

**FOREIGN EXCHANGE RATE AND ECONOMIC GROWTH
OF KENYA (1987 - 2019)**

BY

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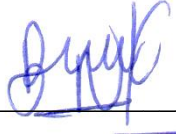
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**A RESEARCH REPORT SUBMITTED TO THE COLLEGE OF ECONOMICS
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DECLARATION

I Abdullahi Dirie Ahmed declare that this thesis report is my work has not been presented for a degree or any other academic award in any university or institution of learning".

Signature  _____

Date ____26/05/2022____

APPROVAL

I affirm that the research report under” Foreign exchange rate and economic growth of Kenya (1987-2019) has been under my supervision and is now ready for submission to College of Economics and Management of Kampala International University with my approval.

NAME: DR. DAYO BENEDICT OLANIPEKUN

Signature



Date

26/05/22

DEDICATION

I dedicate this research report to my family especially mother Maryan Ali Warsame Brother Abdirizak Mohamed Ahmed and sister Farhiyo Dirie Ahmed especially whose effort towards my education is fundamental to this far I have reached, I am very great full for your contributions and May God accord you abundantly

ACKNOWLEDGEMENT

All my praises and thankful hands to God, the most merciful and gracious one for his abundant protection to me which enabled to successfully complete this work. Without the Lord God, all this work and my entire study would have been but just myth.

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I feel greatly indebted to my parents my lovely mother and my beloved brothers and sisters for their mutual support and cooperation they offered to me during the difficult times of my studies. I would like to acknowledge the role played by my family through bearing the inconveniences caused by time and money taken off for the course.

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LIST OF ACRONYMS

(REER)	Real Effective Exchange Rate
ADF	Augmented Dickey- Fuller
AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Lag
BG	Breusch–Godfrey
BMI	Business Monitor Intelligence
CBK	Central Bank of Kenya
EAC	East African Community
ECM	Error Correction Mechanism
EIU	Economic Intelligence Unit
FDI	Foreign Direct Investments
GARCH	Generalized Autoregressive Conditional Heteroscedasticity
GCT	Granger Causality test
Gross	Domestic Product
IMF	International Monetary Fund
KEO	Kenya Economic Outlook
KNBS	Kenya National Bureau of Statistics
KRA	Kenya Revenue Authority
MDG	Millennium Development Goal
NARC	National Rainbow Coalition
OECD	Organization for Economic Corporation and Development
OLS	Ordinary Least Square
PPP	Purchasing power parity
SBC	Schwarz Bayesian (or Information) Criterion
US	United States

ABSTRACT

The purpose of the study was to assess the effect of foreign exchange rate on economic growth of Kenya (1987 to 2019). The objectives were to determine the trend of foreign exchange rate and economic growth of Kenya, establish the short run relationship between foreign exchange rate and economic growth of Kenya and examine the long run relationship between foreign exchange rate and economic growth of Kenya. The study was an entirely time series analysis where data was analyzed for a period between 1987 to 2019, the study adopted an ex-post facto research design where the analysis was done based on descriptive statistics to measure the level of FER and economic growth and Autoregressive Distributed Lag (ARDL) to determine the long run relationship between the variables and error correction mechanisms to determine the short-run relationship between the variables. The study results reveal that there was a general increment in the exchange rate of Kenya. The results reveal that every year that passed; the foreign exchange rate for Kenya was generally increasing. The GDP for Kenya was also increasing, compared to the foreign exchange rate, the GDP was both increasing and reducing. Secondly there was a statistically significant relationship between foreign exchange rate and economic growth in the short run. Finally, in the long run still foreign exchange rate had a non-statistically significant relationship with the economic growth of Kenya. The study concludes that the exchange rate depreciation occurred though not so much as in the cases the Kenya currency strengthened. The study revealed that economic growth of Kenya was generally decreasing and increasing secondly concludes that in the short run, the economic growth of Kenya has not been positively affected by the foreign exchange rate changes. The study shows that the prevalence of foreign exchange rate induces the economic growth in the short run thirdly the study concludes that foreign exchange rate can be an avenue for the attainment of the economic growth in Kenya. The study recommends that there is need for development of mechanisms needed for the enhancement of the foreign exchange rate intended to reduce depreciation. Secondly objective reveal that in the short run, there exist a negative relationship between foreign exchange rate and economic growth of Kenya, the study recommend for appropriate mechanisms to enhance the exchange rate, thirdly robust currency stabilization framework aimed at mitigating high exchange rate fluctuations to promote exports in Kenya hence export earnings. The government needs to seek ways of reducing the volatility of the Kenyan shilling exchange rate.

CHAPTER ONE

INTRODUCTION

This chapter is concerned with background of the study, statement of the problem, purpose of the study, objectives, research questions, hypothesis, scope, significance of the study and operational definitions of key terms.

1.1 Background of the study

1.1.1 Historical Perspective

The relationship between the real effective exchange rate and economic growth is fast becoming an important area of study in both the developing and developed countries (Akpan, 2008). Edwards and Garlick (2007) assert that the exchange rate plays a central role in public debate around trade and trade policy in South Africa, with widespread calls for appreciation, depreciation or simple stabilization. Rodrick (2007) concurs that Economists have long known that poorly managed exchange rates can be disastrous for economic growth. The real exchange rate thus, serves as an international price for determining the competitiveness of a country. Takaendesa (2006) explain that the real exchange rate plays a crucial role in guiding the broad allocation of production and spending in the domestic economy between foreign exchange rate and economic growth is good. Proponents of a weaker currency believe that real depreciation is beneficial to the economy. Edwards and Garlick (2007) explain that real depreciation enhances export competitiveness, encourages export diversification, protects domestic industries from imports and ultimately improves the trade balance; this in turn promotes economic growth. Although this is not the case for developing countries who depend on import of capital goods as it will trigger high production costs that consequently generate inflation, countries that realize reduction in foreign currency usually grow exports for economic growth.

According to Cooper et al (2006), Africans Gross Domestic Product (GDP) growth rate averaged 5% in 2001 to 2006, its highest five-year average on record (IMF, October 2007). GDP growth for the continent increased slightly to 5.7% in 2007, increasing significantly to 6.5% in 2008 due to strong external demand for oil and non-oil minerals, increased investment in these sectors as well as good weather conditions for agriculture in most of the African countries. However, for the

African continent to be able to achieve the Millennium Development Goal (MDG) of halving the proportion of people living in extreme poverty in 2015, economic growth needs to be accelerated and sustained to the level of 7% and 8%. The countries are able to realize general increase in the economic growth should their economic growth rate be increased to above 10% for the years up to 2030.

Zeng (2014) argued that East Africa's relatively successful economies, combining low inflation with high economic growth. This was achieved in spite of the slowdown in the fiscal year 2005/06, when real GDP grew by 5.3 percent, compared with 6.7 percent in 2004/05. The slowdown is largely attributable to the prolonged drought, which affected agricultural production and reduced hydroelectricity output, with negative effects on manufacturing. In the absence of continued drought, real GDP is projected to bounce back to 6 percent in 2022/23, which is still short of the target growth rate of 7 per cent. This average growth would see the continent realize some viable growth in their production and social systems.

According to the Economic Intelligence Unit (2016), investment in infrastructure, strong household consumption, closer integration with EAC and recovery in tourism numbers led to the increase in the country's GDP from 5.6% in 2015 to 5.8% in 2016. The Economic Intelligence Unit (EIU) is also expecting the country's GDP growth to decline to 5.5% in 2021 largely due to a slowdown in investments as due to the possible occurrence of COVID19 that has presented negative effect on the economic growth and production systems (Kenya Economic Survey, 2021)

However, the Business Monitor Intelligence (BMI) believes that private consumption has driven the country's economic growth forward, even when there are speculations of decline in GDP. In relation to this, the Kenya National Bureau of Statistics (KNBS) reported that inflation increased from 7.0% in January 2017 to 9.0% in February 2017 on account of rising food and electricity prices. Inflation averaged 6.3% in 2016 due to subdued oil prices, lower electricity tariffs (due to increased reliance on geothermal power) and low food prices due to improved rainfall. By the end of the first quarter of 2017 Kenya's inflation shot at a rate 14.2% higher than 11.7 and in May inflation jumped to 11.70 percent accelerating from 11.48 percent increase in April and this inflation rate has remained the highest since 2012 (Kenya National Bureau of Statistics, 2017).

And finally, the Economic Outlook (2017) EIU forecasted inflation to average 5.1% between 2017 and 2020 due to prudent monetary policy and efficiency gains arising from regulatory reform and investment in infrastructure. As of September 2018, economic prospects were positive with above 6% GDP growth expected, largely because of expansions in the telecommunications, transport and construction sectors, and a recovery in agriculture. These improvements are supported by a large pool of highly educated professional workers. There is a high level of IT literacy and innovation, especially among young Kenyans (KEO, 2019). In 2020, Kenya ranked 56th in the World Bank ease of doing business rating, up from 61st in 2019 (of 190 countries). Compared to its neighbors, Kenya has a well-developed social and physical infrastructure though much lower than those of developed countries (KEO, 2020).

Since independence, the Kenyan exchange rate has undergone various regime shifts, which have mainly been attributed to economic events. From independence to 1974, the rate was pegged to the dollar, which later shifted to a crawling peg after a series of devaluations, then it became fully liberalized in 1993. The current exchange rate regime is free-floating in nature and is determined by the market forces of demand and supply. However, the Central Bank of Kenya frequently participates in the foreign exchange market when; it needs to curtail volatility originating from external shocks, build stocks of foreign reserves, effect government payments and regulate liquidity in the market (Danga, 2016).

During a country review report released in 2018, the IMF suggested that the Kenyan exchange rate was overvalued by 17.5%. This was attributed partly to CBK engaging in periodic foreign exchange interventions, reflecting the limited movement of the shilling relative to the US dollar. The Central Bank of Kenya (CBK) governor, Dr. Patrick Njoroge, however, refuted the claims in a media briefing, coming out to clarify that the Central Bank does interventions in the market which can be seen as manipulations but they were actions that fall within the purview of the bank. Recently, there were also suggestions that the US had cautioned the Kenyan government against currency manipulation, a fact that the Governor clarified that it is a clause the US government includes in all its trade negotiations. At the start of 2020 the Kenyan Shilling was exchanging at Kshs 101.4 against the US Dollar but due to the effects of COVID-19 weighing down on the economy the shilling has since depreciated by 8.4% to close at Kshs 109.9 at 27th November 2020 (Kenya Economic Survey, 2021)

1.1.2 Theoretical Perspective

The study was based on the Purchasing power parity (PPP) theory that can be traced back to sixteen-century Spain and early seventeen century England, but Swedish Economist Cassel (1918) was the first to name the theory PPP. Cassel once argued that without it, there would be no meaningful way to discuss over-or-under valuation of a currency. The theory contends that exchange rate (the "real exchange rate") fluctuations are mostly due to different rates of inflation between the two economies. Aside from this volatility, consistent deviations of the market and PPP exchange rates are observed, for example (market exchange rate) prices of non-traded goods and services are usually lower where incomes are lower. (U.S. dollar exchanged and spent in India will buy more haircuts than a dollar spent in the United States). Basically, PPP deduces exchange rates between currencies by finding goods available for purchase in both currencies and comparing the total cost for those goods in each currency. This is a comparative (and theoretical) exchange rate, the only way to directly realize this rate is to sell an entire basket in one country, convert the cash at the currency market rate & then re-buy that same basket of goods in the other country (with the converted cash). Going from country to country, the distribution of prices within the basket will vary; typically, non-tradable purchases will consume a greater proportion of the basket's total cost in the higher GDP country, as per the theory the drivers of economic growth are employment, purchasing power, level of investments and resources, the population among others. The foreign exchange is driven by the interest rates, inflation and the economic capacity and stability of the economy including its currency.

