefore the UK investor will not have benefited but will have remained at the same economic state. This means that the yield achieved by the UK investor will be eroded by about four percent at the end of the three months when the UK investor converts the yield in British pounds.

This condition is referred to as the exchange risk. The exchange risk can be minimized or eliminated by way of disposing off the anticipated dollar value that is to be yielded after three month period of investment in a forwards market.

To obtain an arbitrage profit by the British investor, there should be a simultaneous purchase of dollars in the spot market followed by a disposal of the dollar in the forward market. This means that the value of the dollar will increase in the spot market while on the other hand the value of the dollar will decrease in the forward market. This will continue until a balanced position is arrived which will then eliminate any gains or profits made. Therefore, in conclusion it does not matter whether an investor is in the USA or the U.K, ideally the return from their investors should be the same. (Ayuso and Restoy, 1996)

The theory links the level of inflation, exchange rate and the rate of interest all of which form the basis of the study. The theory states that the interest rate differential between two countries can be denoted by the discount of one currency in relation to another currency. It establishes two form of the theory which includes covered interest rate parity (CIRP) and uncovered interest rate parity (UCIRP).

Covered interest rate parity aims at ensuring that the hedged investment returns is equal to interest rate on domestic countries with similar level of risk. Uncovered interest rate parity assumes investors are risk neutral. According to kiguel (1992) in an

efficient market where there is no transaction cost, interest rate differential should be similar to the forward differential, this will help establish money market equilibrium.

Interest rate parity connotes that high and low interest on a currency rate will be offset by forward discount and premium respectively. According to Abeysekera and Turtle (1995) major global market are efficient in the sense that it was rare to obtain profit in the 80s and early 90s from traditional covered interest arbitrage. In addition Horne (1998) indicated that Japan, United State and most of the European countries always use covered interest parity.

The impact on investors' attitude is that they would be indifferent towards the returns on domestic and foreign assets denominated in same currency thereby excluding any short term arbitrage gains.

2.2.2 Purchasing Power Parity

The Purchasing Power Parity theorem was put forward by Kuttner and Posen (2006). The theory brings out the assumptions that the normal rate of exchange that brings about a balance, exists between two currencies that are not convertible is influenced by the ratios of their purchasing powers, therefore the rate of exchange tends to be determined at the point where equality is attained between the purchasing powers of both currencies in trade. In simple terms, when inflation rate in one country increases more than that of another country, exports tend to decrease while an import increase and consequently puts pressure and depresses the country's currency. The theory tries to give an explanation to quantify inflation-exchange rate relationship by showing that changes in exchange rate are a result of discrepancies in inflation rates (Kara& Nelson, 2002).

Further explained, Purchasing power Parity (PPP) theory holds that the exchange rate of two different countries can be measured or determined by the ratios of prices of goods in the respective countries.(Ndung'u,1997).

This implies that there must be a variation in the exchange rate that must trigger a change in the prices of goods and services between the countries. The anticipated variation however may be equivalent to the current spot rate and the different anticipated spot rate.(Kamin, 1997).

The Purchasing Power Parity theory also explains that the long term effects of changes in the exchange rate will cause a change in the price level. Kamin&Klau, (2003) add that, where there are changes in the exchange rates ,the changes will be seen in the relative purchasing power and where the exchange rates do to vary but are constant, the equilibrium will be arrived at when satisfactory methods are observed. Explaining the observed movements in exchange rates for countries whose rates were floating or determining equilibrium parity rates for whose countries whose surviving rates were out of line with post war market conditions.

Despite the many of the critics of the Purchasing Power Theory that have been put forward, there is a reasonable theoretical foundation and explanation. However practical applications of the theory in real life scenarios may be uncertain especially in the long term. (Grigorianm, 2004).

Purchasing power parity plays a central role in forming the basis for under and overvaluation of currencies. It brings out an understanding that in perfect market commodities in different countries will denote same price. The theory can be related to Modigliani and Miller theory where rational investors take advantage of the market disequilibrium, in purchasing power parity investors would take advantage of

currency undervaluation if the prices of similar commodities in different countries is different with same currency. However, Rogoff (1996) disputes the existence of purchasing power parity due to the trade barriers and other factors that are product related or country specific. He says that, purchasing power parity do not always hold and depends on how tradable the commodity is.

The theory can be scattered in two forms which include absolute purchasing power parity (APPP) which generalizes the law of one price where similar good will command same price in different countries and relative purchasing power parity which states that the rate of growth in exchange rate help offset the differential between growth rate in home currency and price index in foreign country.

2.2.3 Balance of Payment Theory

The theory was developed by Hurne (1711-1776), where he argued that increase in the quantity of money set in inflation while decrease in the quantity of money supplied leads to deflation. Balance of payment theory links the nature of balance of payment on the currencies of a country where adverse balance of payment leads to depreciation of the local currency and favourable balance of trade enhance appreciation of the currency.

Hume (1711-1776) further explained that the forces of demand and supply play a significant role in determining the price of foreign money in relation to domestic currency in the foreign exchange currency. Therefore the external value of the currency of a country will arise on the basis of the existing demand and supply of the currency.

According to Kanamori and Zhao (2006) lesser demand of foreign exchange reduces the price of foreign exchange. This indicates that the rate of exchange in the foreign

exchange market is determined by the balance of payment. This theory is relevant to our study as it enlightens on the causes of appreciation and devaluation of currencies as well as what escalates the level of inflation whose relationship with balance of trade is paramount.

2.3 Empirical Review

2.3.1 Exchange Rate and Trade Balance

Exchange rate is the ratio of a countries currency as traded against that of another country (Arize & Igwe 2017). According to Gali and Monacelli (2005), changing one currency against that of foreign currencies causes balance of trade to fluctuate, for example a currency of a given country as compared to foreign currencies in the international trade, it will lead to increase in export and thus increase the balance of trade (Kandil, 2009).

Exchange rate is the rate at which a nation's currency is exchanged for another countries currency. The external value of each currency is indicated by the prevailing economic status of a country and also the purchasing power of individuals in comparison to other countries.

Eita (2018) comments that industries and companies perform and make profits by relying on imports from other countries experience adverse effects of the exchange rate. This he confirms is the case for Namibia's currency compared to other countries.

If there is depreciation of the local currency, this makes the export goods to be cheaper and thus encourages export and profit. This would stimulate the growth of the economy and consequently increase the trade and consequently balance of Payment.

The reverse is the case when there is an appreciation of the local currency. This therefore implies that the depreciation of the local currency has a positive effect on balance of Payment Past studies on exchange rate indicates contrasting findings on balance of trade as outlined below: A study conducted by Akbostanci (2002) in his study on the existence of j-curve in turkey between 1987-2000 using quarterly data found that the short-term behaviour of trade balance with respect to real exchange rate shocks showed an S-pattern rather than the j-curve. Another study by Falk (2008) on the determinant of trade balance using panel data for 32 industrialized economies between 1990 and 2007, found a positive significant relationship between trade balance as a percentage of GDP and real foreign exchange rate.

A study by Mohammad (2010) on long and short- run determinant of trade deficit in Pakistan, found out a significant relationship between foreign income, foreign direct investment and real effective exchange rate on trade deficit. On a study carried out in Malaysia on real exchange rate and balance of trade between 1955 - 2006, Geoi Mei (2008) found out that trade balance and exchange rate have a long run relationship.

Krueger (1983) elaborates a theoretical relationship between the rate of exchange and the balance of trade. Several other studies have been conducted to determine the influence of exchange rate on balance of trade with the main aim of providing valuable inputs to policy makers on the effectiveness of exchange rate policy such as devaluation-based adjustment policies.

According to Himarios (1989) exchange rate is assumed to change the real exchange rate and consequently has a direct influence on the trade balance. Specifically, Vural (2016) argues that depreciation of a currency willingly by a country and adjustment in devaluation of a currency of a country are the major ways in which competitive edge

is obtained. The decrease in Value of a currency has the effect of causing an increase in exports .This is because the exports become more available and affordable while on the other hand the imports become extremely expensive and therefore becomes less desirable and hence the trade balance improves.

Baharumshah (2001) examined economic factors that affect bilateral trade balances of Malaysia and Thailand with the US and Japan. An unrestricted VAR model was estimated using quarterly frequency data from 1980 to 1996. The results indicated a stable long-run relation between trade and three macro variables including exchange rate, domestic income and foreign income. The main findings of the study specifically revealed that the real effective exchange rate is an important variable in the trade balance equation since devaluation improves the trade balances of both economies in the long-run. Secondly domestic and foreign incomes affect trade of balance and that no J-curve effect and causal run from exchange rate to trade balance.

Wilson (2001) examined the interaction of real exchange rate and trade balance for trade of goods in merchandise. He investigated this bilateral trade occurring between various countries including Korea, Malaysia, Singapore, USA and Japan. The period under consideration was the period between 1970 and 1996.He adopted Rose and Yellen; s model of 1989 as originated from substitutes model. The results of the study revealed that real exchange rate does not significantly affect the real trade balance. This is the case for all the countries except the case of the trade between USA and Korea. For Trade between Malaysia and Singapore there was no evidence that the case for J-curve existed.

For Korea, however there was consistency in J-curves effects for Japan and USA while the results for a Korea indicated that the effects of exchange rate were being minimized a fair pricing of exports using foreign currency. There was however no evidence that imports decreased consequently as a result of the exchange rate. This would be required to support a strict interpretation of the J-curve

Levy and Sturzenegger (2003) investigated the relationship between exchange rate and economic growth In contrast with previous studies; their study findings showed that for developing countries, less flexible exchange rate regimes are associated with slower growth, as well as with greater output volatility. For industrial countries, regimes do not appear to have any significant impact on growth and hence Balance of Payment.

