

**EFFECTS OF EXTERNAL TRADE SHOCKS ON ECONOMIC GROWTH
IN KENYA**

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**A Thesis Submitted to the School of Business and Economics in Partial Fulfilment
of the Requirements for the Award of the Degree of Master of Science in
Economics Masinde Muliro University of Science and Technology**

October 2024

DECLARATION

I declare that the research is my original work with no other support and sources than pointed out and has not appeared elsewhere for any degree or any other award.

Signed

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CERTIFICATION

The undersigned supervisors certify they have read and hereby recommend for acceptance of Masinde Muliro University of Science and Technology thesis entitled *‘Effects of External Trade Shocks on Economic Growth in Kenya.’*

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DEDICATION

I dedicate this research to Almighty God for wisdom and potency, Darlene Annalee, my parents, Mr. and Mrs. Kilaku for love, support, and encouragement all along my academic journey.

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ABSTRACT

Over the past decade, Kenya has experienced notable shifts in its trade patterns, characterized by instances of sudden disruptions and volatility. Kenya National Bureau of Statistics indicated that, Kenya has been experiencing unsteady economic growth because of external uncertainties. Therefore, this study examined the effects of external trade shocks on economic growth in Kenya. The key objectives were determining the effect of capital inflow shock on economic growth in Kenya, examining the effect of commodity price shock on economic growth in Kenya, assessing the effect of interest rate shock on economic growth in Kenya and finally establishing a moderating effect of exchange rate on the association between external trade shocks and economic growth in Kenya. Real business cycle theory was adopted as the key theory supported by dependency theory and purchasing power parity. The descriptive and correlational research design were employed to establish the direction and strength of the nexus. The research adopted time series data to show the systematic trend for the period of 14 years, ranging from 2008-2022. This period was the best time to cover trends on great economic phenomena such as great Russia-Ukraine crisis, COVID-19, sovereign European debt, and launch of Kenya's vision 2030. The study employed secondary data drawn from World Bank, Central Bank of Kenya, and Kenya National Bureau of Statistics. Data was analyzed using E-views software version 10. Diagnostic estimations such as normality, stationarity, multicollinearity, correlational analysis and post-diagnostic tests were undertaken to summarize and interpret the findings. Correlational analysis result revealed that capital inflow shock and interest rate shock had a +ve significant effect; 0.7001(0.0000): 0.4300(0.0006) while commodity price shock had a -ve significant association, -0.2639(0.0416). Augmented Dickey Fuller and Dicky Fuller-Generalized Least Squares, tests confirmed the presence of unit root at levels and stationarity at first difference for all variables apart from capital inflow shock which was integrated at I (0). Autoregressive distributed lag Bounds test for cointegration shows that F-statistics was 18.89621 greater than critical values in upper and lower bounds indicating cointegration and long-term relationship. Vector error correction model of the cointegrating equation was -0.1793219. Multiple regression results indicated that capital inflow shock and interest rate shock had a +ve significant effect on economic growth in Kenya with coefficients; 0.3022(0.0000); 0.6658(0.0000) while commodity price shock had a -ve significant effect -0.2019(0.0321) and exchange rate had a weak moderating effect on the relationship. The Breusch-Godfrey test for autocorrelation revealed that there was no serial correlation with p-values > 0.05. The centered Vector Inflation Factor values were less than 10 hence absence of Multicollinearity. Breusch-pagan-Godfrey test had the p-value > 0.05 showing that there was no problem of heteroscedasticity. Jarque-Bera test for normality revealed that the series is distributed normally at 5% level of significance with p-values > 0.05. The cumulative sum test confirmed that the model was stable and fit for policy and decision making. From the results, the study recommends that, the government need to attract more Foreign Direct Investments by setting favourable policies to boost capital inflows as well as domestic production to manage commodity prices and imports which makes the nation more vulnerable to shocks. Central Banks should strategically set lending rate policies to value local currency as well as striking balance between controlling inflation rate and supporting sustainable economic growth. Based on current economic situation in Kenya, the government should enhance transparency, competition, and innovation in financial sector and foster favourable business environment to capitalize on interest rates.