1.1.3 Conceptual Perspective

Foreign Exchange rate is measured as the rate at which a country's currency can be converted into foreign and internationally recognised currencies such as dollars. It is in fact the conversion of domestic currency to international currencies (Domaç, 1997). Exchange rate is further measured in currency is exchanged for another. It is the nominal exchange rate adjusted for relative purchase power (Yang & Zeng, 2014) and it measures how much the currency can purchase in real terms, or the purchase power of the currency abroad relative to that at home. It's the price of a nation's currency in terms of another currency. It has two components, the domestic currency and a foreign currency, and can be quoted either directly or indirectly (Zeng, 2014). Floated exchange rate is the one that is determined by forces of demand and supply while pegged exchange rate is the set by the Central Bank.

Economic growth is the increase in the goods and services produced by an economy over a period of time. According to Guellil, Marouf and Benbouziane (2017), it is measured as the economic percentage increase in real gross domestic product (GDP) which is gross domestic product (GDP) adjusted for inflation. Economic growth according to (Amadeo, 2018) is measured in the form of GDP of the country. A country's productive capacity is identified by the rise in real national income over a period of time.

1.1.4 Contextual Perspective

Kenya's GDP grew by 6.6% annually from 1963 to 1973. It averaged 7.2% in the 70s. The economy registered a decline from 1974 to 1990. The GDP growth declined from 4.2% in the 80s to 2.2% in the 90s. This decline was the least from 1991 to 1993. This resulted to a sustained growth of 4% between 1994 and 1996. The estimates by World Bank show that the Kenyan economic growth will be 5.8% in 2018 and 6.1% in 2019 (World Bank 2018). Focus Economics estimates that Kenyan economy grew by 5.5% and 5.8% in 2018 and 2019 respectively. Kenyan economy grew by 4.8% and 5.5% in 2017 and 2018 respectively (Reuters 2018). The news agency states that Kenyan economy is influenced by drought, political climate, performance of the private sector, global economy and agricultural performance. Ouma and Kihiu (2018) provided that Kenyan GDP at US Dollars 74.94 billion in 2017 representing 0.12% of world economy. Kenyan GDP was set at 15.38 from 1961 to 2017, the highest GDP being US Dollars 74.94 billion in 2017 and the lowest being 0.79 USD Billion in 1961 (Amadeo, 2018)

The fiscal deficit widened to 8.2 percent of GDP, up from the pre-COVID budgeted target of 6.0 percent of GDP and the debt to GDP ratio has risen to 65.6 percent of GDP as of June 2020 (from 62.4 percent of GDP in June 2019). Additional monetary stimulus and liquidity support was also made available through the Central Bank of Kenya (CBK), which reduced the policy rate by 125 basis points (bps) to 7.0 percent and reduced the cash reserve ratio by 100bps to 4.25 percent (IMF, 2018).

Kenya's economic outlook remains highly uncertain, as the COVID-19 pandemic continues to unfold in the country, and globally. The baseline outlook adjusts for the negative impact of COVID-19 on Kenya's growth in 2020, following which the economy is projected to rebound relatively quickly in 2021, lifting real GDP by 6.9 percent. A major factor in this strong rebound is

the impact on the national accounts of measured education sector output normalizing, which is projected to add 2.2 percentage points to real GDP growth next year. The baseline projection also assumes that the major economic impacts of the pandemic largely fade by the early part of 2021, and is also predicated on normal weather supporting agricultural output. However, the situation continues to be fluid, both in Kenya and worldwide; the global economy is tipped for a deep recession in 2020, with significant and potentially more prolonged negative spillovers on Kenya.

1.2 Statement of the Problem

Economic growth is measured by annual increases in GDP of all economic activities of a country. The Kenyan Vision 2030 projects that the GDP growth rate should be 10% as at 2016. By 2017, by 2018 the growth domestic product growth rate was only at 7.6% (Ouma and Kihiiu, 2018). The same was made worse in 2019 to 2020 where the economic performance seriously was low. At independence, the size of Kenya's economy was at par with that of current economic giants of Asia such as South Korea, Hong Kong Taiwan. Specifically, at independence Kenya's GDP was equal to that of South Korea at 2859.4 US dollars (World Bank Kenya, 2019). GDP per capita for the two countries started deviating in the late 1960s and diverged much widely in the 1990s when Kenya's economy was wrecked owing to macroeconomic instability (Danga, 2016).

Kenya's GDP grew by 6.6% annually from 1963 to 1973. It averaged 7.2% in the 70s. The economy registered a decline from 1974 to 1990. The GDP growth declined from 4.2% in the 80s to 2.2% in the 90s. This decline was the least from 1991 to 1993. This resulted to a sustained growth of 4% between 1994 and 1996. The estimates by World Bank show that the Kenyan economic growth was 5.8% in 2018 and 6.1% in 2019 (World Bank 2018). Focus Economics put it that Kenyan economy grew by 5.5% and 5.8% in 2018 and 2019 respectively (Amadeo, 2018). The changes in the economic growth were generally low given that the economy never realized a double-digit growth (Outlook, 2019). With a growing strength of the Kenya currency in the east African community, one would expect growth to be increasing in that foreign exchange is favorable (Lopes, Ferreira-L & Sequeira, 2016). Kenya experience serious fluctuations in their exchange rate especially with the developed countries rates due to reduction in the exports of the country and increase in the imports which reduced the country's foreign exchange reserves (Ouma and Kihiiu, 2018), the possible causes of fluctuations are inflation, interest rates and low economic productivity. Kenya has undertaken efforts to reduce the fluctuation through the policy and

investments in the economy (Amadeo, 2018). The foreign exchange fluctuations reduce the value of the country's investments that has serious negative effects on the GDP of Kenya (Kenya Economic Survey, 2019). Even with the revelation, the economy is still struggling; it was based on this that a study on foreign exchange rate and economic growth of Kenya was conducted to assess the status quo from 1987 to 2019.

1.3 Purpose of the study

The purpose of the study was to assess the effect of foreign exchange rate on economic growth of Kenya (1987 to 2019)

1.4 Objectives of the study

The specific objectives are to:

- 1) To establish the short run relationship between foreign exchange rate and economic growth of Kenya.
- 2) To examine the long run relationship between foreign exchange rate and economic growth of Kenya.

1.5.1 Research Questions

- 1) What is the short run relationship between foreign exchange rate and economic growth of Kenya?
- 2) What is the long run relationship between foreign exchange rate and economic growth of Kenya?

1.5.2 Hypothesis of the study

H01: There is a short run relationship between foreign exchange rate and economic growth of Kenya.

H02: There is a long run relationship between foreign exchange rate and economic growth of Kenya.

1.6. Scope of the study

1.6.1 Geographical Scope

The study was conducted in Kenya, officially the Republic of Kenya (*Jamhuri ya Kenya*); its a country in Eastern Africa. At 580,367 square kilometers (224,081 sq mi), Kenya is the world's 48th largest country by total area. With a population of more than 47.6 million people in the 2019 census, Kenya is the 29th most populous country. Kenya's capital and largest city is Nairobi, while its oldest city and first capital is the coastal city of Mombasa. Kenya is bordered by South Sudan to the Northwest, Ethiopia to the north, Somalia to the East, Uganda to the West, Tanzania to the South, and the Indian Ocean to the Southeast.

1.6.2 Subject Scope

The study set to assess the effect of foreign exchange rate on economic growth of Kenya. The objectives are to establish the trend of foreign exchange rate and economic growth, establish the short run relationship between foreign exchange rate and economic growth and establish the long run relationship between foreign exchange rate and economic growth of Kenya.

1.6.3 Time Scope

The study used time series data considering a time between 1987 to 2019. This period is appropriately chosen as it was the period when the economy experienced both stability and instability in both the goods and money markets with the same economic structures and policies implying the two variables under study have been subjected to the same conditions.

1.7 Significance of the study

This study is significant in the following ways. The study will provide insight in knowing the extent to which foreign exchange rate affects economic growth. The results of the study will aid policy makers to design appropriate policies to improve and sustain economic growth.

The study will also add to the stock of knowledge on the foreign exchange rate effects on the economy of Kenya and its findings will be of great importance to other researchers in the same field. Exchange rate volatility affects international price competitiveness of exports leading to loss of market share and backward linkages, this study intends to assess the trend of the foreign exchange rate and their effect on economic growth in Kenya.

1.8 Operational definitions of key terms

Gross domestic product (GDP) is the market value of all officially recognized final goods and services produced within a country in a given period of time. It is the total of the country's resources in monetary terms.

Exchange rate is the value at which the value of the country's currency can be converted into foreign and internationally recognised currencies such as dollars. It is in fact the conversion of domestic currency to international currencies.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter is concerned with review of information that different authors have advanced on the topic in regard to study objectives, it therefore looks at the theoretical review, conceptual framework, related empirical literature and gap identification.

2.1 Theoretical Review

The study adopted the purchasing parity theory of Cassel (1918). The purchasing parity theory of exchange rate is purchasing power parity (PPP) which is also called the inflation theory of exchange rates. PPP can be traced back to sixteen-century Spain and early seventeen century England, but Swedish economist Cassel (1918) was the first to name the theory PPP. Cassel once argued that without it, there would be no meaningful way to discuss over-or-under valuation of a currency. The purchasing parity theory was first presented to deal with the price relationship of goods with the value of different currencies. The theory requires very strong preconditions. The purchasing parity is justified by the existence of the fluctuations of the countries currencies due to the reduction in purchasing power of the individuals, the reduction in purchasing power therefore leads to foreign exchange fluctuations.

The study is also guided by the Purchasing Power Parity Theorem, developed by Cassel in 1918. The theory is founded on the law of one price which stipulates that in the without transaction costs, the prices of identical goods should be equal despite the location of the markets. The PPP theory, measures the purchasing power of one currency for example US Dollar against another i.e. Uganda shillings once their exchange rates have been taken into consideration.

Under the Purchasing Power Parity Theorem, there is an establishment of the rate of exchange between the two country currencies by the parity between the purchasing powers of different currencies. Therefore, it looks at scenarios like when the inflation rate is differing between two currencies i.e. US dollar and British pound, the exchange rate will adjust or change to relate to the relative Purchasing Power of the US dollar and British pound. Thus, the relationship the Purchasing Power Parity Theorem is attained from the notion that in the situations with limited

trade restrictions, the changes in the exchange rate mirror will lead to changes in the relative price levels in of both US and Britain (Engel, 1996).