2.3.2 Interest Rate and Trade Balance

Interest rate is the cost of borrowing in a given economy. The difference in interest between home country and foreign country leads to capital mobility (Mundell, 1963) which helps in unveiling the effect of interest on balance of trade. According to a study by Hoffman and MacDonald (2009) on the relationship of real interest rate on balance of trade using bi-variate VAR using bilateral USA vis a vis G7 countries: Canada, Japan, France Germany, Italy and UK using real interest rate data between 1978-2007 and found that interest rate was economically significant on balance of trade.

Mohanty and Klau (2004), indicate that high interest rate leads to outflow of capital and thus leads to depreciation of currency. A study by Khan (2008), analyzing the short-term effect of interest rates on the balance of trade using annual data for the period 1960-2005, found that interest rate is negatively related to balance of trade.

According Easterly and Shmidt-Hebbel (1993) on the implication of budget deficit on macroeconomic variables for 10 developing countries is that high inflation leads to trade deficit which is followed by budget deficit.

Interest rates, inflation and other macro-economic variables form part of economic mechanisms. An increase in interest rate means an increase in the opportunity cost of household consumption. Therefore the increase in interest rate will lead to a reduction in spending by Households. In addition, organizations prefer to reduce on their investments than to incur additional cost in purchasing of equipment and machineries at higher interest rate. Since consumption by both households and firms' investments are the components of Gross Domestic Product (GDP), the GDP of a country would also be affected by an increase in interest rate.

Mwai, Nyaga and Kamau (2015) that interest rates not only influence the spending and savings but also affect other variables including the need for local currency, the price of products produced and the balance of payments.

Interest rate is a critical element in determining the monetary policy in a country. Tai and Lock (2017) confirm that one of the ways to improve the economy, the money supply policy is expanded and interest rates are then reduced. This policy is referred to as a flexible monetary policy. Where a conservative monetary policy is applied, the economy is restrained and the interest rates in turn increase. Many scholars have actually proven that in real situations, interest rates are influenced by leading in situations such as the government through the Central Banks which then determines the level of money supply. Interest rate has therefore been found to be critical as far as monetary policy decisions are concerned.

It is confirmed further that, if there is a change in interest rate, there exists resultant changes in other areas such as stock market, real estate, money market, and also goods and services market. This means that if interest rates increase it will lower the confidence of investors in all the markets. This is because the value of borrowing will exceed the return that investors will obtain from their investments. This will consequently reduce the disposable income of investors.

Bosworth (2014) further confirmed that the interest rate and investment are key variables affecting the rate of economic growth. He noted that changes in interest rates increase the cost of a business and reduce stock returns. Hansen and Seshadri (2013) added that interest rates have direct influence on banks' decision in security investments and stock market price.

Interest rate is an economic variable that calculates the cost of acquiring credit for Investment in an economy. It is said to negatively relate to investment, this means that high interest rate puts off investment ideas while low interest rate encourages investment ideas by potential investors. It often changes as a result of inflation, productivity of capital and Federal Reserve policies and also affects both the future cash flow of firms and discount rate. According to Fernando (2006), a rise in interest rate decreases corporate profitability and likewise leads to an increase in the discount rate applied to equity investors; both of which affects the economy adversely. Consequently, a rise in interest rate is expected to impact negatively on the performance of the organization and thus on the economy. Maxwell (2014) finds a negative long-run relationship between interest rates and Balance of Payment and also a uni- directional causality running from interest rates to Balance of Payment

Muhammad (2010) established that Citizens of such a country also receive the benefit of having the ability to choose between several competing goods and lower prices than they would otherwise experience. If the currency of the country is weaker and the country was enjoying a trade surplus. According to Milton Friedman, trade deficit simply means that consumers get to purchase and enjoy more goods at lower prices; conversely, a trade surplus implies that a country exported goods that its own citizens did not get to consume and while paying high price for the goods that were consumed.

2.3.3 Inflation Rate and Trade Balance

Inflation is the persistent increase in the prices of general commodities in a given economy (Melberg, 1992). An economy should depict price stability where the prices increase at low and predicable rate, any deviation from what is termed as low rate and predictable level amount to inflation.

Other scholars have considered inflation as the percentage rate of changes in the price level over time. It is generally measured by changes in Consumer Price Index (CPI). Its variation has impact on economic activities because it affects both aggregate demand and supply. High inflation means a decline in real income; investors react by selling off their assets (stocks inclusive) to enhance their purchasing power. Contrarily, low inflation motivates investors to acquire more assets. Another argument is that increase in the rate of inflation reduces stock prices because of the interaction of inflation with the tax system. Investors undervalue corporate stock during inflationary period because they fail to consider capital gain on corporate debt, and also they price stock to give an Earning Price Ratio that could be comparable to nominal rather than real interest rates Fama and Schwert (1977) had found evidence

that economic growth is negatively related to both the expected and the unexpected component of Consumer Price Index.

Sayed (1989) who looks into the correlation between the current account deficit and inflation in the Egyptian economy for the period (1975-1985). Sayed concluded that the various measures of inflation are consistent with their findings on the continuous increase of the general price level with the development that is happening in the current account deficit in the Egyptian economy.

When a county devalues its currency, it improves the Balance of Payments under ideal conditions known as the Marshall-Lerner condition. Devaluation causes the price of imports to rise relative to exports which, in theory, will increase the global competitiveness of domestic products (Kandil and Mirazaie, 2005).

Aye Mengistu and Lee (2014) examined the effects of the export sector in selected Asian countries. Ideally, the expectation is that inflation would have a positive effect on inflation. Their study did not find evidence for effects of inflation in improving trade balance. This they attributed to the fact that there was unresponsive effect from the exports due to decreased trading in local commodities and products that are manufactured. Dependence on imports was also seen as a big contributor to this problem since they become very expensive with the local currency.

Ademe (2016) confirmed negative relationship between inflation rates and trade balance. The price hike tends to reduce demand of foreigners on domestic goods as cost increases and affect trade balance negatively.

According to past research, depreciation of currency is expected to improve trade balance. As domestic currency depreciates, the competition in the local market also tends to increase since this lowers the relative price of local manufactured goods,

thereby improving trade deficit. The absorption approach confirmed that with currency depreciation, locally traded and manufactured goods and services become more attractive as compared to imported goods. The explanation is that the devaluation gives immediate effect on price of foreign goods. It reduces the local demand on foreign goods and foreign currency due to change in prices. As a result, the demand is shifted towards the local country and imports are reduced accordingly. Currency depreciation improves trade volume of exports to other countries at the same time decreases the trade volume of imports from foreign countries, hence improve trade balance (Jha, 2003).

The results also supported by Ogutu (2014), which shows that depreciation of currency has the potential to improve trade balance. However, the study finds no effect of exchange rate on trade balance in long run.

These results however contradicts with Bahmani-Oskooee et al. (2005), which found that depreciation can improve trade balance in long run but short run effect may be different. It was said that trade balance will deteriorate first and get better after some time.

Gylfason (1997) studied the relationship between export and some of its determinants including the inflation and used techniques of econometrics for the cross-sectional data of 160 countries. The results of his research concluded that high inflation is directly associated with low exports and has a significant influence. Further, the study shows that exporters of local goods tend to experience more inflation than the exporters of manufactures. Dexter et al. (2005) have conducted a crucial study in perspective of the US economy; they have concluded that the international trade has a

cogent impact on the inflation. However, the exports have a direct relationship with the inflation, and imports have an inverse association with the inflation.

In Pakistani, Khan and Gill (2010) carried out a study and examined the various macroeconomic determinants of inflation. For their study, they took data from 1972 to 2005. The results of the study concluded that the prices import, borrowings by the government, private sector borrowing, exchange rate, wheat support price, real demand, and government taxes all had a significant influence on inflationary process in case of the Pakistani economy.

A study by Sturzenegger (2002) on the sources of fluctuation on output and inflation conducted in the developed nations, that is Latin America and Asian countries indicates that stabilization could be expansionary particularly countries with high inflation. According to Mackowiak (2003), it is difficult to achieve stabilization without recession. A study by Ndungu and Ngugi (1999) indicated that inflation result from currency devaluation, monetary devaluation and other structural factors

Alemu and Sang (2014) investigated the relationship between currency depreciation and trade balance. Their study found that high inflation rates as well as lending interest rates result in a negative effect on trade balance. The reason give is that high inflation rate is harms economic growth and trade balance since the cost of borrowings lowers the rate of capital investment. Further, the high lending interest rate increases the cost of capital, and consequently leads to discouraging of potential business people in exporting of goods. Further, money supplies have contributed a lot to the changes of real exchange rates. However, the changes of exchange rates do not give major impact on bilateral trade balances.

Yiheyis and Musila (2018) looked at short term relationships between inflation and exchange rate and the resultant influence on trade in Uganda which has been experiencing consistence trade deficits. Other problems included consistently high inflation rates. The study results showed that depreciation of currency influences trade balance significantly in the long term. In the short term however there is a positive insignificant relationship where inflation increase leads to a change in exchange rates. The result is an economy that responds to the changes. Collectively both the short-run and long-run multipliers do not support the idea of J-curve as well as the S-curve effect.

The study gives very important information and provides suggestions as to the ways in which trade balance can be improved other than just improving on other variables such as exchange rates and policies. It therefore calls for a deeper look at other external macroeconomic variables including inflation rate and trade balance for developing economies and countries with small GDP.