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LIST OF ABBREVIATIONS AND ACRONYMS

ARLD	Auto-Regressive Lag Distributed
CAPI	Capital inflow shock
CDDCs	Commodity Dependency Developing Countries
CP	Commodity price shock
CPI	Consumer Price Index
DF-GLS	Dickey Fuller Generalized Least of Squares
EAC	East African Community
ER	Exchange rate
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IMF	International Monetary Fund
IR	Interest Rate shock
KSH	Kenya Shilling
LDCs	Less Developed Countries
PPP	Purchasing Power Parity
SSA	Sub-Saharan Africa
TWI	Trade Weighted Index
UNCTAD	United Nations Conference on Trade and Development
USD	United States Dollar
VECM	Vector Error Correction Model
VAR	Vector Auto –Regression
WBG	World Bank Group
WIR	World Investment Report
MICs	Middle-income countries

OPERATIONAL DEFINITION OF THE KEY CONCEPTS

- External Trade shocks** Refers to uncertain, unpredictable, unexpected, and unanticipated occurrences that bring effects to macroeconomic variables. Trade shocks such as commodity price shock, capital inflow shock and interest rate shock, majorly occur from external economy causing great economic effect especially developing countries
- Commodity Price Shock** This refers to incident when prices of general commodities have drastically increased or decreased within a short span. This shock in most cases leads to sudden hike in prices because of external forces hence increase in cost of living.
- Capital Inflow Shock** It refers to a sudden change in direct foreign investments flowing in a country.
- Interest rate Shock** This refers to sudden change in real lending rates set by the central banks.
- Moderator Exchange Rate** This refers to the influences of currency prices on the direction and strength of the nexus between the explained and explanatory variables under study.
- Economic growth** Refers to the increase in the production of goods and services in an economy over a specific period, typically measured by the rise in the value of the country's Gross Domestic Product.

Trade weighted Index (TWI)	Also referred to as real broad index. TWI refers to the measure that tracks the value of country's currency relative to a basket of foreign currency. It measures the overall strength or weakness of a country's currency against trading partner. It measures whether the currency is appreciating or depreciating on average to its trading Partners.
Macroeconomic factors	These are factors that affect a region or economy at large or in a wider scope
Volatility	Tendency to fluctuate abruptly and unexpectedly.
Consumer Price Index (CPI)	A vital macroeconomic factor used to monitor the fluctuations of prices and how they affect the policy decisions.
Business Cycles	Refers to series of economic fluctuations on GDP. Stages of movement of economic activities
Foreign Direct Investment Inflow	FDI inflow refers to the value of inward direct investment made by non-resident investors in the economy
Gross Domestic Product (GDP)	Refers to the measure of the final value of goods and services produced in an economy. It is the total monetary value of all final goods and services produced inside a country within a specific time, typically a quarter or a year.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The worldwide economic expansion is fractured due to different shocks, yet it has been the most studied area across the globe. As a result of external trade shocks, developing countries in particular experience volatility of macroeconomic variables causing effects on economic growth (Zwierzchowski & Panek, 2022). According to Aizenman, Yothin, Gemma, and Shu (2017), the general growth of GDP among countries is more reliant on exogenous factors such as: global oil and non-oil prices, world financial exchange rate volatility, and FDI growth. The period between 1950 and 2016, the proportionally increased growth of developed countries occurred not from experiencing faster growth but rather from shrinking less and less often (World Bank, 2017).

World Bank, (2022) reported that increase in prices of food commodities has resulted from the Russia-Ukraine war, and it has been the largest since 2008. Even though economic shocks are uncertain and less predictable, there is a need for economists and policymakers to comprehend the reasons behind as well as measures to regulate the occurrence of external trade shocks and to reduce the vulnerability of developing economies. According to Calderon, Chuhan-pole, and Kubota (2019), the sovereign crisis of European debt in 2011/12 and the plunge in oil prices internationally affected the current structure of capital inflows and general product prices in the global aspect.

Murach and Wagner (2021) revealed that a decline in GDP growth of a nation can be attributed to an extraordinary boom in commodity prices, as well as under-investment by

foreign investors.

The IMF (2016) revealed that foreign funds give more expenditure discipline, productivity, capital allocation efficiency and growth in the recipient country. However, capital inflows through foreign investments across the globe require strategic policies to mitigate the negative effects on economic growth, (UNCTAD, 2021). This is because allowing too much dominance of external investors may pose unhealthy competition while unfavorable environment causes sudden decline of foreign investors hence reducing capital inflows affecting economic growth.

According to Massa (2015), and Aizenman *et al.*, (2017), global financial crisis that occurred between 2007 and 2009 caused great volatility in economic growth which has affected global commodity prices, capital inflows, and exchange rate stability up to date. De Resende (2014), revealed that IMF reported the financial crisis that dramatically dropped the economic growth from 13.8% in 2007 to 6.1% in 2008 and 2.1% in 2009 in both developed and developing countries.