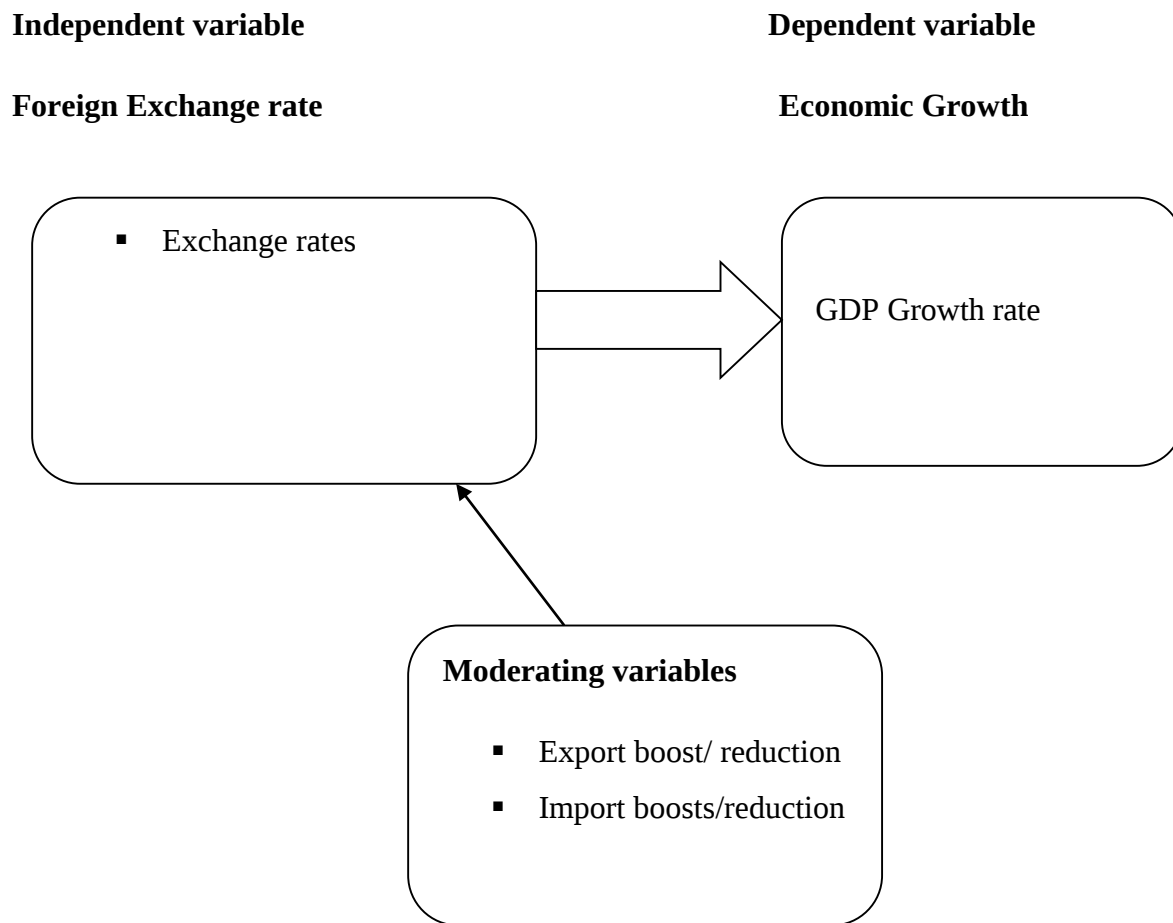
This is a comparative (and theoretical) exchange rate, the only way to directly realize this rate is to sell an entire basket in one country, convert the cash at the currency market rate & then re-buy that same basket of goods in the other country (with the converted cash). Going from country to country, the distribution of prices within the basket will vary; typically, non-tradable purchases will consume a greater proportion of the basket's total cost in the higher GDP country

Absolute PPP holds in an integrated, competitive product market with the implicit assumption of a risk neutral world, in which the goods can be traded freely without transportation costs, tariffs, export quotas, and so on. However, it is unrealistic in a real society to assume that no costs are needed to transport goods from one place to another. In the real world, each economy produces and consumes tens of thousands of commodities and services, many of which have different prices from country to country because of transport costs, tariffs, and other trade barriers (Kanamori and Zhao, 2006). Absolute PPP is generally viewed as a condition of goods market equilibrium. Under absolute PPP, both the home and foreign market are integrated into a single market. Since it does not deal with money markets and the balance of international payments, we consider it to be only a partial equilibrium theory, not the general one. Perhaps because absolute PPP require many strong impractical preconditions, it fails in explaining practical phenomenon, and signs of large persistent deviations from Absolute PPP have been documented (Kanamori and Zhao, 2006).

2.2 Conceptual Review

The conceptual framework shows the interaction between the independent variables and dependent variable. It shows the connection between the foreign exchange rate and economic growth affected by moderating variables.

Figure 2.1: Conceptual framework



Source: Researcher 2021

The channels that exchange rate can affect economic activities can be divided into two. First is the aggregate demand channel and the second is the aggregate supply channel. The traditional view has it that the Real Effective Exchange Rate operates through the aggregate demand channel. This means that the depreciation of the Real Effective Exchange Rate enhances the international competitiveness of domestic goods, boosts net exports and eventually enlarges GDP. A strong exchange rate value contributes to the growth of economic activities in a country where by export values are increased as well as receipts from exports. Exchange rate variations improves

performance of private sector through increased acquisition capacity; a strong and appreciating exchange rate contributes to a steady and decreasing expenditure especially abroad in purchasing imports.

Exchange rate affect the GDP growth for countries for example exchange rate variation if positive will reduce the value of private sector consumption, improve private sector investments, reduce costs of government spending especially on purchasing abroad and increase the value of exports.

Therefore, exchange rate variations if positive in form of appreciation lead to increase in Gross domestic product. The exchange rate fluctuations in a country directly contribute to the reduction in the GDP values of a country.

2.3.0 Related studies

2.3.1Trend of foreign exchange rate in Kenya 1987 to 2019

The Real Effective Exchange Rate (REER) is one of the indicators of the international competitiveness of a country and is generally understood to mean various levels of relative price or costs expressed in a certain currency. In this respect, REER values above 100 signify a downward trend in the country's competitiveness relative to the base period, whereas REER below 100 means rising competitiveness of the country relative to the base period (Choudri and Khan, 2004). According to Atingi-Ego and Sebudde (2000), A Real Effective Exchange Rate has often been at the Centre of policy debate in developing countries on issues such as economic development, export promotion and also macroeconomic stabilisation. Defined as the relative price of Tradable to Non-Tradable, the REER is the pertinent relative price signal for inter-sectoral growth in the long run.

Jakob (2016) contend that appropriate exchange rate regime for promoting pro-poor economic openness is one in which the government purposefully intervenes in the foreign exchange market with clear medium-term objectives of export promotion and exchange rate stability. This arrangement is preferable to “floating” regimes for a number of reasons: first, the view that economies have a unique, market-determined exchange rate that strikes the correct balance between tradable and non-tradable is incorrect in practice; and second, the practical goal of export promotion is achieved through devaluation, lowering the foreign currency price of a country's exports.

From the time of independence in the 1960s to the 1970s, Kenya maintained a fixed exchange rate, with the currency being overvalued at some point (Njuguna, 1999). This was coupled with exchange controls, domestic credit controls, interest rates control and domestic prices controls that were ignited by the balance of payment crisis, which occurred in 1971–1972. As much as these controls had eased the inflationary pressure, they caused major distortions in the economy. In 1982, the country shifted to a flexible exchange rate regime. This included the flexible exchange rate regime with a crawling peg (1982–1990) and the dual and floating exchange rates in 1990. The country experienced a period of relatively lower inflation rates during the crawling peg regime, but the floating regime led to high inflation rates and a rise in interest rates. The low inflationary pressure during the crawling peg regime can be attributed to the foreign exchange import controls imposed by the government during that period.

Kenya abandoned exchange rate controls in the early 1990s as part of reforms aimed at improving the investment environment and spurring economic growth (Ouma and Ihiu, 2018). The Kenyan shilling has remained relatively stable against the United States dollar and other major currencies for the last five years, with a slight general upward trend (depreciating by only about 15 per cent against the dollar). However, the uncertainties surrounding the timing of the first interest rate increase in the United States following the tapering of quantitative easing led to a stronger dollar, undermining the stability of many emerging markets' and developing economies' financial markets. This caused volatility among most currencies of emerging markets' economies and currencies of frontier markets, including the Kenya shilling (K Sh). The

shilling depreciated against the dollar in nominal terms from the first quarter of 2015 to the third quarter of 2015, peaking at K Sh 106.245 on 8 September 2015 (and monthly average of 105.27 Kenya shilling per dollar). However, it strengthened from the last quarter of 2015 before depreciating slightly again from July 2016. During this period, volatility increased as the local currency reacted to global and domestic developments (Central Bank of Kenya, 2016).

The volatility and depreciation were attributed to portfolio investors divesting from these markets for safe havens in developed economies' markets, from which returns were poised to rise with expected increases in interest rates. In Kenya, the local currency faced depreciation pressures from a strengthening dollar and high current-account deficits, reflecting the peak of capital equipment

imports in 2014, weak exports receipts and increased foreign investors' outflows from the Nairobi Securities Exchange in the first half of 2015. The Central Bank of Kenya policy support through open market operations and existing foreign reserves of \$7.6 billion (equivalent to 4.5 months of import cover) at the end of June 2015 together with the precautionary arrangements with the International Monetary Fund (IMF) of \$1.5 billion continued to provide adequate buffers against short-term shocks, restoring stability of the exchange rate from the end of 2015 through to the end of 2016.

The Central Bank of Kenya has downplayed the arguments about the inadequacy of its foreign exchange rate reserves to target the level and influence the direction of the exchange rate. Its position is that the bank's primary responsibility is to formulate and implement a monetary policy that achieves stability in the general price level, including the exchange rate, which is the price of the Kenya shilling. To achieve this stability, a combination of indirect monetary policy tools and/or instruments such as open market operations and statutory requirements are employed. Among these instruments are foreign exchange market operations. In a liberalized foreign exchange regime, the central bank only needs to allow the exchange rate to move in line with the fundamentals of the economy. Its participation in the foreign market is, therefore, limited to acquiring foreign exchange to service official debt, finance government imports, build foreign exchange reserves, and, in times of volatility, buy or sell foreign exchange to stabilize the market. Foreign exchange reserve becomes an indirect instrument of monetary policy (Central Bank of Kenya, 2017).

The experience of Kenya can be considered as a case of a flexible exchange rate regime producing expected results in macroeconomic performance, with the inflation rate largely within the monetary policy medium term target of 5 per cent (+/- 250 basis points) and the economy growing at an acceptable rate (above 5 per cent), though below the two-digit vision in the 2030 target. However, this was not the case at the offset of the adoption of the floating exchange rate regime. The exchange rate was floated in an environment of excess liquidity, and massive depreciation and high and accelerating inflation ensued. The mopping up process pushed the treasury bill rate up, and, because this is the benchmark for other interest rates, all other interest rates shot up to historic levels. The exchange rate of the Kenya shilling was devalued three times in 1993 (Njuguna, 1999)

2.3.2 Economic growth of Kenya 1987 to 2019.

Kenya regained its independence in 1963. Under President Jomo Kenyatta, the Kenyan government promoted Africanization of the Kenyan economy, generating rapid economic growth through public investment, encouragement of smallholder agricultural production, and incentives for private, often foreign, industrial investment. An influential sessional paper authored by Tom Mboya and Mwai Kibaki in 1965 stressed the need for Kenya to avoid both the capitalistic economy of the West and the communism of the East. The paper argued that Kenya should instead concentrate on African socialism, while avoiding linking Kenya's economic fortunes to any country or group of countries. From 1963 to 1973 gross domestic product (GDP) grew at an annual average rate of 6.6%, and during the 1970s it grew at an average rate of 7.2% (Oman and Kihui, 2018). Agricultural production grew by 4.7% annually during the same period, stimulated by redistributing estates, distributing new crop strains, and opening new areas to cultivation. However, the rate of GDP growth declined to 4.2% per year in the 1980s, and 2.2% a year in the 1990s.