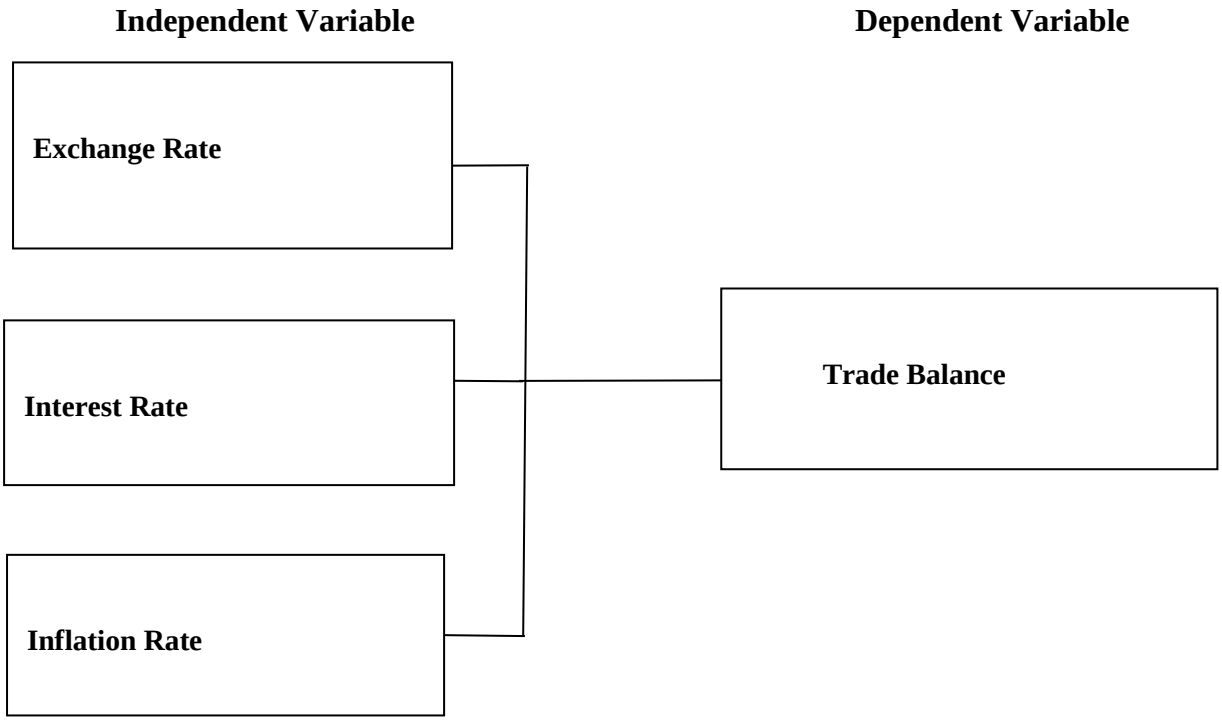
Stockman (1981) carried out an analysis of the relationship between exchange rates, inflation and the pattern of international trade including payments in reference to a small economy. The small economy is defined as one with utility maximizing agents and a transaction demand for money. The study findings showed that expected increase in general price of goods has a positive significant influence in the economy since it has a role in tax determination as well monetary transactions.

Increased rate of monetary expansion has an effect of causing a reduction in the price of local production as well as changing the makeup of the production. This in turn leads to a variation in the pattern of international competitive advantage and trade flows. In ordinary circumstances, a decline in the exchange rate as a result of a rise in

the rate of monetary expansion leads to a trade surplus and causes a capital outflow. On the other hand, a second depreciation leads to a deficit in trade.

2.3 Conceptual framework

It is used in research to outline possible courses of action or to present a preferred approach to an idea or thought. It shows an understanding of the relationship of the variables being reviewed (Bradley 2008)



Source: Author (2018)

Figure 1: Conceptual Framework

2.5 Literature Gap

Table 1: Literature Gap

	Author	Subject	Finding	Gap
1	Hook (2017)	Volatility of Malaysian exports to her trading partner	Trends in liberalization of capital promoted cross border flows and currency speculations	Fails to outline the country specific characteristics with regards to macro-economic indicators
2	Harvey and Hegerty (2017)	Japan balance of trade and asymmetric effect on fluctuations	Japan trade balance improved in the long run following the Yen depreciation in the global market	Its not clear from the study on the extent of change on trade balance resulting from currency depreciation
3	Danga and Kiptui (2016)	Determinants of nominal exchange rate fluctuations in Kenya	Found significant relationship between money supply, foreign exchange reserves and interest rates on nominal exchange rate	The study neglects the effects of the said variables on trade balance
4	Ogutu (2014)	Relationship between real exchange rate and balance of trade in Kenya	Found a negative relationship between real exchange rate and balance of trade.	The study by Ogutu only focused on the effect of one macroeconomic variable on trade balance which will be bridged by current study.

Source: Author (2018)

2.6 Summary of Literature Review

The literature reviewed above brings forth a deeper understanding of the macroeconomic variables on the balance of trade. The theories elaborate in details the concepts surrounding both the independent variable and dependent variables being studied. Previous studies conducted on interest rate, inflation rate as well as exchange rate position the current study in the existing literature and thus informs the researcher

not only on the qualitative aspects of the research but more importantly on the methodological approaches adopted in carrying out those studies.

In addition, exchange rates, interest rates and inflation rates are important in the management of a country macroeconomic stability, where low inflation and international competitiveness has become major policy target. This study was guided largely by the theories on monetary approach to the balance of payment, purchasing power parity theory and the interest rate parity theory. Several scholars and their work have presented empirical review of these macroeconomic variables. A study by Iyoboyia and Muftau (2014) investigated the impact of exchange rate depreciation on the Balance of Trade in Nigeria and found there was a causal relationship between Balance of Trade and exchange rate. This study therefore sought to fill this research gap and provide more evidence of the situation.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section is an overall scheme, plan or structure that aids the researcher in answering the raised research questions. This chapter sets out phases that were undertaken with regards to methodological aspects. Specifically the following subsections are included; research design, target population, data collection instruments, data collection procedures and finally data analysis & presentation.

3.2 Research Design

Research design refers to the method used to carry out a research. This research project was studied using descriptive research design. According to Cooper and Schindler (2003), a descriptive study is concerned with finding out the what, where and how of a phenomenon. Descriptive research design was chosen because it enables the researcher to gather in-depth information regarding the variables of the study.

3.3 Target Population

Target population in statistics is the specific population about which information is desired. According to Ngechu (2004), a population is a well-defined or set of people, services, elements and events, group of things or households that are being investigated. The study targeted the country's economy in totality.

3.4 Data Collection Method

The study used secondary data in reaching at the conclusion. The study gathered data relating to inflation, interest rate, exchange rate as well as trade balance from 1985 to 2015. The relevant data was retrieved from the World bank database. Other secondary

data were gathered from the internet, books as well as central banks articles and documents.

3.5 Data Analysis Technique

After data was collected, it was screened for errors and then analyzed, the study used descriptive statistics method which involved use of measures of central tendency as well as measures of dispersion such as standard deviation, variance and ratios etc. The researcher employed the use of Eviews 9 software in the analysis and present the findings through the use of professional tables, graphs and charts. The following model was fitted in the data:

$Y_t = a_{ot} + a_1X_{1t} + a_2X_{2t} + a_3X_{3t} + \mathcal{E}$

$Y_t = a_t + a_1EXR_t + a_2INR_t + a_3INF_t$ (Fitted regression Model)

Where,

Y = Trade balance (TB)

$\mathbf{X_1}$ = Exchange Rate (EXR)

$\mathbf{X_2}$ = Interest Rate (INR)

$\mathbf{X_3}$ = Inflation (INF)

$\mathcal{E}$ = Error

$\mathbf{a_1}, \mathbf{a_2}, \mathbf{a_3}$, = Regression coefficients, while, $\mathbf{a_o}$ = Constant

Classical regression modelling assumptions on serial correlation, heteroscedasticity, normality, randomness of error terms and multicollinearity were tested. Serial correlation was tested using Breusch-Godfrey test that assumed that there was no serial correlation against an alternative of serial correlation. Presence of first order

serial correlation can be mitigated through use of fixed generalized least squares model. White test was applied to test for heteroscedasticity, it null hypothesis stated that there was no heteroscedasticity and if p value was less than 0.05, then there was enough evidence to warrant rejection of the null hypothesis and acceptance of presence of heteroscedasticity. If present it can be mitigated through fitting of feasible generalized least squares model. Normality was tested through graphical method and use of Jarque-Berra test and if p value was greter than 0.05, then the data was normally distributed otherwise would be skewed to the right or the left. Multicollinearity was tested through correlation analysis and if independent variables had correlation coefficient greater than 0.7 against each other then there were correlated and model respectification ought to have been carried out or some variables dropped from the equation (Baltagi, 2005).

3.6 Time Series Properties

3.6.1 Unit Root Test

Unit root test was conducted to check whether the data is stationary or stochastic. This was done through the use of Augumented Dickey Fuller test, the null hypothesis is that there is unit root and therefore we accept the null hypothesis if test-statistic is < than the absolute value of the critical value thus we accept the H_0 that the series has a unit root meaning the trend will be non - stationary and therefore need de - trending through first difference.

3.6.2 Granger Causality

Granger causality was carried out to show the explanatory power variables under explanation (Granger, 1988). Variables under examination are said to granger cause each other whenever historical pattern can explain current features of themselves

(Zou, Ladrou, Guo & Feng, 2010). Hence, granger causality was carried out to evaluate the effect of interest rate, inflation rate and exchange rate on trade balance in Kenya.