World Bank report, (2022) shows that there has been current slowdown of global economic growth despite the world's recovery from COVID-19. According to the report, current fluctuations in commodity prices may reverse to price boom of 2007/2008. Globally, decisions made by the government, investors, and consumers in relation to interest rate, investments, and consumption of different commodities affect the growth and development of various economic sectors (Ikenna, 2016). According to Fueki, Hiroki, Naoto, Shinsuke, & Yoichiro (2018), the decline in the economic performance of any country can result from external trade shocks such as oil price fluctuations. Reed, (2020) argued that some economic superpowers in the globe have declined their demand for African commodities yet most countries in Africa depend on economic superiors for

survival.

Inoue & Okmoto, (2017), observed that many Asian countries dine in low international food and oil prices while exporters of the commodities have been affected negatively. Thus, the decline in producer prices has negatively impacted production processes and garnered attention that needs to be addressed. According to Filippo, Cristiano, & Leon-Ledesma, (2020), an increase in commodity prices leads to negative impacts on real-world activities due to inflation.

According to UNCTAD/TDR (2021), US economic advisers recognized the urgent need to adjust policies to address new investment sector shocks created by past policies. World investment report (2021) noted that the exchange rate's fluctuation leads to instabilities of commodity prices in foreign markets hence controlling the trading behavior between countries. A study by Olofsson (2019), found that fluctuating interest rates affect the prices of internationally traded goods. This is because investors add on a risk premium, which restricts international capital flows and hinders economic expansion.

From the World Bank's (2022), analysis of economic growth, the East Africa is revealed to experience a decrease in economic welfare from 4.1% in 2021 to 3.3% in 2022, largely due to a decrease in global economic growth, a sudden hike in prices leading to inflation, mounting debt distress, and tight global financial conditions. This report also notes that the political unrest caused by the Russia-Ukraine conflict has further exacerbated these challenges for policymakers in African nations, as it has led to a decrease in foreign capital inflows, a surge in commodity prices, and unfavorable financial exchange rates. Capital inflows between Africa's developing countries have been influenced by performance of macroeconomic variables midst of trade shock crises for over five years ago (Mowlaei, 2018). According to World Bank (2020) and Jarret & Meunier, (2020) the GDP annual

growth fluctuated from 2% in 1965 to 0.9% in 1975 to 4.3% 1985 to 4.4% in 1995 5.9% in 2005 to 5% in 2015 and -0.3% in 2020.

African economies have made some economic progress in the last decade but understanding and forecasting of commodity prices remain a hard nut due to inadequate knowledge, hence difficulty of making clear decisions (Tiawara, 2015). UNCTAD (2021), reported that international investments in third-world countries is the engine for sustainable growth. WIR, (2021) reckoned that due to the severe hit resulted by COVID-19 shock, the world needs inclusive recovery by promoting foreign investments in different economic sectors. Based on UNCTAD report (2022), only 5% of all FDI flows come to Africa. Consequently, African economies tend to develop more swiftly when the prices of their exports are at boom than when they experience downturns. International integration of developing countries through trade and capital inflows has improved growth but increased the risks and ways through which global shocks are transferred to local economies.

According to UNCTAD (2021), exogenous shocks cause fluctuations in macroeconomic factors such as general prices which results into erratic reversal of terms of trade, policies and general economic mismanagement. Batte and Matovu (2016), opined those external shocks on economic growth in most of developing countries are intuitive due to increased dependency rate especially in Africa. According to their study, African countries need to rethink since 70% of total exports accounts for commodities with lower value and are prone to price fluctuations. Therefore, fluctuations in commodity prices can cause a favorable change on economic growth and need a deeper understanding.

Calderon *et al*, (2019), noted that SSA and other countries' welfare was affected by external trade shocks including, global financial crisis in 2008/09. After these shocks, pandemic crisis also emerged influencing commodity price shock and capital inflows which has

remained an active shock to growth Up to date (World Bank, 2021). These highlights are a great bother to economic growth hence, source of motivation to undertake this study using times series trends from 2008 to 2022.

Deloitte (2022) reported that the GDP growth in EAC tend to decelerate to 5.3% from 6.4% in 2021 due to the driving up of commodity prices globally and the devaluation of local currencies. This poses a need for more studies to examine other external shocks affecting economic growth in LDCs. The KNBS report, (2021) found that Kenya highly depends on foreign investments and savings which expands trade links in open market increasing the nation's vulnerability to the impacts of external shocks. IMF (2019), fluctuations of commodity price can negatively affect a nation's distribution of income, poverty reduction as well as general economic growth.