Kenya's policy of import substitution, which started in 1946 with European and Asian enterprises, did not achieve the desired result of transforming Kenya's industrial base, and in the late 1970s rising oil prices began to make Kenya's manufacturing sector noncompetitive (Meilink, 1982). In response, the government began a massive intervention in the private sector. Lack of export incentives, tight import controls, and foreign exchange controls made the domestic environment for investment even less attractive. From 1991 to 1993, Kenya had its worst economic performance since independence. Growth in GDP stagnated, and agricultural production at an annual rate of 3.9% (Ouma and Kihui, 2018). Inflation reached a record of 100% in August 1993, and the government's budget deficit was over 10% of GDP (Greenhouse, 1991). As a result of these issues, bilateral and multilateral donors suspended their aid programs to Kenya in 1991. In the 1980s and 1990s, Kenya signed structural adjustment loans with the World Bank and IMF, the loans were to be given on condition that Kenya adopts some government reforms, a liberal trade and interest rate regime and an industrial policy that was outward-oriented among other reforms.

In 1993, the Government of Kenya began a major program of economic reform and liberalization. A new minister of finance and a new governor of the central bank undertook a series of economic measures with the assistance of the World Bank and the International Monetary Fund (IMF). As

part of this program, the government eliminated price controls and import licensing, removed foreign exchange controls, privatized a number of publicly owned companies, reduced the number of civil servants, and introduced conservative fiscal and monetary policies. From 1994 to 1996, Kenya's real GDP growth rate averaged just over 4% a year.

In 1997, however, the economy entered a period of slowing or stagnant growth, due in part to adverse weather conditions and reduced economic activity before the general elections in December 1997. In July 1997, the Government of Kenya refused to meet earlier commitments to the IMF on governance reforms. As a result, the IMF suspended lending for three years, and the World Bank also put a \$90 million structural adjustment credit on hold.

Economic growth improved between 2003 and 2008, under the Mwai Kibaki administration. When Kibaki took power in 2003, he immediately established the National Debt Management Department at the treasury, reformed the Kenya Revenue Authority (KRA) to increase government revenue, reformed financial laws on banking, wrote off the debts of strategic public enterprises and ensured that 30% of government tax revenue was invested in economic development projects. With these National Rainbow Coalition (NARC) government-driven reforms, the KRA collected more tax revenue in 2004 than was anticipated. The government then initiated investments in infrastructure. By 2005, the Kenyan public debt had reduced from highs of 80% of GDP in 2002 to 27% of GDP in 2005. The financial sector greatly improved, and Equity Bank Kenya became one of the largest banks in East Africa. Economic growth improved from 2% in 2003 to 7% in 2007. In 2008, the growth slumped to 1% due to post-election violence before returning to an average of 5% between 2009 and 2013. However, in 2009 due to the drought and the global financial crisis, high input costs and a fall in demand for some of the country's exports, caused the agriculture sector contracted by 2.7% (Kenya Economic Survey, 2018).

Between 2013 and 2018 under the Jubilee Party government led by Uhuru Kenyatta, GDP growth averaged above 5%. Growth in small businesses is credited with some of the improvement. Real GDP growth (annualized) was 5.7% in Q1 of 2018, 6.0% in Q2 2018 and 6.2% in Q3 2018 (Bostan, Ionel and Bogdan, 2019). Despite this robust growth, concerns remain on Kenya's debt sustainability, current account deficit, fiscal consolidation and revenue growth. Kenya ushered in a new political and economic governance system with the passage of a new constitution in 2010

that introduced a bicameral legislative house, devolved county government, a constitutionally tenured judiciary and electoral body. The first election under this new system was held in 2013. The August 8, 2017 presidential elections were nullified on September 1, 2017 by the Supreme Court, and a new presidential election was held on October 17, 2017. President Uhuru Kenyatta was sworn in for a second and final five-year term on November 28, 2017 (Kenya Economic Survey, 2019)

Over 2015-2019, Kenya's economic growth averaged 5.7%, making it one of the fastest growing economies in Sub-Saharan Africa. The performance of the economy has been boosted by a stable macroeconomic environment, positive investor confidence and a resilient services sector. The COVID-19 shock has hit Kenya's economy hard through supply and demand shocks on both the external and domestic fronts and caused activity to slow sharply in 2020 (real gross domestic product is estimated to have contracted by 0.3% in 2020). Agricultural output grew robustly, but manufacturing and many services subsectors (e.g., tourism, education) were severely disrupted.

2.4 Empirical Studies From developed countries

Domaç (1997), for the period 1960–1990, examined the relationship between exchange rate and economic growth in Turkey. Using regression analysis, he found that unexpected devaluations had a positive effect on output. Thus, the author determined that the contractionary devaluation hypothesis is not valid in Turkey.

Chen (2012) focused on the role of the exchange rate in economic growth and the convergence of growth rates in Chinese provinces. Data set between 1992 and 2008 for 28 provinces were tested with dynamic panel data estimation. He found that the real exchange rate increase had a positive effect on the economies of provinces. Man et al. (2013) investigated the short run relationship between exchange rate and economic growth in Pakistan for the period 1976–2010 by employing three stage least square techniques. They showed that the exchange rate has a positive impact on economic growth through promoting export and import substitute industry.

Habib et al. (2017) analyzed the impact of movements in the short run relationship of real exchange rate on economic growth based on five-year average data for a panel of over 50 countries in the post-Bretton Woods period. They determined that a real depreciation raised the annual real GDP growth. Thus, the results revealed the broader effects of devaluation on economic growth for

developing countries. As seen in the literature above, many studies have found that exchange rate depreciation has a positive impact on the economy and thus have supported the devaluation policy for economic growth

Thapa (2002) analyzed the econometric short run relationship between the real exchange rate and economic activities in Nepal using annual data from 1978 to 2000. The estimated ECM regression equation showed that the real exchange rate had a contractionary effect on economic growth. Galindo and Montero (2005) investigated the causality of short run relationship from exchange rate to economic growth by using panel data relating to Latin American countries. Empirical results indicated that depreciation in exchange rate in the Latin American countries which have a high foreign debt ratio negatively affected economic growth.

Di Nino et al. (2011) analyzed the connection between exchange rate and economic growth in Italy. They concluded that there is a positive relationship between undervaluation and economic growth for a dataset covering the period 1961–2011. In addition, the authors also showed that undervaluation supported growth by increasing exports, especially in high-productivity sectors.

Developing Countries

Narayan and Narayan (2007) investigated the effects of devaluation for the Fiji economy between 1970 and 2000. They employed the co-integration method and found that the devaluation in the short- and long-term lead to a widening effect for the output level. More specifically, it was indicated that 10% devaluation increased the output by 3.3%. According to Guellil, Marouf and Benbouziane (2017), fixed exchange rates led to increased economic growth in developing countries in the long run. Developing countries fear the effect of floating exchange rates (Guellil, Marouf&Benbouziane 2017).

Ribeiro et al (2019), by taking into account the structural features²⁶of the developing economies, examined the relationship between real exchange rate and economic growth. The sample consisted of 54 developing countries and covered the period 1990–2010. The empirical result showed that the impact of undervaluation on economic growth in developing countries was negatively signed.

Tarawalie (2010) provided empirical estimates of the relationship between the real exchange rate and economic growth in Sierra Leone, employing the Johansen cointegration technique for the period 1999Q1–2006Q4. The results indicated that the real exchange rate had a positive effect on output growth. Specifically, a depreciation of the real exchange rate increased the output growth in Sierra Leone.

Obansaet.al (2013) examined the short run impact of exchange rate on the Nigerian economic growth for the period of 1970–2010. The result indicated that the exchange rate had a strong positive impact on economic growth. Thus, they found evidence that economic growth is significantly associated with real exchange rate depreciation.

Missioet.al (2015) empirically analyzed the short run relationship between real exchange rate and growth rate of output for broad sample of 63 developing countries from 1978 to 2007. They found that maintaining a competitive level of the real exchange rate had a positive effect on growth rate. This result means that depreciation of a currency can affects the long-term growth of an economy via an increase in its income elasticity of the demand for exports.

Yiheyis (2016) investigated the short run interaction among the exchange rate and economic growth in 20 African countries for the term 1981–1999. The results of unbalanced panel data analysis indicated that the depreciation of local currencies created a shrinking effect on economic growth. This finding implies that currency depreciation, by increasing the price in the domestic currency of imported intermediate inputs used in the production process, feeds through production costs, thus causing a restriction on the production process.

Blecker and Razmi (2008) examined the short run impact of devaluation on economic growth in 17 developing countries for the period 1983–2004. Results of the dynamic panel data analysis (Generalized Method of Moments) showed a negative relationship between the exchange rate and economic growth. As a result, the authors emphasized that the contractionary effect of devaluation for developing countries was compared to industrialized countries, the study conclude that the devaluation if done in an improper planning has a negative effect on the economies of countries.

Vaz and Baer (2014) employed a panel model using unbalanced panel data covering 1995–2008 for a sample of 39 countries in Latin America and proved a negative short run impact of exchange rate on output. Thus, they showed that depreciation of the currency in Latin American countries

caused a nominal cost increase in the production process and hence decreased economic growth rate rather than raised it. Çelik et al. (2017) investigated the transfer mechanism from the exchange rate to economic growth via panel data analysis using cross-sectional data between 1995 and 2014 for 12 transition economies in Eastern Europe and Middle Asia. The results of the study showed that an increase in exchange rate resulted in an economic downturn. However, they also indicated that real exchange rate movements did not turn out to be the major variable in explaining economic growth.

2.5 Long run relationship between foreign exchange rate and economic growth

Kenya

According to Danga (2016), exchange rate has been unstable in Kenya with a rising trend. It has come up with pervasive effects and consequences for prices, wages, interest rates, production levels and employment opportunities. His study was motivated by the rate at which KES was depreciating in 2015 against USD with the highest rate of 106.035 on 07 September 2015, the highest rate ever witnessed in Kenya since independence. In 2011 Kenya experienced exchange rate overshooting from KES 83 to over KES 100 within span of 6 months and it has risen steadily to over KES 106 in September 2015.

Developed Countries

Hooper and Kohlhagen (1978) examined the effect of exchange rate unpredictability on price and international trade between the United States and Germany. The study was conducted in the period 1965–1975 and they found that uncertainty regarding exchange rates has an adverse impact on trade but a positive impact on the price of products where the exporter is a risk-lover. Inconsistent negative effect on market price was found in the case of importers where uncertainty is measured as the standard deviation of spot and forward exchange rates over three months.

Bahmani-Oskooee and Gelan (2018) employed the Autoregressive Distributed Lag (ARDL) model in their study in order to investigate the effects of exchange rate risk on trade flows in the short-run and long-run for twelve African countries during the period 1971Q1–2015Q4. The ARDL method has advantages in forecasting compared to other techniques based on co-integration. The volatility of the exchange rate improves or worsens exports and imports, but in the short run, the

effect is more prevalent. It was found that a long run relationship existed between exchange rate and economic growth of the countries.