3.6.3 Cointegration and Error Correction Mechanisms

Determinsitsic or stochastic trends has likelihood of fitting spurios models which poses problematic interpretation. They may have high explanatory power and goodness of fit statistics. To alleviate this challenge they ought to be differenced and ultimately they loss long run value contribution. This can be reminded through co-integration which minimize information loss through de-trending. Moreover, it eliminates likelihood of fitting spurios regression though it accommodates correlation with non-stationary parameters. To examine long run characteristics of variables under examination error correction mechanism or co-integration analysis through feedback mechanism is applied. Hence, error correction model was fitted in the study.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This section presents study findings; descriptive, regression and time series analysis were adopted for data analysis. Descriptive statistics were deployed to show distribution of study variables. Regression analysis was carried out to show applicability of classical regression on analysis the study data. Time series was adopted since the study failed on classical regression assumptions. Also, the findings will be compared with existing empirical and theoretical evidence to evaluate their conformity and disagreement.

4.2 Descriptive Statistics

Study findings in Table 4.1 shows descriptive analysis of study variables. In this study trade balance was operationalized as natural logarithms of absolute values of trade balance, exchange rate was operationalized as natural logarithms of exchange rate, interest rate and inflation rate were operationalized as increase in interest rate and inflation rate from 100 percent which was the base rate. The average trade balance was 20.9, was negatively skewed and not normally distributed since its Jarque_Bera coefficient was less than 0.05, hence null hypothesis of normality of data was rejected. The average exchange rate was 4, with a minimum of 2.8 and maximum of 4.6. Exchange rate and interest rate were normally distributed since their Jarque-Bera coefficients had p value greater than 0.05. The average increase in interest rate and inflation rate was 10% though inflation rate had maximum increase of 50% as compared to interest rate which increased by 20%. Inflation rate was not normally distributed since Jarque-Bera p value was less than 0.05.

Table 4.1 Descriptive Statistics

	Trade balance	Exchange rate	Interest rate	Inflation rate
Mean	20.9	4.0	1.1	1.1
Median	21.1	4.2	1.1	1.1
Maximum	23.0	4.6	1.2	1.5
Minimum	15.3	2.8	0.9	1.0
Std. Dev.	1.8	0.6	0.1	0.1
Skewness	-1.4	-1.0	-0.2	1.9
Kurtosis	5.1	2.5	2.9	6.9
Jarque_Bera	16.3	5.9	0.3	37.4
Probability	0.0	0.1	0.9	0.0
Sum	647.4	122.7	33.6	34.8
Sum Sq. Dev.	92.7	10.5	0.1	0.3
Observations	31	31	31	31

4.3 Regression Analysis

Classical regression analysis was carried out to examine causality between exchange rate, interest rate, inflation rate and trade balance. As shown in Table 4.2, there was significant relationship between exchange rate, interest rate, inflation rate and trade balance ($F=12.4$, p value < 0.05) and at least one of marco-economic variable was non-zero. Exchange rare, inflation rate and interest rate jointly explained 0.6, 60 percent of changes in trade balance while the remaining percentage was explained by other factors excluded in the model. Further, exchange rate had positive and significant effect on trade balance ($\beta = 2.2$, p value < 0.05). Interest rate had positive and non-significant effect on trade balance ($\beta = 1.0$, p value > 0.05). Inflation rate had negative and insignificant effect on trade balance ($\beta = -0.6$, p value > 0.05).

Table 4.2 Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	11.6	5.5	2.1	0.0
Exchange rate	2.2	0.4	5.9	0.0
Interest rate	1.0	3.4	0.3	0.8
Inflation rate	-0.6	2.5	-0.2	0.8
R-squared	0.6	Mean dependent variable		20.9
Adjusted R-squared	0.5	S.D. dependent variable		1.8
S.E. of regression	1.2	Akaike info criterion		3.3
Sum squared residuals	38.9	Schwarz criterion		3.5
Log likelihood	-47.5	Hannan-Quinn criterion.		3.4
F-statistic	12.4	Durbin-Watson stat		1.2
Prob (F-statistic)	0.0			

4.3.1 Test for Serial Correlation

After fitting classical regression model fitness was evaluated; specifically, homoscedasticity, serial correlation, randomness of error term, normality of error term and multicollinearity of macro-economic variables. Serial correlation was tested using Breusch-Godrey serial correlation which hypothesed that there was no serial correlation against an alternative of first order serial correlation. As shown in in Table 4.3 there was no first order serial correlation.

Table 4.3 Breusch-Godfrey Serial Correlation LM Test

F-statistic	2.357581	Prob. F(2,25)	0.1154
Obs*R-squared	4.919038	Prob. Chi-Square(2)	0.0855

4.3.2 Test for Heteroskedasticity

Homoscedasticity is an assumption that there is equal variance of error term. Error term is said to violate this assumption if an increase in independent variable or decrease is associated with changes in variance of error terms. White test for heteroscedasticity was applied with a null hypothesis that there was homoscedasticity against an alternative that there was no homoscedasticity. As shown in Table 4.4, the p value was less than 0.05, which indicated that there was enough evidence to warrant rejection of null hypothesis and conclusion that there was heteroskedasity and use of ordinary least squares model was not appropriate in the study since there were high chances of drawing biased conclusions.

Table 4.4 White Test for Heteroscedasticity

F-statistic	3.010395	Prob. F(9,21)	0.018
Obs*R-squared	17.46388	Prob. Chi-Square(9)	0.0419
Scaled explained SS	16.87124	Prob. Chi-Square(9)	0.0508

4.3.3 Normality Test

Pictorial presentation in Figure 4.1 depicted that the error term was not normally the p value for Jarque-Bera 0.05. This calls for data transformation prior to fitting regression model.

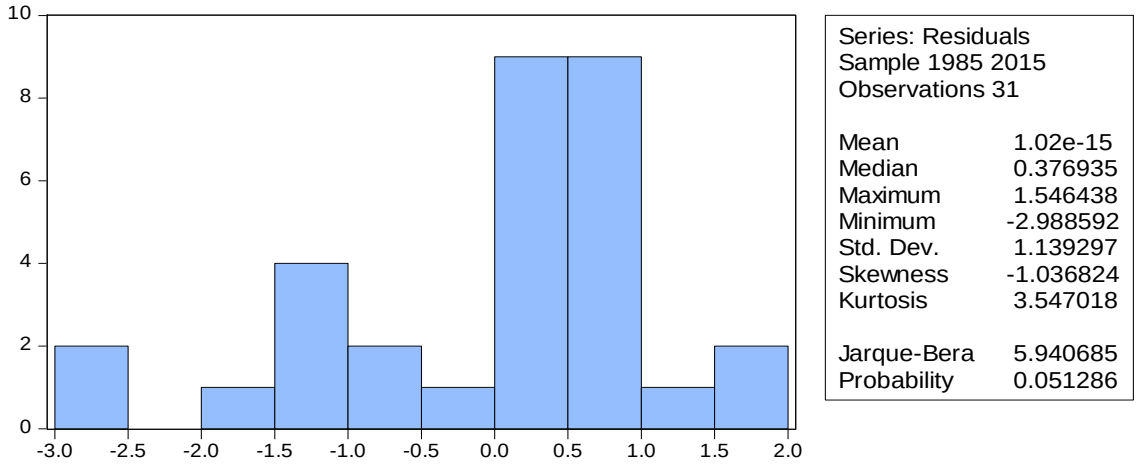


Figure 4.1 Normality Test

4.3.4 Test for Randomness of Error Term

Test for randomness of error term depicted that there was a certain pattern that was followed by variables under examination during the study. In some instances, there were upward and downward patterns. In earlier periods low values were documented as compared to recent periods.

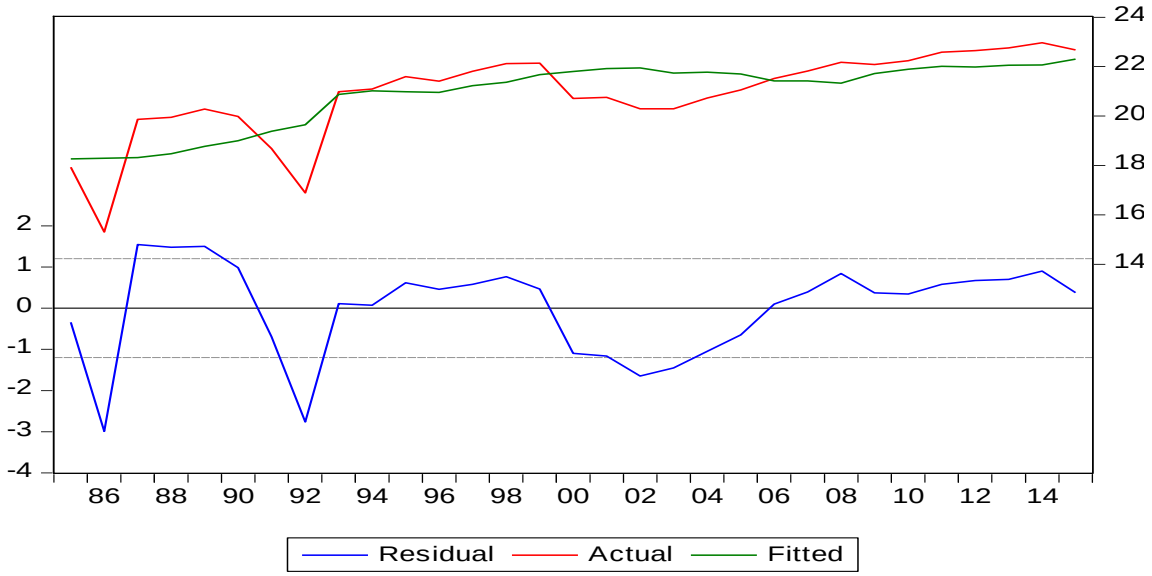


Figure 4.2 Test for Randomness of Error Term

4.3.4 Correlation Analysis

Product moment correlation analysis was carried out to evaluate the strength of effect between macro-economic variables and trade balance. Also, it examined the strength of association among exchange rate, interest rate and inflation rate. As depicted in Table 4.5 there was positive and significant effect between trade balance and exchange (rho = 0.8, p value < 0.05). Interest rate had positive and non-significant effect of trade balance (rho = 0.2, p value > 0.05). Thirdly, inflation rate had negative and non-significant effect on trade balance (rho = -0.1, p value > 0.05). Exchange rate had positive and non-significant effect on interest rate. Inflation rate had negative effect on exchange rate. Interest rate had negative effect on inflation rate. Since none of independent variables had correlation coefficient greater than 0.8 then there was no collinearity among independent variables.