Kenya recorded a decline of GDP in the second quarter of 2022, 5.2% compared to 11.0% in second quarter of 2021 (KNBS, 2022). Picardo (2021), reported the indirect effects of fluctuating exchange rates such as changes in prices of imported goods, low currency value, and a harsh environment for foreign investors. Lately, the CBK has reported a high increase in interest rates in Kenya and according to report by Deloitte (2022), Kenya's shilling is depreciating at a higher rate, from average of 109.6 in terms of US dollar in 2021 to average of 123 in 2022. KNBS (2022), also quoted depreciation of Ksh by 7.9% against major currencies in second quarter of 2022. This aspect needs urgent research to get better- insightful policies to mitigate the exchange rate and explore the challenge faced by policymakers to improve the local currency.

In summary, the World Bank, UNCTAD and IMF reports and studies done in related areas reveal that external shocks have great significance on economic growth around the globe. The dependency rate across African countries has increased such that, if one country

especially developed economies is affected, its dire economic growth effects to all other countries depending on them. The key influence of pursuing this area is unstable global commodity prices and low demand for the country's export due to instabilities in a global economy, devaluation of Kenya Shilling against major currencies (USD), and unsteady economic growth as reported by (KNBS, 2022).

A fragile global economic environment and a double-dip recession in the local economy have affected capital inflows and overall investment levels, (World Bank 2021). Therefore, it is evident that there is an urgent need for Kenya to examine the root cause of volatility especially commodity prices and foreign direct investments due to limited ability to hedge against the vulnerability to external trade shocks. Just like other developing countries, Kenya possesses shallow and weak monetary policy and price control responses which are impeded by structural bottlenecks hence the existing policies of smoothing out the country from impact of external shocks are constrained, (UNCTAD 2021). Therefore, this study will add knowledge and address the gaps to near the solution of economic growth.

1.2 Statement of problem

Kenya experienced fluctuating economic growth in previous years, with a mean growth rate of 5.9% from 2010 to 2018 (Youse & Dubebe, 2021). World Bank Group, (2022) reported a decline in GDP growth in Kenya to 5.5% due to the escalating prices, Ukraine crisis and high dependency rates from external sources. Therefore, its economic progress remains vulnerable to external trade shocks, which threaten its future stability and prosperity. Trade shocks are very important occurrences to take into consideration while planning for economic growth, yet existing policies have not been very effective due to indefinite continuity of macroeconomic fluctuations which need critical and continuous assessment (World Bank, 2021).

Many developing economies face common recurring problems in relation to fluctuating-uncertain capital flows, financial crisis, commodity price, interest rate and currency rates which affects poverty alleviation policies and other economic growth projects (UNCTAD, 2021). Despite some LDCs having achieved an open economy, they still experience lag in economic growth, financial instability, and high rate of unemployment, poverty, and markets instability-persistently, (World Bank, 2017).

The world is now in a post-pandemic rebounding yet general prices have experienced sharp move in developing countries (World Bank, 2022). Further, overview survey by UNCTAD, (2022) shows that foreign capital inflows in Kenya among other EAC has declined from 37.52% in 2021 to 35% in 2022 due to vulnerability to external shocks. Additionally, most studies in this field have been undertaken in first class countries and a few in third world nations with contradicting results, yet LDCs are more vulnerable to shock effect. A study by Lonwabo, (2021), revealed that capital inflow shock has negative effect on economic growth in South Africa while Munene (2017), found a positive strong nexus between capital inflows and economic growth. Ademola et al., (2020) and Combes et al., (2016), found that appreciation of exchange rate negatively impacts economic growth while Babar and Kanwal, (2017) argued that exchange rate shock had no impact on economic growth.

The gap of few up to date literature on this phenomenon also gives a chance for more research to give more solutions to curb effects of shock in poor economies. The study by Jinan and Apostolos, (2021) revealed that rising commodity prices has been a challenge in LDCs since 1960s and 2000s. Their study explained that both the uncertain changes and shocks of commodity prices displayed a vital challenge to policy-makers due to their impact on economic planning. Macroeconomic results of external trade shocks are still, not well

explored despite efforts made to mitigate economic shocks in Kenya, (Wambugu 2016). Hence, a call for more studies to unravel the mystery behind external economic trade shocks. This study addressed these deficiencies using 2008- 2022 data set.