Alper 2017 examined the impact of exchange rate volatility on Turkey's trade to the 15 European countries during 2002–2013 by using Generalized Autoregressive Conditional Heteroscedasticity (GARCH) (1, 0) for calculating volatility. The main empirical finding from Alper (2017) is that exchange rate volatility reduces export flows in the short-run. However, the effect for import sectors is both positive and negative in the long run. In addition, Turkey's trade with European Union countries is not affected by the volatility of exchange rates.

Bostan and Firtescu (2019) conducted a study regarding the influence of the exchange rate on international commercial trade competitiveness of Romania. The study used statistical data for the period 2007–2014 and Ordinary Least Squares (OLS) regression is employed. Variables such as exchange rate, inflation, investments and interest rate are considered as exogenous, while Romanian exports and imports are endogenous variables. They concluded that the exchange rate is an important determinant of competitiveness, but the influence of uncertainty on export and import is different.

Dal Bianco and Loan (2017) is based on the influence of price and real exchange rate volatility on foreign direct investment (FDI) inflows for 10 Latin American and Caribbean countries. This study used GARCH techniques and data for the period 1990 and 2012. FDI, measured as a percentage of GDP, was used as dependent variable, and the independent variables were price and real exchange rate volatility, institutional quality (i.e., political freedom) capita Gross Domestic Product, trade openness (in % of GDP), human capital (i.e., literacy rate), and infrastructural development (i.e., number of telephone lines).

Developing Countries

Studies by Chen and Dao (2011) showed a contraction of China's tradable and non-tradable sectors as a result of an appreciation of the country's exchange rate. Similarly, a significant effect of the exchange rate and employment levels were observed in Ghana's manufacturing sector, such that depreciation in Ghana's currency inhibited the level of job creation.

Ngandu (2009) analyzed the effect of movements in the exchange rate on employment in South Africa using the computable general equilibrium model (an economy-wide approach). The study revealed that an appreciation in the ZAR tends to shift employment from tradable sectors such as manufacturing to non-tradable sectors. Where an appreciation in the exchange rate increased demand and spending in non-tradable sectors, it however decreased foreign demand in tradable sectors resulting from increased export prices. Nonetheless, the study asserts that the country still experiences increased aggregate employment as non-tradable sectors absorb lost jobs in tradable sectors.

Mpofu (2013) assessed the impact of real exchange rate movements on South Africa's manufacturing sector using Autoregressive Distributed Lag (ARDL) during the period 1995 to 2010. The results revealed that a depreciation in the exchange rate results in employment growth in the manufacturing sector. Whereas results by Bhorat *et al.* (2014) based on the years from 1975 to 2009 revealed a strong negative impact where an appreciation of the local currency (ZAR) resulted in decreased employment in the tradable sector, while having no effect on non-tradable sectors

Rodrik (2008) provides empirical evidence for the positive long run growth effects of real exchange rate undervaluation for a panel data sample of 184 countries. The distinguishing feature of Rodrik (2008) from previous studies analyzing the growth effects of real exchange rates is his undervaluation index used as the real exchange rate measure. In his undervaluation index, he adjusts the PPP-based real exchange rate measure with Balassa-Samuelson effect.

Sturzenegger (2012) conduct panel data analysis based on this undervaluation index. Mostly focusing on the theoretical channels through which real exchange rate levels can affect economic development in long run, Gala (2008) finds a positive correlation between real exchange rate undervaluation and growth for a panel of 58 developing countries for the period 1960–1999. Gluzmann, Levy-Yeyati and Sturzenegger (2012) explore the effect of undervalued currency on different components of GDP such as consumption, investment, saving, exports, imports and employment in order to determine the channels of this effect. They show that, for developing countries, undervaluation does not seem to affect the tradable sector by promoting exports or creating a substitution from imports but instead leads to greater domestic savings and investment, as well as employment.

Rapetti, Scott and Razmi (2012) modify the study of Rodrik (2008) by changing the definition of developing and developed country samples. They show that his finding is sensitive to the criterion used to divide the sample between developed and developing countries. Rodrik (2008) classifies developing (developed) countries as those with a real GDP per capita of less (more) than \$6000. If the cut-off point is selected from anywhere between \$9000 and \$15,000, the estimated coefficient becomes highly significant for developed countries as well. This suggests that the asymmetry between developed and developing countries may depend critically on the choice of the GDP per capita cut-off.

Nouira and Sekkat (2012) conduct panel cointegration estimates besides GMM estimates in order to deal with non-stationarity of the variables of interest. Differently from other studies, his estimation results show that currency misalignments have not any statistically significant long run effect on growth. That is, they fail to support the view that real exchange rate misalignments are detrimental for economic growth.

Osigwe and Uzonwanne (2015) scrutinized the granger causality of foreign reserve, exchange rate and FDI in Nigeria. ADF and PP were adopted to test for stationarity of the variables. Causality among the variables was traced using Johansen cointegration technique and the Granger Causality test (GCT). Result of the analysis suggested long run relationship among foreign reserve, FDI and exchange rate. GCT indicated a unidirectional causality runs consistently from exchange rate to foreign reserve from lag one to three. From lag one to two, it also indicated unidirectional causality from FDI to foreign reserve. However, at lag three, it showed bidirectional Granger causality between foreign reserve and FDI. Furthermore, evidence of unidirectional causality running from exchange rate to FDI was discovered from lag one to three.

Liu and Deseatnicov (2016) presented that exchange rate found negative response towards the outward FDI. In short run, exchange rate level's impact on outward FDI is significant and negative. In the long run, significant and positive relationship between skewness and outward FDI is found. On other hands, outward FDI is influenced positively and significantly by the volatility of exchange rate. Goel and Saradhi (2015) showed that FDI is not significantly related to REER while net aggregate loans and flows of the portfolio have positive and significant effects on REER.

Parajuli (2019) examined the relationship between the exchange rate, foreign direct investment and trade in the developing economy of Mexico from the Organization for Economic Corporation and Development countries and how exchange rates and the volatility of exchange rates impact the flow of Deform 1994 to 2018. The results showed a positive correlation between the expectations of exchange rates and FDI. The exchange rate coefficient variable showed that appreciation in the home currencies encourages outward FDI flows from members of OECD countries to Mexico.

Sifunjo and Mwasaru (2019) in investigating the short run relationship between exchange rates and stock prices from November 1993 to May 1999 with the data set consisting of monthly observations of the Nairobi Stock Exchange stock price index and the nominal Kenya shilling per US Dollar change rates concluded that a perceived risk with respect to the foreign exchange market and hence the stock market led to a higher cost of capital that in effect led to reduction in the sources of supply. This arose not only from the falling investor confidence in these two markets but also the financing capacity of the investors may decline.

2.6 Research Gaps

From the literature discussed above, it is evident that several researchers have conducted studies to establish the effect of foreign exchange rate and economic growth in different countries other than Kenya. The key identification is that there exist no study which examined the impact foreign exchange rate and economic growth in Kenya in 2021; this leaves a content gap for this study to fill. In addition, no single study was found that examined the effect of foreign exchange rate and economic growth in Kenya in the time. Besides the studies were conducted employing different methodologies, with many being article reviews covered small populations hence presenting a methodological gap, yet this was a time series study analysis work spanning over the period of 30 years. This leaves a contextual gap for this study to fill. The constructs of the studies are also different presenting the theoretical needs to comprehend and address the gaps, hence the need for contextual, theoretical and methodological gaps that the study sets to address.

CHAPTER THREE

METHODOLOGY

3.0. Introduction

This chapter comprises the research design, data type and sources, data analysis, ethical considerations

3.1 Research design

The study was conducted based on ex-post facto research design focusing on longitudinal design. The study was based on quantitative research for the assessment of the secondary data for scientific assessment and determining the conclusions for objectives. The design is a quasi-experiment for the examination of independent variable on the dependent variable. The design was used because it does not involve the random assignments because of the study use published random data for the random assignments due to the fact of conducting the design in the study. The design was chosen because of the capacity of the design to employ numerical and large data analyzed spanning over a long period of time.

3.2 Model Specification

The model intended to establish a relationship between foreign exchange rate and economic growth. This study adopted the production function. The production function approach that models the amount of output was produced for each factor of production, given technological constraints. In this approach population growth enters as a free input furnished by government. Aschaur (1989) provided the initial works on production function.

Consider an aggregate production function in which foreign exchange rate is an input into the aggregate production function thus, there is an optimal level of exchange rate which maximize the growth rate of economic growth. If population growth is too low, growth in the industrial sector fall whereas if its high growth in industrial sector rises. Aggregate output produced using population capital at time t is expressed as:

$$Y = AL^\beta K^\alpha \dots\dots\dots (i)$$

In carrying out the linear combination of the variables in the model an alternative approach, which certainly has more advantage over both the single equation and Johansen maximum likelihood

procedures is adopted for this study. This approach was proposed by Stock and Watson, (1993). This approach improves on others by correcting the effect of endogeneity and serial correlation which is the major criticism of single equation method and the Johansen maximum likelihood procedure by including leads and lags of first differences of the regressors. In addition, the Stock-Watson method has asymptotic optimality properties like the Johansen procedure. This is expressed below as:

$$Y_t = \alpha_1 + \alpha_2 \text{Ln}K_t + \alpha_3 \text{Ln}L_t + \alpha_4 \text{Ln}FER + \alpha_5 \text{Ln}FDI + e_1 \quad (\text{ii})$$

Y_t = Economic growth, K = Capital, L = Labor, FER = Foreign exchange rate, FDI = Foreign Direct Investments, e_1 = Error term.

Based on the discussion on the measurement of foreign exchange rate was adopted in this study. Therefore, Foreign exchange rate, foreign direct investments, labor and capital are adopted. These four measures are adopted because of their relevance in the production process that can lead to increased focus for economic growth.

In order to avoid multicollinearity and to compare the impact of this measure of foreign exchange rate is expressed as a function of economic growth. Thus, equation is the generic model while the specific equations are adopted and estimated using the dynamic approach that accounts for present and effect on economic growth.

3.3 Variable definition and Measurements

In our estimation equation, the dependent variable stands for growth rate of the economy; its data is obtained from World development indicators published by World Bank on line. It is intended to capture the role of the “catch up” effect of a country.

Exchange rate is the value at which the country’s currency can be converted into foreign and internationally recognised currencies such as dollars. It is in fact the conversion of domestic currency to international currencies. Exchange rate volatility refers to the extent to which the prices of currencies tend to fluctuate over time (Cote, 1994).

Economic growth is the increase in the level of goods and services of a country within a fixed period of time; in this case economic growth was measured in term of Gross Domestic Product expressed in the percentage change.

Foreign direct investment (FDI) is defined as an investment made by a firm or an individual investor in one country into business interests located in another country. Normally, FDI is the sum of the capital equity, re-investment of earning and other short term and long-term capital. It provides facilities of technology, employment and innovations which is best forecaster for economic growth of country (Chen & Dao, 2011). It will be measured at FDI at constant price percentage changes. The foreign direct investments is a high cause of foreign exchange fluctuations especially in Africa with high degree of profit repatriations hence the focus of the study and its inclusion in the study.