Table 4.5 Correlation Analysis

	Trade balance	**Exchange rate**	**Interest rate**	**Inflation rate**
Trade balance	1			
Exchange rate	0.8	1		
	0.0			
Interest rate	0.2	0.1	1	
	0.4	0.4		
Inflation rate	-0.1	-0.1	-0.3	1
	0.4	0.5	0.1	

4.4 Stationarity Test

Stationarity was tested using Augmented Dickey Fuller (ADF) test. The null hypothesis stated that the data was stationary against an alternative that the data was not stationary. As shown trade balance, exchange rate and inflation rate were not stationary. Consequently, stationarity at first difference was evaluated.

Table 4.6 Stationarity Test at Levels

Variable	Test at levels	ADF Test		
		T statistic	Critical Value at 5%	P value
Trade balance	Constant	-2.49	-2.96	0.13
	Constant and Trend	-3.45	-3.61	0.07
Exchange rate	Constant	-1.89	-2.96	0.33
	Constant and Trend	-1.25	-3.57	0.88
Interest rate	Constant	-3.89	-2.96	0.01
	Constant and Trend	-3.83	-3.57	0.03
Inflation rate	Constant	-3.01	-2.96	0.04
	Constant and Trend	-3.14	-3.57	0.12

As shown in Table 4.7 exchange rate and inflation rate were stationary after first difference while trade balance was not stationary. Hence, trade balance second difference was applied.

Table 4.7 Stationarity Test at First Difference

Variable	Test at first difference	ADF Test		
		T statistic	Critical Value at 5%	P value
Trade balance	Constant	-2.77	-3.00	0.08
	Constant and Trend	-3.02	-3.62	0.15
Exchange rate	Constant	-4.48	-2.97	0.00
	Constant and Trend	-4.82	-3.57	0.00
Inflation rate	Constant	-5.79	-2.97	0.00
	Constant and Trend	-5.74	-3.58	0.00

As shown in Table 4.8, trade balance was stationary in second difference. Hence, while fitting time series model it was necessary to lag it more as compared to other variables under examination.

Table 4.8 Stationarity Test at Second Difference

Variable	Test at second difference	ADF Test		
		T statistic	Critical Value at 5%	P value
Trade balance	Constant	-3.82	-3.00	0.01
	Constant and Trend	-3.74	-3.63	0.04

4.5 Cointergration Test

Upon examination of degree of integrated which revealed that all variables were integrated at order two. Though, interest rate was stationary at levels, exchange rate and inflation rate at first difference. It was important to evaluate cointegration through use of Johansen Cointegration. It was applied since it has capacity to deal multivariate cointegrating attributes. Furthermore, it is credited with capacity to separate long and short run effect of attributes under examination. Trace statistics were applied in the current study. As depicted in Table 4.9 there were at most two cointegrating equations as indicated by Trace statistics. Consequently, there was a long run equilibrium of variables under examination. Due to the presence of two cointegrating equations vector error corrected model was fitted prior to which granger causality was carried out.

Table 4.9 Johansen Cointergration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.79	77.08	47.86	0.00
At most 1 *	0.49	32.01	29.80	0.03
At most 2	0.22	12.61	15.49	0.13
At most 3 *	0.17	5.43	3.84	0.02
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

4.6 Granger Causality

Granger causality was carried out to examine causality of exchange rate, interest rate, inflation rate and trade balance. As shown in Table 4.10, there was no causality between exchange rate and trade balance, interest rate and trade balance. Though there was unidirectional causality from inflation rate to interest rate. None of macro-economic variables had influence on each other. Hence, it can be concluded that there was no substantial effect of exchange rate and interest rate on trade balance.

Table 4.10 Granger Causality

Null Hypothesis:	F-Statistic	Prob.	Conclusion
Exchange rate does not Granger Cause Trade balance	2.25	0.13	
Trade balance does not Granger Cause exchange rate	1.79	0.19	No causality
Interest rate does not Granger Cause trade balance	1.42	0.26	
Trade balance does not Granger Cause interest rate	0.20	0.82	No causality
Inflation rate does not Granger Cause trade balance	0.08	0.92	
Trade balance does not Granger Cause inflation rate	3.83	0.04	Unidirectional causality from inflation rate to trade balance
Interest rate does not Granger Cause exchange rate	0.08	0.92	
Exchange rate does not Granger Cause interest rate	2.97	0.07	No causality
Inflation rate does not Granger Cause exchange rate	0.12	0.88	
Exchange rate does not Granger Cause inflation rate	2.25	0.13	No causality
Inflation rate does not Granger Cause interest rate	1.52	0.24	
Interest rate does not Granger Cause inflation rate	0.64	0.54	No causality

4.7 Vector Error Correction Model

Upon confirmation that the data was time series and integrated to order two. Due to presence of cointegrating equation the VECM was the most appropriate model to fit so as to examine short run and long run equilibrium of variables under examination. To minimize likelihood of error misspecification it is necessary to examine maximum number of lags.

4.7.1 Lag Selection Criterion

Lag selection criterion was carried out using sequential modified LR test statistics, final prediction error, Akaike information criterion, Schwartz information criterion and Hanna-Quinn information criterion. Study findings in Table 4.11 revealed that the optimal number of lags were two as indicated by LR, AIC, FPE and HQ.

Table 4.11 Lag Selection Criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	12.2393	NA	6.52E-06	-0.58852	-0.39821	-0.53034
1	76.15892	105.0108	2.16E-07	-4.01135	-3.059776	-3.72045
2	98.33525	30.09646*	1.50e-07*	-4.452518*	-2.73968*	-3.928888*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

4.7.2 Results for Vector Error Correction Model

As shown in Table 4.12, trade balance is explained 54.44 percent by lagged trade balance, exchange rate, interest rate and inflation rate. Trade balance was not significantly affected by lagged trade balance, exchange rate and interest rate.

D (Trade balance,2) = C(1)*(D(Trade balance(-1)) +1.33195500878*Exchange rate(-1) + 4.2804759805*Interest rate(-1) + 2.35505821446*Inflation rate(-1) - 12.8335536692) + C(2)*D(Trade Balance(-1),2) + C(3) *D(Trade Balance(-2),2) + C(4)*D(Exchange Rate(-1)) + C(5) *D(Exchange Rate(-2)) + C(6)*D(Interest Rate(-1)) + C(7) *D(Interest Rate(-2)) + C(8)*D(Inflation Rate(-1)) + C(9) *D(Inflation Rate(-2)) + C(10)

An R squared of 0.675 indicated that 67.5 percent of changes in lagged exchange rate, was accounted for by trade balance, interest rate and inflation rate while the remaining percentage could be accounted for by other factors which were excluded in the model. The resultant equation revealed that exchange rate was significantly affected by lagged interest rate and lagged trade balance.

D (Exchange Rate) = C(11)*(D(Trade Balance(-1)) +1.33195500878*Exchange Rate(-1) + 4.2804759805*Interest Rate(-1) + 2.35505821446*Inflation Rate(-1) - 12.8335536692) + C(12)*D(Trade Balance(-1),2) + C(13) *D(Trade Balance(-2),2) + C(14)*D(Exchange Rate(-1)) + C(15) *D(Exchange Rate(-2)) + C(16)*D(Interest Rate(-1)) + C(17) *D(Interest Rate(-2)) + C(18)*D(Inflation Rate(-1)) + C(19) *D(Inflation Rate(-2)) + C(20).

An R squared on 0.546, depicted that 54.6 percent of changes in interest rate is accounted for lagged trade balance, interest rate, exchange rate and inflation rate.

With exception of lagged interest rate, trade balance, exchange rate and inflation rate had no significant effect on interest rate.

D (Interest Rate) = C(21)*(D(Trade Balance(-1)) +1.33195500878*Exchange Rate(-1) + 4.2804759805*Interest Rate(-1) + 2.35505821446*Inflation Rate(-1) - 12.8335536692) + C(22)*D(Trade Balance(-1),2) + C(23) *D(Trade Balance(-2),2) + C(24)*D(Exchange Rate(-1)) + C(25) *D(Exchange Rate(-2)) + C(26)*D(Interest Rate(-1)) + C(27) *D(Interest Rate(-2)) + C(28)*D(Inflation Rate(-1)) + C(29) *D(Inflation Rate(-2)) + C(30).