1.3 Study Objectives

1.3.1 General Objective

The overall objective of the study is to evaluate the effects of external trade shocks on economic growth in Kenya

1.3.2 Specific Objectives

Specifically, this study sought to:

- i. Examine the effect of capital inflow shock on economic growth in Kenya.
- ii. Assess the effect of commodity price shock on economic growth in Kenya.
- iii. Evaluate the effect of interest rate shock on economic growth in Kenya.
- iv. Assess the moderating effects of exchange rate on relationship between external trade shocks and economic growth in Kenya.

1.4 Research hypotheses

H₀₁: Capital inflow shock has no significant effect on economic growth in Kenya.

H₀₂: Commodity price shock has no significant effect on economic growth in Kenya.

H₀₃: Interest rate shock has no significant effect on economic growth in Kenya.

H₀₄: Exchange rate has no moderating effect on the relationship between external trade shocks and economic growth in Kenya.

1.5 Significance of the study

Findings will keep investors more informed on various external tradeshocks and their effects on investment decisions. It will help them understand that after the occurrence of the shocks, a diversified control strategy is key and therefore they may consider diversifying their investment risks in different regions. Investors will use this study to get foundational information and how they can gauge economic situations, the uncertainty of shocks, and the consequences to their choices of investment.

World Bank reports show that almost two-thirds of lower-middle-income countries are highly dependent on commodities for fiscal and export revenues yet their macroeconomic-financial stability has been threatened by large swings on commodity prices lately. Therefore, this study is of great value to the policymakers while formulating economic policies as well as help government in controlling depreciation and appreciation of local currencies. Policymakers at institutional and organizational level will get guidance and more information on handling trade shocks and setting procedures to govern the company for market survival. Institutions and governments in developing countries will use this study to expand their knowledge in establishing intentional policies to improve growth in the economy. Economic policies require clear and strategic implementation to reduce the blow of external shocks specifically in LDCs.

Scholars can also get additional knowledge on external shocks. Academic researchers will realize gaps from this study which will enable them to do more research to fill the inadequacies. It will also help the academicians build their studies as they review literature and make references. Since shocks are uncertain occurrences and cannot be planned for in advance, the final findings and recommendations of this study will help developing nations to consider the relevance of the objectives tackled and adjust from external shock

vulnerabilities. This research will be valuable to knowledge body regarding common external shocks affecting the economy, especially in Africa.

1.6 Scope of the study

The focus of this research was to evaluate the effect of external trade shocks on economic growth in Kenya for the period of fourteen years, 2008-2022. The study was preferable in Kenya to fill the knowledge gap since only few studies have been carried out on the external shocks nationally. The related studies conducted in Kenya are also inadequate and outdated. The time frame of fourteen years is long enough to examine and incorporate periodic fluctuations on economic growth caused by shocks from external forces. Similarly, within the period under study, Kenya currency has experienced greater margin of depreciation which needs more research to develop better control policies, (World Bank 2022).

During this period (2008-2022), there has been occurrence of several unique economic phenomena such as, global financial crisis (2007-2009), sovereign debt crisis in Europe (2010- 2012), Russia-Ukraine clashes, unconventional monetary policies by the Central Banks, COVID-19, trade wars and protectionist measures with far-reaching economic implications globally. Specifically, Kenya has experienced rising cost of living due to elevating prices and high rate of devaluation on Kenya shilling within this scope. In addition, the past fourteen years Kenya has also experienced post- election instabilities and COVID-19 crisis which was believed to influence the rise in commodity prices and decline in foreign investments.

Moreover, the inter-connectedness of the global economy made supply chain disruptions more pronounced due to domino effect on other industries and countries that depend on those supplies. Despite the high recovery level, economic growth in Kenya remains

unsteady due to low capital inflows and daily exchange rate issues. Therefore, the selected variables to be engaged under study included Capital inflows shock, commodity price shock, and interest rate shock.

These variables are commonly used in economic analysis and have proven to be influential in understanding the dynamics of the global economy. Including these variables in the study, enabled examination of sudden shifts in capital inflows, sudden changes of prices in key commodities, interest rate shock and their impact on economic growth and overall economic stability. Exchange rate was applied in this research as a moderating aspect. Fluctuations on exchange rate have implications for financial stability particularly in economies with high external debts or large exposure to foreign currencies like Kenya. The research adopted time series data trends from secondary sources.