Labor. Actually, means any type of physical or mental exertion. In economic terms, labor is the efforts exerted to produce any goods or services. It includes all types of human efforts physical exertion, mental exercise, use of intellect, etc. done in exchange for an economic reward (Kanamori& Zhao, 2006). It will be measured at labor force participation, growth rate.

Capital refer to the assets—physical tools, plants, and equipment—that allow for increased work productivity. Capital comprises one of the four major factors of production, the others being land, labor, and entrepreneurship. Common examples of capital include hammers, tractors, assembly belts, computers, trucks, and railroads (Chen, 2012). It will be based on gross fixed capital formation rates

The economic growth is determined upon the factors such as balance of trade, imports and exports that affect the growth of the economy. The variables measurements are determined based on the definitions of economic growth by Coricelli, 1997 who provided for the measurements based on the production function. It was measured on the GDP growth rate/ changes in the growth of the economy.

3.4 Nature and Sources of data

Secondary data was used in this study. The data used in this study was annual bulletin of world bank OECD statistics, IMF. The data was transformed into log-level and first difference using the following formula.

The method of transformation was $FP = \ln (FP_t - FP_{t-1})$ 3.2. (iii)

For the case of further analysis ARD and residual tests, first difference data was used because the because the data was unit root.

3.5 Data Analysis

3.5.1 Descriptive Analysis

Description of the variables during the data analysis involves a discussion of the descriptive statistics of all these different data variables in the study. Different measures of central tendency and spread of the dataset was used to present a view of the data so that preliminary analysis of its nature was presented before an inference about the general populations for further results were made using the results of the sample data at hand.

3.5.2 Trend Analysis

The study employed line graphs to examine the trends of labor, capital, foreign exchange rate and foreign direct investments. Trend analysis was used because it helps visualize the movements and fluctuations of the data series from season to season.

3.6 Time series property of data

3.6.1 Unit Root Tests

In time series analysis, a great deal of attention was given to Stationarity of the variables in order to get rid of the problem of spurious regression. It is often said that most macroeconomic variables follow a random walk model, i.e., exhibiting a unit root behavior. According to Studenmund (2011), a random walk process can be identified as stationary when its means and variance are found to be constant across time, and the value of the covariance between the two time periods is dependent on the lag between them and not the actual time of computing the covariance. This study therefore, employed the Stationarity analysis to test whether the mean and variance of the stochastic term was a constant over time. The Augmented Dickey- Fuller (ADF) test is appropriate. The ADF tests the null hypothesis that there exists a unit root in the time series (non-stationary time series), which is $H_0: \alpha=0$ against the alternative hypothesis, $H_1: \alpha < 0$, that the time series is stationary (no unit root). A rejection of the null hypothesis under these tests means the series does not have a unit root. Assumptions of the Classical regression model necessitate that both the dependent and independent variables are stationary and the errors have a zero mean and finite variance. Decisions are made basing on the t-statistic, that is to say, if the absolute value of t-statistic is more than the critical values, then we reject the null hypothesis and conclude that the series is stationary. On the other hand, if the absolute value of the t-statistic is less than the critical

values, we fail to reject the null hypothesis and conclude that the series is non-stationary. The critical values for this t-statistic are given in Mackinnon (1991).

3.7 Regression Analysis

The study adopted adopts Autoregressive Distributed Lag (ARDL) approach to cointegration developed by Pesaran (1997) and subsequently redeveloped bounds testing approach by Pesaran, Shin, & Smith (1999, 2001). The study chooses ARDL approach due to its comparative advantages over other cointegration approaches such as the Engle & Granger (1987), Johansen & Juselius (1990, 1992) and Johansen (1995). While these approaches require variables to be integrated at first difference order, $I(1)$ and must assume equal lag length in the model, ARDL method was developed to circumvent these requirements due to the unreliability of the existing unit roots tests use in determining the integration order of the variables (Duasa, 2007).

The ARDL bounds testing approach to cointegration determines the long run level relationship between variables and further derive the error correction representation model for the estimation of short run coefficients of the variables if long run relationship exists among them. F-statistic of the joint significance test (Wald test) is used to determine whether the lagged levels of the variables are significant and cointegrated in first difference regression of the model (Conditional Error Correction Model Specification). The F-statistic is compared with the two asymptotically sets of critical values developed by Pesaran et al. (2001), applicable for large sample studies, and further reformulated by Narayan (2004, 2005) to accommodate small sample studies of observations ranging from 30 to 80. The critical values constitute the lower bound and upper bound for $I(0)$ and $I(1)$ respectively, depending on whether the model includes a deterministic trend or not. If the F-statistics falls above or greater the upper bound, long run level relationship is said to exist among the variables; if falls below or less than lower bound, long run level relationship among the variables exists not. The decision whether there exists cointegration among the variables remains inconclusive if the F-statistics fall in between the upper and the lower bounds.

The Conditional Error Correction Model (Long Run ARDL Model) is built on the assumption of uncorrelated residual terms. It is therefore necessary to appropriately determine the optimal lag length for the underlying ARDL model in which the disturbance terms are not serially correlated (Wolde-Rufael, 2010) and (Pesaran et al., 2001). In determining the optimal lag length, we employ

Akaike Information Criterion, AIC (Akaike, 1974), Schwarz Bayesian (or Information) Criterion, SBC (Schwarz, 1978) and Hannan-Quinn Criterion, HQC (Hannan & Quinn, 1979) methods. The lag length at which the values of these methods are minimized is the optimal lag (Pesaran et al., 2001). The popularly used ones are AIC and SBC, but SBC is more parsimonious. However, Al-jammal (2010) found AIC to be preferred in a simulation study between AIC and SBC, and if the difference between the minimum AIC and another AIC of a model is less than two (2), rule of thumb suggests substantial evidence for the model at both AICs.

The analysis of regressions analysis to determine the Labor, capital, foreign exchange rate, FDI on economic growth. The regression model is based on the provision of

$$Y_t = \alpha_1 + \alpha_2 \ln K_t + \alpha_3 \ln L_t + \alpha_4 \ln FXR + \alpha_5 \ln FDI + e_1 \quad (\text{iv})$$

The method of hypothesis test adopted in this study was the P-value. The decision is to reject the null hypothesis if the P-value is less than 0.05 and accept if it is below.

The methods of the hypothesis test adopted in the study were P-value based on 0.05 level of significance. If the p-value is less than 0.05 we reject the null hypothesis and conclude that a significant relationship exists between the variables.

3.8 Diagnostic Tests

3.8.1 Serial Correlation Test

Serial Correlation is a correlation among members of the series of error terms ordered in time. It is mainly caused by incorrect functional forms, auto regressions, manipulation of data, data transformation and non-stationarity of the data (Wooldridge 2009: 274). Under this Durbin - Watson d test and Breusch–Godfrey (BG) test. In this study, the BG test that is based on the Lagrange Multiplier principle is chosen since other tests have drawbacks that made the BG test to be favored. The decision rule was based on the p-value of 0.05 level of significance.

3.8.2 Normality Test

In the literature, there are several tests for normality, this employed Jarque–Bera tests. The Jarque-Bera test for normality was employed in this research. The Jarque -Bera test based on OLS residuals mainly used in a large sample test. First, it requires calculating the Skewness and Kurtosis and then measures the OLS residuals as. In this case, there was use the JB test to determine whether

the residuals are normally distributed or not. Under the null hypotheses where the residuals are normally distributed, if the p-value of the statistics is sufficiently low or lower or equal to the level of significance, then it will be rejected. But if the p-value is found to be reasonably higher, then the normality assumption was not be rejected.

This employed Shapiro-Wilk W test for Normal data method. The model is based on the p-value is less than 0.05. (P-Value <0.05).

3.8.3 Heteroscedasticity Test

One of the ordinary least squares and Regression Model assumptions is that the variance of disturbance terms should be constant. As pointed out by Engle (1982). When the data is not homoscedastic, although coefficients obtained from the regression analysis would hold, the confidence intervals obtained from them would be extraordinarily large and as a result, would affect further inference to be made about the data. In this study, Breusch Pagan Cook-Weisberg test for Heteroscedasticity was used to test if the residuals from the regression model are homoscedastic or no.

CHAPTER FOUR

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

4.0 Introduction

In this chapter, the researcher presents analyses and interprets the data. The presentation, analysis and interpretation of the data are dependent on the objectives of the study. The purpose of the study was to assess the effect of foreign exchange rate on economic growth of Kenya (1987 to 2019). The objectives were to determine the trend of foreign exchange rate and economic growth of Kenya, to establish the short run relationship between foreign exchange rate and economic growth of Kenya and to examine the long run relationship between foreign exchange rate and economic growth of Kenya the presentation, analysis and interpretation are shown below.

4.1 Trend of foreign exchange rate and economic growth of Kenya

The first objective of the study was to determine the trend of foreign exchange rate and economic growth of Kenya. To determine the trend, descriptive statistics in form of mean, median, minimum, maximum, standard deviation, kurtosis and skewness were used to determine the trend of the foreign exchange and GDP of Kenya.

Table 4.1: Descriptive statistics on the foreign exchange rate and economic growth of Kenya

	FER	FDI	GDP	LABOUR	CAPITAL
Mean	65.11	0.8575	4.055	9.26	22.63
Median	72.10	0.5000	4.500	6.60	18.60
Maximum	103.40	3.4000	8.4000	16.60	155.50
Minimum	16.20	0.0400	0.3000	5.70	15.40
Std. Dev.	26.43	0.8706	2.2229	4.08	23.93
Skewness	-0.583	1.3462	-0.3614	0.76	5.41
Kurtosis	2.31	3.91	2.1262	1.86	30.59
Jarque-Bera	2.507	11.11	1.768	4.94	1208.43
Probability	0.285	0.0038	0.413	0.08	0.00
Sum	2148.7	28.300	133.84	305.60	747.00

Sum Sq.	22363.0	24.256	158.13	533.61	18334.4
Dev.					
Observations	33	33	33	33	33

From Table 4.1, the rate of flow of foreign exchange rate averaged 65.1 percent whereas that of Foreign direct investment averaged 0.85 percent. Again, GDP averaged 4.0 percent, labor averaged to 9.2percent and capital averaged to 22.9 percent. Among all the variables, foreign exchange rate has the highest standard deviation followed by capital and this corroborates the general perception that FDI and exchange rate are highly volatile. The standard deviation of labor and GDP are all low and hence they are less volatile. The high maximum value for foreign exchange rate is attributable to the structural change in the inflow of FDI, labor and exchange rate which affect the economic growth of Kenya.

4.2 Time Series Property of Data (Stationarity tests)

The study sought to determine the time series property of the data for the purpose of establishing if it is auto correlated or its autoregressive. This was done in order to convert the variables to stationary as a key assumption in multiple linear regression analysis and other inferential statistics. Besides, working with highly collinear variables would yield spurious result from which further inference is insignificant. Unit root tests were conducted on all the variables using both the Augmented Dickey-Fuller. In each case, the null hypothesis is that the variable has unit root and accepting it would imply the data is non-stationary. The alternative hypothesis is that the data has no unit root (stationary). The result of ADF tests are summarized in Table 4.2. Both tests are tested at a 0.05 level of significance. The rejection criteria are that we reject the null hypothesis if the test statistic value is greater than their respective critical values of 0.05 level of significance and if the p-value is less than 0.05.