An R squared on 0.734 depicted that 73.4 percent of changes in inflation rate can be accounted for by lagged trade balance, interest rate, inflation rate and exchange rate. Lagged trade balance and inflation rate had significant effect on inflation rate. Interest rate and exchange rate had no significant effect on inflation rate.

D (Inflation Rate) = C(31)*(D(Trade Balance(-1)) +1.33195500878*Exchange Rate(-1) + 4.2804759805*Interest Rate(-1) + 2.35505821446*Inflation Rate(-1) - 12.8335536692) + C(32)*D(Trade Balance(-1),2) + C(33) *D(Trade Balance(-2),2) + C(34)*D(Exchange Rate(-1)) + C(35) *D(Exchange Rate(-2)) + C(36)*D(Interest Rate(-1)) + C(37) *D(Interest Rate(-2)) + C(38)*D(Inflation Rate(-1)) + C(39) *D(Inflation Rate(-2)) + C(40).

Table 4.12 Results for Vector Error Correction Model

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1.09	0.46	-2.40	0.02
C(2)	0.60	0.55	1.10	0.27
C(3)	0.22	0.27	0.84	0.40
C(4)	-5.58	3.14	-1.78	0.08
C(5)	4.07	2.67	1.53	0.13
C(6)	-0.91	4.23	-0.21	0.83
C(7)	-0.55	3.52	-0.16	0.88
C(8)	0.86	3.76	0.23	0.82
C(9)	-0.91	3.45	-0.26	0.79
C(10)	0.16	0.33	0.49	0.63
C(11)	-0.13	0.03	-4.02	0.00
C(12)	0.08	0.04	1.90	0.06
C(13)	0.02	0.02	1.04	0.30
C(14)	0.08	0.23	0.33	0.74
C(15)	0.12	0.19	0.62	0.54
C(16)	0.67	0.31	2.17	0.03
C(17)	0.63	0.26	2.45	0.02
C(18)	0.08	0.27	0.30	0.76
C(19)	-0.12	0.25	-0.47	0.64
C(20)	0.06	0.02	2.53	0.01
C(21)	0.03	0.03	0.96	0.34
C(22)	-0.02	0.03	-0.71	0.48
C(23)	0.00	0.02	-0.20	0.84
C(24)	0.24	0.18	1.33	0.19
C(25)	0.01	0.15	0.06	0.95
C(26)	-0.59	0.24	-2.41	0.02
C(27)	-0.40	0.20	-2.00	0.05
C(28)	0.19	0.22	0.88	0.38
C(29)	0.10	0.20	0.50	0.62
C(30)	-0.02	0.02	-0.99	0.33
C(31)	-0.09	0.02	-4.15	0.00
C(32)	0.06	0.03	2.39	0.02
C(33)	0.02	0.01	1.73	0.09
C(34)	-0.05	0.15	-0.33	0.74
C(35)	-0.23	0.13	-1.81	0.07
C(36)	0.40	0.21	1.96	0.05
C(37)	-0.07	0.17	-0.41	0.68
C(38)	-0.33	0.18	-1.83	0.07
C(39)	-0.37	0.17	-2.22	0.03
C(40)	0.02	0.02	1.51	0.14

Equation: D(Trade Balance,2) = C(1)*(D(Trade Balance(-1)) +1.33195500878*Exchange Rate(-1) + 4.2804759805*Interest Rate(-1) + 2.35505821446*Inflation Rate(-1) -12.8335536692) + C(2)*D(Trade Balance(-1),2) + C(3) *D(Trade Balance(-2),2) + C(4)*D(Exchange Rate(-1)) + C(5) *D(Exchange Rate(-2)) + C(6)*D(Interest Rate(-1)) + C(7) *D(Interest Rate(-2)) + C(8)*D(Inflation Rate(-1)) + C(9) *D(Inflation Rate(-2)) + C(10)

R-squared	0.544469	Mean dependent variable	-0.01363
Adjusted R-squared	0.303305	S.D. dependent variable	1.50356
S.E. of regression	1.254995	Sum squared residuals	26.77522
Durbin-Watson stat	2.07055		

Equation: D(Exchange Rate) = C(11)*(D(Trade Balance(-1)) +1.33195500878*Exchange Rate(-1) + 4.2804759805*Interest Rate(-1) + 2.35505821446*Inflation Rate(-1) -12.8335536692) + C(12)*D(Trade Balance(-1),2) + C(13) *D(Trade Balance(-2),2) + C(14)*D(Exchange Rate(-1)) + C(15) *D(Exchange Rate(-2)) + C(16)*D(Interest Rate(-1)) + C(17) *D(Interest Rate(-2)) + C(18)*D(Inflation Rate(-1)) + C(19) *D(Inflation Rate(-2)) + C(20)

R-squared	0.675436	Mean dependent variable	0.063354
Adjusted R-squared	0.503608	S.D. dependent variable	0.129388
S.E. of regression	0.09116	Sum squared residuals	0.141274
Durbin-Watson stat	2.158713		

Equation: D(Interest Rate) = C(21)*(D(Trade Balance(-1)) +1.33195500878*Exchange Rate(-1) + 4.2804759805*Interest Rate(-1) + 2.35505821446*Inflation Rate(-1) -12.8335536692) + C(22)*D(Trade Balance(-1),2) + C(23) *D(Trade Balance(-2),2) + C(24)*D(Exchange Rate(-1)) + C(25) *D(Exchange Rate(-2)) + C(26)*D(Interest Rate(-1)) + C(27) *D(Interest Rate(-2)) + C(28)*D(Inflation Rate(-1)) + C(29) *D(Inflation Rate(-2)) + C(30)

R-squared	0.546273	Mean dependent variable	-0.00062
Adjusted R-squared	0.306064	S.D. dependent variable	0.086752
S.E. of regression	0.072267	Sum squared residuals	0.088783
Durbin-Watson stat	1.81894		

Equation: D(Inflation Rate) = C(31)*(D(Trade Balance(-1)) +1.33195500878*Exchange Rate(-1) + 4.2804759805*Interest Rate(-1) + 2.35505821446*Inflation Rate(-1) -12.8335536692) + C(32)*D(Trade Balance(-1),2) + C(33) *D(Trade Balance(-2),2) + C(34)*D(Exchange Rate(-1)) + C(35) *D(Exchange Rate(-2)) + C(36)*D(Interest Rate(-1)) + C(37) *D(Interest Rate(-2)) + C(38)*D(Inflation Rate(-1)) + C(39) *D(Inflation Rate(-2)) + C(40)

R-squared	0.739228	Mean dependent variable	-0.00211
Adjusted R-squared	0.601173	S.D. dependent variable	0.096572
S.E. of regression	0.060988	Sum squared residuals	0.063231
Durbin-Watson stat	1.974722		

4.8 Post Estimation Analysis

Post estimation analysis was carried to confirm the model adopted in examination of the effect of marco-economic variables was stable. Serial correlation test was tested using Langragian multiplier test and stability condition was examined to indicate it was unit. Impulse response and var

iance decomposition were also carried out.

4.8.1 Autocorrelation

Auto correlation was tested using Langragian multiplier test. As shown in Table 4.13, there was no serial correlation since the p value for second lag was less than 0.05. This indicated that there was enough evidence to warrant rejection of the null hypothesis at 5 percent level of significance.

Table 4.13 Autocorrelation

Lags	LM-Stat	Prob
1	15.67885	0.4756
2	33.14462	0.0071

4.8.2 Stability of Variance

As shown in Table 4.14 there was stability of variance since all modulus of roots characteristics polynomials did not exceed 1. These findings concurred with Kiriba (2015) on his examination on relationship between lagged macroeconomic variables and stock return of listed insurance companies in Nairobi securities exchange.

Table 4.14 Stability of Variance

Root	Modulus
1	1
1	1
1	1
-0.447463 - 0.627557i	0.770747
-0.447463 + 0.627557i	0.770747
0.017474 - 0.679622i	0.679846
0.017474 + 0.679622i	0.679846
0.552068 - 0.331306i	0.64385
0.552068 + 0.331306i	0.64385
-0.55495	0.554953
-0.156741 - 0.361865i	0.394352
-0.156741 + 0.361865i	0.394352

4.9 Impulse Response

Pictorial presentation in Figure 4.3 depicted impulse response of trade balance on exchange rate, interest rate and inflation rate. Lagged trade balance responded negatively to exchange rate, inflation rate and interest rate at initial period though there were reversal of events which were characterized by positive trend within the remaining period under examination. Interest rate and lagged trade balance recorded negative shocks in the initial periods in relation to exchange rate. Inflation rate had negative effect on exchange rate throughout the period under examination. Inflation rate recorded negative shocks to lagged trade balance, exchange rate and interest rate throughout the period under examination.

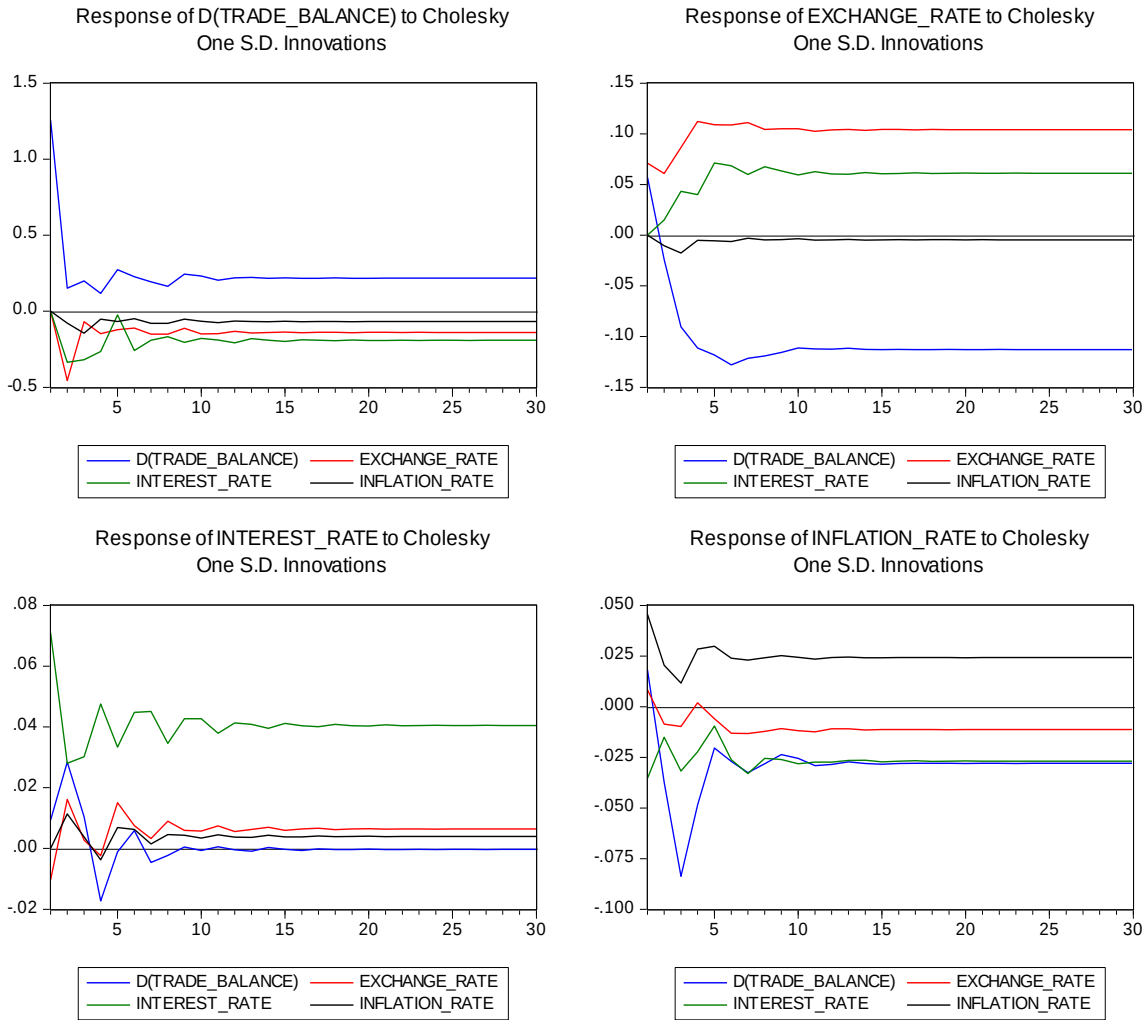


Figure 4.3 Impulse Response

4.10 Variance Decomposition

Variance decomposition was carried out to evaluate proportionate shocks in trade balance that was attributed to exchange rate, inflation rate and interest. Hence, there can be incorporated in examination of their significance in examination of trade balance. As shown in Figure 4.4 interest rate had the most significant contribution on trade balance followed by exchange rate and the least role was attributed to inflation rate.

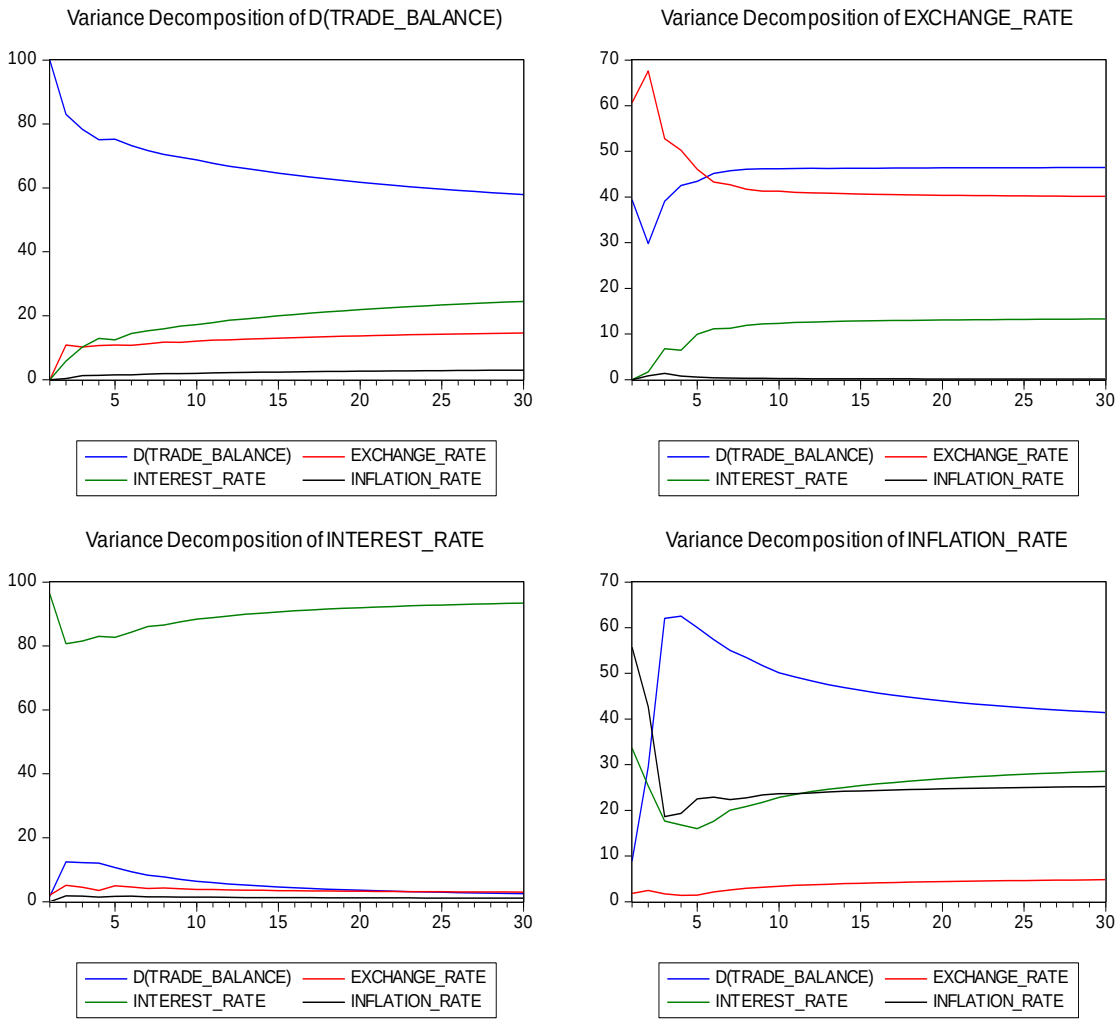


Figure 4.4 Variance Decomposition

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This chapter presents discussion, conclusion and recommendations of findings. Policy and empirical recommendations will be drawn and future areas of study interest will be documented.

5.2 Summary of the Findings

The current study stemmed forth from empirical, theoretical, methodological and timely gaps which arose from past documented studies. Conceptually, study had examined effect of different macroeconomic variables on economic growth and development, stock market performance and growth and limited attention had been drawn on effect of macro-economic variables on trade balance though it has significant contribution. Also, methodological issues could be easily identified from past studies since despite of collecting time series data they applied ordinary least squares even without carrying out diagnostic test an issue which would have increased likelihood of drawing biased conclusion. Empirical evidence has been skewed towards developed economies though they are known to enjoy comparative advantage which may impact positively on their balance of trade as compared to developing economies. They are different changes which have taken place since 1987, politically, economically and they may have impacted trade pattern in Kenya within the said period thus the need to evaluate them empirical. Consequently, an examination on the effect of exchange rate, inflation rate and interest rate was carried out. The specific objectives of the study were to examine the effect of exchange rate, inflation rate and interest rate on balance of trade.

5.2.1 Exchange Rate and Trade Balance

The first objective examined the effect of exchange rate on trade balance in Kenya. Regression analysis revealed positive and significant effect of exchange on interest rate. These results discredited Akbostanci (2002) who documented non-linear relationship between trade balance and real exchange rate in Turkey though the data was quarterly. The study confirmed Falk (2008) who documented positive significant effect of balance of payment on exchange rate in industrialized economies. Further, the study confirmed documented evidence by Mohammad (2010) in Pakistan though the study was short run in nature. Documented evidence on interest rate and trade balance refuted study findings by Bosworth (2014) who argued that interest rate and investment return rate are crucial on economic growth and development. Furthermore, the study refuted arguments by Hansen and Seshadri (2013) who argued that interest rate had greater influence on banking decision which has pivotal role in local and international trade.

5.2.2 Interest Rate and Trade Balance

The effect of interest rate on trade balance was examined. It was documented that there was no significant effect of interest rate on trade balance. These findings concurred with Mohanty and Klau (2004) who argued that increased interest increases flow of capital which may attributed to huge of foreign currency to finance trade deficit. They discredited Khan (2008) who documented inverse effect of interest rate on trade balance. Furthermore, the study concurred with Mwai et al., (2015) who argued that consumption is dependent on prevailing interest rate and their increase would signal increased demand of trade deficit. This was in contrast with

recommendation with Tai and Lock (2017) who purported that interest rate can be used to improve money supply which would trigger increased expenditure.