Table 4.2: Stationarity Test Result

Augmented Dickey Fuller (ADF)				
Levels				
Variables	Constant			Prob.*
GDP	Level Augmented Dickey-Fuller test statistic			
		5% level	-2.957110	0.020
	First difference			
		5% level	-6.179592	0.000
Foreign exchange rate	Augmented Dickey-Fuller test statistic			
		5% level	-1.306299	0.614
	First difference			
		5% level	-5.324237	0.000
FDI	Augmented Dickey-Fuller test statistic			
		5% level	-3.770293	0.007
	First difference			
		5% Level	-6.004961	0.000
Labor	Augmented Dickey-Fuller test statistic Test critical values:			
		5% level	-2.085170	0.251
	First difference			
		5% level	-3.781542	0.009
Capital	Augmented Dickey-Fuller test statistic			
			-5.830152	0.000
	Test critical values:	1% level	-3.653730	
		5% level	-2.957110	
		10% level	- 2.617434	
	First differences			
		5% level	-9.367022	0.000

(*) indicate significant at 5% level

Source: Researcher 2021

The null hypothesis (H_0) for the Augmented Dickey-Fuller test (ADF) test is that all the series have a unit root. The result indicate that the all the variables are not stationary at level when constant or trend is included in the ADF tests. Since the series are not stationary at level, the variables were diffrence once before they became integrated of order one I(1) when constant or constant and trend is included in the ADF test. The order of integration of a time series determines if it linear combination would be stationary that is, integrated of order zero (0). In this scenario, all the variables are nonstationary at I(1) this implies that we can only regress the variables only if they are co-integrated.

Table 4.3: Pairwise Correlation Matrix

	DFER	DFDI	DLABOUR	DCAPITAL	DGDP
DFER	1	0.32	0.579	0.093	0.394
DFDI	0.320	1	0.183	0.113	-0.196
DLABOUR	0.578	0.183	1	0.048	0.091
DCAPITAL	0.093	0.114	0.0487	1	-0.305
DGDP	0.394	-0.196	0.091	-0.305	1

Source: Researcher 2021

We present a pairwise correlation matrix in Table 4.3 which shows the extent to which all variables used in the econometric model are correlated. Generally, pairwise correlation test shows the lowest and highest correlation coefficients approximately given as 0.394 between foreign exchange rate and economic growth. We used the coefficients to conclude that there is no evidence of correlation the variables, thus no influence the variances and co-variances and as such the precision of our estimation.

4.3 Long run relationship between foreign exchange rate and economic growth of Kenya.

To assess the short-run and long-run relationship between the foreign exchange rate and economic growth, the Autoregressive Distributed Lags (ARDL) method is utilized. The ARDL method was introduced and developed by Pesaran& Shin (1998) and was refined a few years later by Pesaran et al. (2001). The ARDL method has been extensively utilized as it provides several advantages over traditional statistical methods for assessment of cointegration and short/long-run relationships.

Table 4.4: Long run relationship between foreign exchange rate and economic growth of Kenya

Conditional Error Correction Regression					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	-3.294	11.465	-0.2873	0.779	
LGDP(-1)*	-2.3809	0.5885	-4.0452	0.001	
LFER**	2.317	2.0856	1.1109	0.290	
LFDI(-1)	0.178	0.4777	0.3744	0.715	
LCAPITAL(-1)	-0.398	1.0012	-0.398	0.699	
LLABOUR(-1)	-1.238	1.465	-0.844	0.416	
D(LGDP(-1))	1.155	0.462	2.500	0.029	
D(LGDP(-2))	0.901	0.337	2.671	0.023	
D(LGDP(-3))	0.537	0.219	2.452	0.032	
D(LFDI)	-0.020	0.176	-0.118	0.907	
D(LFDI(-1))	-0.066	0.433	-0.152	0.881	
D(LFDI(-2))	0.089	0.328	0.271	0.799	
D(LFDI(-3))	0.235	0.246	0.953	0.367	
D(LCAPITAL)	-0.699	0.440	-1.588	0.140	
D(LCAPITAL(-1))	0.435	0.677	0.642	0.53	
D(LCAPITAL(-2))	0.605	0.439	1.377	0.19	
D(LLABOUR)	0.283	3.977	0.071	0.94	
D(LLABOUR(-1))	6.598	3.618	1.823	0.09	
* p-value incompatible with t-Bounds distribution.					
** Variable interpreted as $Z = Z(-1) + D(Z)$.					
Levels Equation					
Case 2: Restricted Constant and No Trend					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
LFER	0.973189	1.004927	0.968418	0.3536	
LFDI	0.075139	0.190311	0.394823	0.7005	
LCAPITAL	-0.167569	0.440714	-0.380223	0.7110	
LLABOUR	-0.520274	0.530410	-0.980890	0.3477	
C	-1.383854	4.992120	-0.277208	0.7868	
EC = LGDP - (0.9732*LFER + 0.0751*LFDI -0.1676*LCAPITAL -0.5203					
*LLABOUR -1.3839)					
F-Bounds Test			Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)	
			Asymptotic:		
			n=1000		
F-statistic	5.074781	10%	2.2	3.09	
K	4	5%	2.56	3.49	
		2.5%	2.88	3.87	
		1%	3.29	4.37	
		Finite			
Actual Sample Size	29	Sample:			
		n=35			
		10%	2.46	3.46	
		5%	2.947	4.088	
		1%	4.093	5.532	
		Finite			
		Sample:			
		n=30			
		10%	2.525	3.56	
		5%	3.058	4.223	
		1%	4.28	5.84	

Source: Researcher 2021

The above bound test results in table 4.4 shows that the F- statistic is 5.075, which is greater than the upper bounds of all significant levels of 10%, 5%, 2.5% and 1%. This implies that there was a long run relationship between foreign exchange rate and economic growth rate of Kenya during the period between 1987 and 2019.

From the above long run coefficient analysis, the estimated coefficient of the constant (C) is -1.383854. This means keeping all other factors constant, real gross domestic product (RGDP) was decreasing by -1.383854 during the period of 1987 and 2019 in the long run. The estimated coefficient of foreign exchange rate is 0.9731, while its P-value is 0.3536, this implies that foreign exchange rate has insignificant positive effect of gross domestic product (GDP) of Kenya in the long run. This result reveals that a 1 unit increase in foreign exchange rate of Kenya increases GDP in 0.973. The estimated coefficient and P-value of foreign direct investment (FDI) are 0.075139 and 0.7005 respective. This implies that there is insignificant positive relationship between FDI and GDP of Kenya in the long run. However, according to the coefficients and P-values of the capital and labor reveals that both capital and labor factors have insignificant negative effect of economic growth rate of Kenya in the long run. The results indicate that the foreign exchange rate significantly affect the economic growth of Kenya.

4.4 Short run relationship between foreign exchange rate and economic growth of Kenya (1987 to 2019).

To capture the short run dynamics of the model, the method of Engle-Granger cointegration is a way that one can estimate the long-run equilibrium relationship between two or more variables. Engel and Granger have shown that if two variables Y and X are cointegrated, then there is a long-term equilibrium relationship between these variables, although these variables may be in disequilibrium in the short-run. This short-run relationship between two variables can be formulated in a model called error correction model (ECM). The error of equilibrium (disequilibrium) can be used to combine the short-run to long-run period. The method used for this combination is called the error correction mechanism (ECM). To estimate an error correction model using the method of least squares (OLS) we should count the cointegration vector. The specificity of the error correction model forces the long-run behavior of endogenous variables to converge to the cointegration relationship while arranges the short-run dynamics.

Table 4.5: Error correction mechanisms (short run relationship between foreign exchange rate and economic growth of Kenya (1987 to 2019)).

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	0.5096	0.189	2.693	0.043
D(GDP(-2))	-0.222	0.1522	-1.461	0.203
D(GDP(-3))	0.2105	0.143	1.46802	0.202
D(FDI)	-0.4273	0.3085	-1.3848	0.224
D(FDI(-1))	0.3846	0.3464	1.1102	0.317
D(FDI(-2))	-0.2981	0.3127	-0.9534	0.384
D(FDI(-3))	2.2775	0.4237	5.3743	0.003
D(DLABOUR)	-6.9593	0.9094	-7.6524	0.0006
D(DLABOUR(-1))	-1.32417	0.3443	-3.8449	0.012
D(DLABOUR(-2))	0.45411	0.2141	2.1204	0.087
D(DLABOUR(-3))	-1.4901	0.3855	-3.8653	0.011
D(DFER)	0.4299	0.0579	7.4164	0.000
D(DFER(-1))	0.1110	0.0424	2.6184	0.047
D(DFER(-2))	0.1880	0.0446	4.2127	0.008
D(CAPITAL)	-0.0377	0.0095	-3.9475	0.010
D(CAPITAL(-1))	-0.1256	0.0187	-6.6959	0.001
D(CAPITAL(-2))	-0.0637	0.0118	-5.3867	0.003
D(CAPITAL(-3))	-0.0220	0.0074	-2.9397	0.030
CointEq(-1)*	-1.48537	0.2091	-7.1003	0.00
R-squared	0.933214	Mean dependent var		0.041
Adjusted R-squared	0.813000	S.D. dependent var		2.4230
S.E. of regression	1.047830	Akaike info criterion		3.17695
Sum squared resid	10.97949	Schwarz criterion		4.0727
Log likelihood	-27.06584	Hannan-Quinn criter.		3.4575
Durbin-Watson stat	2.120728			
* p-value incompatible with t-Bounds distribution.				
F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.20125	10%	2.2	3.09
	7			
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Researcher 2021

The above table (table 4.5) indicated that the coefficient of error correction term is (-1.485), which is negative and statistically significant at 5% level of significance. Negative sign and significant coefficient show that the existence of co-integration relationship among the model variables. The magnitude of the coefficient implies that about 148% of the disequilibrium caused by previous year's shocks converges back to the current year's long run equilibrium.

The estimated coefficient and p-value of foreign exchange rate (FEXR) are 0.429999 and 0.0007 respectively. This means that FEXR has a positive significant effect on the gross domestic product of Kenya (GDP). This implies that a 1% increase in foreign exchange rate increases GDP to 42.99% in the short-run.

The estimated coefficient of foreign direct investment (FDI) and P-value are -0.427334 and 0.2247. this implies that foreign direct investment has an insignificant negative effect on the Gross Domestic product of Kenya in the short run. Furthermore, according to the coefficients and P-values of Capital and Labor in the above table, both capital and labor have a significant negative effect on the economic growth rate of Kenya in the short run.

The coefficient of (R^2) is 0.933214, this indicates that about 93.3% of total variation or a change in the growth of Kenya's GDP is explained by changes in the explanatory variables in the model, while the remaining 6.67% is explained by other factors not included in the study.

Table 4.6: Serial correlation analysis

Included observations: 31		
Lags	LM-Stat	Prob
1	78.98910	0.0000
Probs from chi-square with 25 df.		

The study results indicate that there is no serial correlation at larger order in the data between foreign exchange rate and economic growth in Kenya between 1987 to 2019, the results indicated that there is no serial correlation between the variables under the study.