5.2.3 Inflation and Trade Balance

The third objective of the study examined the effect of inflation rate on trade balance in Kenya. It was documented that inflation rate had inverse and non-significant effect on trade balance. These findings failed to concur with Aye et al., (2016) who argued that inflation rate has positive effect on trade balance in Asia. A caution was suggested to eliminate likelihood of constraining the demand and supply of local currency. This would increase its costs and narrow balance of trade gaps. Ademe (2016) recorded negative effect of inflation on trade due to limited currency supply among suppliers. Ogutu (2014) documented that inflation rate depreciates currency purchasing power. This lowers export and widens trade balance gap. Khan and Gill (2010) recommended against reliance on foreign currency so as to control inflationary pressure. This would cement Alemu and Sang (2014) who documented that currency depreciation lowers trade balance.

5.3 Conclusion

From the study findings the following conclusion can be drawn. Since exchange rate had positive and significant effect on trade balance. There is need for encouragement of local exports so as to narrow trade balance gaps. This would not only increase the demand for local currency amongst those importing into Kenyan market but also encourage exploitation of comparative advantage in Kenya. Since Kenya is developing and its main economic engagement is agricultural based there is need for development of agricultural value addition activities so as to boost the value and quality of export from Kenya. Real exchange rate against the dollar positively affect

the balance of trade in Kenya, this is because a stronger currency reduces the cost of imports in the international market. Exchange rate fluctuations can be controlled at the country level by ensuring that the country's economy is stable through attraction of foreign investment and productivity in the country.

Secondly, interest rate had positive effect on trade balance in Kenya. There is need for government to minimize reliance borrowing locally and internationally. This would aid in mitigation against increased interest rate which would promote growth of local production capacity. Government local and international borrowing can only be alleviated through development of tax collection measures and minimization of tax spillage, sheltering and filtering which would aid in undertaking of social and economic development projects. The lending interest rate showed a positive effect on trade balance which explains the willingness of the financial institutions to extend credit facilities as a result of the motivation factor in terms of interest. The borrowers are thereafter able to finance their business operations which goes a long way in increasing the amount of exports from the various productive sectors of the economy such as the agricultural sector which is the backbone of the economy.

Inflation rate had negative effect on trade balance in Kenya. There is need for government to management consumer price index through use of monetary and macroeconomic policies. This should be exercised carefully to minimized likelihood of overreliance on imported products which may lead to increased import and less exports which would widen trade gaps. Customer price inflation has a negative effect on the balance of trade, this is due to the effect it has on the purchasing power of money. The effect of inflation is immensely adverse as it discourages spending in the purchase of local commodities, this increases the introduction of goods from foreign

countries which end up increases the level of imports into the country thus contributing to adverse trade balance.

5.4 Recommendation

From the study findings it's recommended that; Kenyan government should develop database system that would guide on examination of trade balance, exchange rate, inflation rate and interest rate. Through, this Kenyan government would adopt policies that would cushion its currency from external threats and shocks. Further, it would mitigate against likelihood of influencing the forces of demand and supply on the favor of specific party. Through, incorporation of data in decision making it would be easier to evaluate historical patterns and forecast future trends.

5.4.1 Exchange Rate and Trade Balance

Regarding exchange rate, Kenyan should develop measures aimed at cushioning it from changes in oil markets, main exports and those importing products from local markets. This would be aimed at regulating supply of dollars which is the dominant currency in most trade. Also, there is need for local exports to develop measures aimed at influencing international markets to demand their products. This would increase demand for the local currency and lower likelihood of its depreciation and widening of trade gaps.

Exchange rate stability is highly needful in enhancing favourable balance of trade; in this aspect the government should hedge to control any adverse effect from foreign exchange loss where the local currency is disadvantaged. The government should store an optimal currency in form of the hard currencies to be used in the payment of exports and therefore manage the fluctuations that could arise from devaluation of local currency.

5.4.2 Interest Rate and Trade Balance

Concerning interest rate there is need for development of mechanisms that are aimed at controlling its increase. This will also minimize balance of trade gaps. Interest rate increase can be managed through controlled government borrowing and development of mechanisms aimed at minimizing corruption and enhancement of tax compliance. Bodies mandated with collection of tax should be equipped and aided in adoption of strategies and measures aimed at improving the state of tax compliance.

The central bank should review the interest rate capping which has been fixed at a maximum of 13.5%, this is because interest rate has a positive influence on the balance of trade of a country and thus impacts on the growth of the country. The review of the monetary policy surrounding interest rate in Kenya should be judiciously enhanced so that the banks can be motivated towards supporting local firms and therefore capable of increasing the balance of trade through increased exports.

5.4.3 Inflation Trade Balance

Management of inflation rate would ensure that there is steady state of consumers purchasing power. Uncontrolled rates of inflation would trigger low adoption of factors of production and would erase benefits associated with optimal operation of factors of production. Furthermore, decreased production capacity would increase reliance on importation and widening of trade balance gaps. Hence, government should use all tools at their disposal to control inflation but care must be exercised to eliminate likelihood of constraining factors of production.

The government through the Kenya revenue authority should engage is strategic development of policies that curb the high level of inflation through taxation, in this

aspect the government agency should determine find an optimal fiscal policy that does not discourage savings and investment in the name of reducing money in supply and discouraging spending.

5.5 Limitations of the Study

Prior to adoption of computerized database systems government relied on manual files which may have not been prepared with this research need in mind. This constrained access to relevant data for the study since the researcher had to read several economic surveys some of which are only available in hard copy. This was mitigated through collection of data over a period of one month and from different sources in government records.

Though, the research had studies financial modeling and forecasting in course work the skills acquired had to be updated through in depth reading of econometric textbook. This was attributed to dynamic of data analysis and requisite for conformity of several diagnostic tests failure to which may have affected conclusions drawn in the study. This was mitigated through continued consultation and discussion with my supervisor and research coordinator in school of graduate studies.

5.6 Areas for Further Studies

The current study evaluated the effect lagging macroeconomic variables on trade balance and gathered annual data. Similar, study should be carried and consider quarterly and monthly data respectively. Through, this sample size for the study would be increased. Also, there is need to evaluate the effect of monetary policy on trade balance in Kenya within the same period and consider quarterly or monthly data. The study limited itself to Kenya, an East African case should be examined so as to evaluate role of economic policies adopted in Kenya on Uganda, Tanzania and

Rwanda. This study only evaluated direct effect of exchange rate, inflation rate and interest rate there is need for consideration of moderating and mediating variables which may influence directly and indirectly on trade balance. Methodologically, future studies should fit autoregressive distributed lag model or generalized autoregressive model so as to evaluate the noise within the period under examination.

Since the current study embarked on the effects of three macroeconomic variables on the trade balance in Kenya, further researchers should further on the effects of other macroeconomic variables apart from exchange rate, interest rate and inflation which were studied in the current study. The academicians and future researchers should aim at comparing the effect of exchange rate, interest rate and inflation in Kenya with other developed nations such as Japan, USA and other economic giants.

A close focus should be directed towards determining the optimal models that influences the balance of trade significantly and the strategies that can be put into operation to mitigate adverse balance of trade as have been experienced in the country. Finally, there is need for examination of qualitative attributes which may have effect on trade balance within the period under examination. This would allow analysis of non-quantifiable attributes that would aid in development of policies which are more robust and in line with economic goals and achievement of vision 2030 and bog four agenda.

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Appendix I: Collected Data

YEAR	Trade Balance	Exchange rate	Interest Rate	Inflation Rate
1985	-60917289.01	16.43211667	5.257537652	13.00656642
1986	-4437393.463	16.22574167	4.864495047	2.534275989
1987	-426084265.7	16.45449167	8.157389639	8.63767319
1988	-460525945.1	17.7471	8.026232316	12.26496305
1989	-643675851.5	20.57246667	6.815211935	13.78931728
1990	-476548601.1	22.91476667	7.332797069	17.78181443
1991	-130246378	27.50786667	5.745512647	20.08449558
1992	-21696732.04	32.21683333	1.825329186	27.33236445
1993	-1296327284	58.00133333	3.413472407	45.9788813
1994	-1453451893	56.050575	16.42810989	28.81438943
1995	-2395870744	51.42983333	15.80164834	1.554328161
1996	-2000541132	57.11486667	-5.776588542	8.864087416
1997	-2970948723	58.73184167	16.87956849	11.36184505
1998	-4064850081	60.3667	21.09632603	6.722436508
1999	-4119475591	70.32621667	17.45404878	5.742001095
2000	-987045307.1	76.17554167	15.32743345	9.980025154
2001	-1036959028	78.563195	17.81250097	5.738598143
2002	-651650569.8	78.74914167	17.35814064	1.961308217
2003	-649327981.1	75.93556944	9.770510928	9.81569063
2004	-1007314078	79.17387606	5.045257596	11.62403554
2005	-1396557728	75.55410945	7.609987548	10.31277836
2006	-2225255504	72.10083502	-8.009866973	14.45373421
2007	-2996249358	67.31763812	4.819090789	9.75888023
2008	-4268637872	69.17531982	-0.984996971	26.23981664
2009	-3916539738	77.3520123	2.837078161	9.234125924
2010	-4548264829	79.2331517	12.025898	3.961388891
2011	-6442234812	88.81076997	3.840675702	14.0215499
2012	-6894118908	84.52960176	9.453588077	9.378395851
2013	-7669588171	86.1228789	11.33885965	5.71827408
2014	-9434174775	87.92216381	7.889581988	6.877498097
2015	-7058000000	98.17845333	6.362246645	6.582410917