Table 4.7: Residual Heteroskedasticity Tests

Joint test:					
Chi-sq	df	Prob.			
317.9346	330	0.6734			
Individual components:					
Dependent	R-squared	F(22,7)	Prob.	Chi-sq(22)	Prob.
res1*res1	0.4840	0.298	0.98	14.522	0.881
res2*res2	0.2455	0.1036	1.000	7.3704	0.998
res3*res3	0.68376	0.6879	0.765	20.512	0.551
res4*res4	0.9540	6.6084	0.007	28.621	0.156
res5*res5	0.3624	0.1808	0.999	10.873	0.976
res2*res1	0.3014	0.1373	0.999	9.0445	0.993
res3*res1	0.5202	0.3450	0.973	15.606	0.834
res3*res2	0.2390	0.0999	1.000	7.1723	0.998
res4*res1	0.8162	1.4134	0.334	24.487	0.322
res4*res2	0.6871	0.6987	0.757	20.613	0.544
res4*res3	0.9038	2.9926	0.070	27.116	0.206
res5*res1	0.4415	0.2515	0.994	13.245	0.926
res5*res2	0.2874	0.1283	0.999	8.6248	0.995
res5*res3	0.3047	0.1394	0.999	9.1426	0.992
res5*res4	0.5915	0.4607	0.922	17.745	0.721

Source: Researcher 2021

The findings from the Breusch-Pagan test for heteroscedasticity above indicate that the model does not suffer from the problem of non-constant variance. This is because the p-value of 0.673 is greater than 0.05 thus we fail to reject the above stated null hypothesis in table 4.8 and conclude

that there is constant variance in the model. The model shows that heteroscedasticity was not found in the data.

Table 4.8: Normality tests for the variables

Component	Skewness	Chi-sq	Df	Prob.
1	0.563458	1.587424	1	0.2077
2	2.486268	30.90764	1	0.0000
3	0.037198	0.006918	1	0.9337
4	0.316033	0.499384	1	0.4798
5	2.117728	22.42386	1	0.0000
Joint		55.42522	5	0.0000
Component	Kurtosis	Chi-sq	Df	Prob.
1	3.055527	0.003854	1	0.9505
2	11.53149	90.98289	1	0.0000
3	1.883171	1.559134	1	0.2118
4	2.654674	0.149062	1	0.6994
5	8.940095	44.10591	1	0.0000
Joint		136.8009	5	0.0000
Component	Jarque-Bera	df	Prob.	
1	1.591278	2	0.4513	
2	121.8905	2	0.0000	
3	1.566053	2	0.4570	
4	0.648446	2	0.7231	
5	66.52977	2	0.0000	
Joint	192.2261	10	0.0000	

Source: Researcher 2021

Null hypothesis of normality is H_0 : Residuals are normally distributed. We reject the null hypothesis for normality if the p-value is less than 0.05. In our model since the p-value of 0.000 is less than the p-value of 0.05, we reject the null hypothesis and thus conclude that the residuals of the model are not normally distributed.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter presents a discussion of findings, conclusion and recommendation of the research.

5.1 Discussion of results

5.1.1 Short run relationship between foreign exchange rate and economic growth of Kenya.

The study results indicate that there was a statistically significant relationship between foreign exchange rate and economic growth in the short run. The study findings indicate that the presence of exchange rate induces the economic growth of Kenya. The study results are in agreement with those of Habib et al. (2017) analyzed the impact of movements in the short run relationship of real exchange rate on economic growth based on five-year average data for a panel of over 150 countries in the post-Bretton Woods period. They determined that areal depreciation raised the annual real GDP growth. Furthermore Thapa (2002) analyzed the econometric short run relationship between the real exchange rate and economic activities in Nepal using annual data from 1978 to 2000. The estimated ECM regression equation showed that the real exchange rate had a contractionary effect on economic growth. Galindo and Montero (2005) investigated the causality of short run relationship from exchange rate to economic growth by using panel data relating to 9 Latin American countries, even the results are consistent with those of Di Nino et al. (2011) analyzed the connection between exchange rate and economic growth in Italy. They concluded that there is a positive relationship between undervaluation and economic growth for a dataset covering the period 1961–2011. Finally Man et al. (2013) investigated the short run relationship between exchange rate and economic growth in Pakistan for the period 1976–2010 by employing three stage least square techniques. They showed that the exchange rate has a positive impact on economic growth through promoting export and import substitute industry. The results are disagreement with those of Vaz and Baer (2014) employed a panel model using unbalanced panel data covering 1995–2008 for a sample of 39 countries in Latin America and proved a negative short run impact of exchange rate on output. Thus, they showed that depreciation of the currency in Latin American countries caused a nominal cost increase in the production process and hence decreased economic growth rate rather than raised it.

5.1.2 Long run relationship between foreign exchange rate and economic growth of Kenya.

In the long run still foreign exchange rate had a non-statistically significant relationship with the economic growth of Kenya. The findings show that in the long run, the foreign exchange rate generated less economic growth of Kenya. The findings are in agreement with those of Bahmani-Oskooee and Gelan (2018) employed the Autoregressive Distributed Lag (ARDL) model in their study in order to investigate the effects of exchange rate risk on trade flows in the short-run and long-run for twelve African countries during the period 1971Q1–2015Q4. The results agree with those of Sturzenegger (2012) conduct panel data analysis based on this undervaluation index. Mostly focusing on the theoretical channels through which real exchange rate levels can affect economic development in long run and finally Parajuli (2019) examined the relationship between the exchange rate, foreign direct investment and trade in the developing economy of Mexico from the Organization for Economic Corporation and Development countries and how exchange rates and the volatility of exchange rates impact the flow of Deform 1994 to 2018. The results showed a positive correlation between the expectations of exchange rates and FDI. The results disagree with those of Alper (2017) who examined the impact of exchange rate volatility on Turkey's trade to the 15 European countries during 2002–2013 by using Generalized Autoregressive Conditional Heteroscedasticity (GARCH) (1, 0) for calculating volatility. The main empirical finding from Alper (2017) is that exchange rate volatility reduces export flows in the short-run. However, the effect for import sectors is both positive and negative in the long run. In addition, Turkey's trade with European Union countries is not affected by the volatility of exchange rates.

5.2 Conclusions

The study results reveal that there was a general increment in the exchange rate of Kenya. The results reveal that every year that passed; the foreign exchange rate for Kenya was generally increasing. The GDP for Kenya was also increasing, compared to the foreign exchange rate. The study concludes that the exchange rate depreciation occurred though not so much as in the cases the Kenya currency strengthened. The study revealed that economic growth of Kenya was generally decreasing and increasing.

The study results indicate that there was statistically significant short run relationship between foreign exchange rate and economic growth of Kenya. The study findings indicate that the presence of exchange rate induces the economic growth of Kenya. The study concludes that in the

short run, the economic growth of Kenya has positively affected by the foreign exchange rate changes. The study shows that the prevalence of foreign exchange rate induces the economic growth in the short run.

In the long run still, foreign exchange rate had no significant relationship with the economic growth of Kenya. The findings show that in the long run, the foreign exchange rate generated economic growth of Kenya. The study concludes that foreign exchange rate can be an avenue for the attainment of the economic growth in Kenya.

5.3 Recommendations

The study reveals an increasing foreign exchange rate, the study recommends that there is need for development of mechanisms needed for the enhancement of the foreign exchange rate intended to reduce depreciation. This can be import substitution industries need to be established, there is need to reduce the importation and increase exports. The foreign reserves in the country need refurbishment. The economic growth performance determinants need to be assessed and determined, there is need for the development of economic growth stimulants such as FDI and focusing on reducing the interest rates to generate economic performance.

first objective reveal that in the short run, there exist a positive relationship between foreign exchange rate and economic growth of Kenya, the study recommends for appropriate mechanisms to enhance the exchange rate, the government should also embark on strong fiscal policy to reduce the unnecessary money supply which can lead to inflation that negatively impact on economy and reduce economic growth.

Secondly there is need to consider diversification of the export products and markets while at the same time improving on quality to enhance competitiveness. In particular, considered export diversification strategies require enhanced emphasis on promoting non-traditional, higher productivity and technology-intensive exports. Lastly, a need exists for a robust currency stabilization framework aimed at mitigating high exchange rate fluctuations to promote exports in Kenya hence export earnings. The government needs to seek ways of reducing the volatility of the Kenyan shilling exchange rate. In managing exchange rate risk, the government and the Central

Bank of Kenya need foresight, better forecasting and a willingness to undertake calculated risk to avoid economic losses arising out of exchange rate fluctuations.

5.4 Contribution of Knowledge

This study attempts to address multiple gaps and in doing so makes important contributions.

First, the study extends limited research on understanding of foreign exchange rate and its impact on Economic growth. my study is one of the first to consider foreign exchange rate and its impact on Economic growth of the country.

Second, the study introduces and assess other mediating variables those contribute the economic growth such as foreign direct investment, Capital and Labor.

Third, the study generated a new knowledge that can contribute economic growth which is improving skills of human capital investment. Human capital affects economic growth and can help to develop an economy by expanding the knowledge and skills of its people. The level of economic growth driven by consumer spending and business investment determines the amount of skilled labor needed.

Lastly, the study proposed a new methodology that previous studies don't used it such as Vector Auto Regressive (VAR) and Error Correction Model.

5.5 Areas for Further Research

The results presented in this report may not be conclusive and should be treated as being preliminary. Further analysis of the survey data foreign exchange rate and economic growth rate needs to be done to validate these findings and provide greater confidence in explaining the changes in exchange rate and economic growth rate. Therefore, more studies can be carried on the following.

- i) The relationship between inflation and exchange rate.
- ii) The relationship between exchange rate and portfolio investments.
- iii) The relationship between interest rate and GDP rate
- iv) The relationship between interest rates and GDP rate

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APPENDIX: DATA FOR ANALYSIS

Year	GDP	Labour	Capital	FER	FDI
1987	5.9	5.8	19.4	16.2	0.5
1988	6.2	5.7	20.6	16.5	0.4
1989	4.6	6.8	19.0	17.7	0.05
1990	4.1	11.5	16.5	20.5	0.7
1991	1.4	16.6	16.9	22.9	0.6
1992	0.79	16.4	18.8	27.5	0.2
1993	0.35	16.2	21.3	32.2	0.7
1994	2.6	16.0	16.0	58.0	2.5
1995	4.4	15.6	15.4	56.0	0.1
1996	4.1	15.2	15.6	51.4	0.5
1997	0.4	14.6	155.5	57.1	0.9
1998	3.2	13.9	16.7	58.7	0.5
1999	2.3	13.3	18.1	60.3	0.1
2000	0.6	11.5	17.2	70.3	0.4
2001	3.7	10.1	15.8	76.1	0.8
2002	0.5	9.0	16.2	78.5	0.04
2003	2.9	8.0	18.6	78.7	0.2
2004	5.1	7.3	19.4	75.5	0.5
2005	5.9	6.6	19.9	79.1	0.2
2006	6.4	6.4	18.8	75.9	0.11
2007	6.8	6.2	18.5	72.1	0.2
2008	0.3	6.1	20.4	67.3	2.2
2009	3.3	6.0	20.3	69.1	0.2
2010	8.4	6.1	21.1	77.3	0.3
2011	6.1	6.0	20.5	79.2	0.4
2012	4.5	6.0	20.8	88.8	3.4
2013	5.8	6.1	22.8	84.5	2.7
2014	5.3	6.1	21.6	86.1	2.0

2015	5.7	6.0	17.6	87.9	1.3
2016	5.8	6.1	18.2	101.5	0.9
2017	4.8	6.1	17.2	103.4	1.6
2018	6.3	6.1	16.7	101.3	1.8
2019	5.3	6.2	15.6	101.1	1.3