1.7 Limitations of the study

This study adopted time series data from different secondary sources which may give contradicting information on the same variable. This challenge was evaded by getting data from verified sites, and internationally, and locally recognized authorities. The research was also challenged by wide variety of online information that does not appear special and relevant to the needs of this study. These limitations were avoided by reviewing wide data in relation to the study, use of triangulation method, and obtaining data from verified-internationally and locally recognized sources such as Kenya National Bureau of Statistics (KNBS), World Bank, and Central Bank of Kenya (CBK) to enhance the reliability of the data obtained.

The study also carried out diagnostic tests that assisted in improving the quality of information in the study. Most empirical studies were undertaken in developed countries; however, the study projected and tested those relevant literature to developing nations. The

literature on related field was very limited in third world countries and Kenya has been upgraded to middle-income country. However, the current research reviewed the related studies done in both developed and underdeveloped nations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Distinct evidence covering external trade shocks and economic growth were reviewed under different sections: Section 2.2 entails the review of pertinent theories and their relevance to the study. Conceptual review of the variables under study is contained in section 2.3 while empirical literature is reviewed in section 2.4. Research gap summary was show in section 2.5 and conceptual framework shown in part 2.6, discussed the diagrammatic model of the variables, their indicators and relationship.

2.2 Theoretical Review

This section explores the Real Business Cycle (RBC) theory which is the main theory supported by other significant theories which were relevant to the objectives under this study. The study analysed literature of the theories related to the problem under study.

2.2.1 Real Business Cycle Theory

The foundational premise of this research is the Real Business Cycle theory, which was advanced by Finn Kydland and Edward Prescott in their 1982 literary work “Time to Build and Aggregate Fluctuations”. They foresaw random fluctuations in productivity level which shifts economic growth and development either positively or negatively. According to this macroeconomic theory, actual external shocks are responsible for the variations in the business cycle. The RBC hypothesis explains business cycle fluctuations as an effective reaction to outside shifts in the actual economic environment (McGrattan, & Ellenand Edward, 2014).

RBC theory reveals that, macroeconomic changes are actual as Finn and Edward suggested some of external shocks such as product prices, external debts, exchange rates, innovations, stricter business environment and safety regulations which induces change in economic growth, (Cooley, 1995). RBC theory explains that an event may occur to the core of a nation directly or indirectly from the external environment and cause effects on capital or labor causing impact to firm's decisions and economic growth in that country, (Greenwood, Rogerson & Wright, 2021).

The theory predicts a time pattern of allocation for foreign investments and consumption in the presence of external shocks. Gali (2015), explained that RBC theory highlights how real shocks, including trade disturbances, cause cyclical fluctuations in economies that rely heavily on exports. If advanced economies depict sustained growth over time and some other periods, they reflect random fluctuations in growth and development caused by exogenous shocks due to globalization.

RBC theory also explains fluctuating oil prices therefore it enabled the researcher to relate commodity price shock and economic growth. Instability in general prices can greatly influence economic growth in any nation, (Gazda, 2010). In relation to this theory this study brought out the influences of adverse, fluctuating business environments on inflows of foreign capital and their impact on the expansion of an economy. However, this theory is criticized because it ignores time for price stickiness. This study examined the data trends for the past fourteen years which is enough period to accommodate the stickiness and fluctuations of prices to surmount the critic.

The RBC theory was relevant to the problem under investigation as it relates to addressing the effects of exterior shocks on economic growth and economic activities. The benefit of RBC theory to this research is to expound further the fluctuations of macroeconomic

factors in terms of external trade shocks. This theory enabled the study to link up trade shocks such as commodity prices, capital inflows, and business environment in terms of interest rate and exchange rates to economic growth over a period of fourteen years. Similarly, RBC models enhanced the researcher relate consequences from external economics which causes sudden change in capital inflows through foreign direct investments to achieve national growth to the recipient economy.

2.2.2 Dependency Theory

In 1960, following World War II, this theory was established by Raul Prebisch, an Argentine economist and a statesman to explain the cause and effect of dependency, (Munro, 2023). According to dependency theory, wealthier countries swell at the expense of developing ones as resources move from the periphery of these countries to most of them. This theory argues that poor states are impoverished, and rich states get richer due to integration of third world countries in the global system, (Munro,2023). Prebisch & Singer (1950) argued that the terms of trade for primary commodities tend to decrease over time, leaving developing countries exposed to economic shocks.

The development of the theory was triggered by decline of economic growth and development in Latin America contributed by external trade shocks. Dependency theorists are in liberal reformists and neo-Marxists category. According to neo-Marxists, growth is achieved through command centered economy while liberal reformists advocate for targeted policy interventions, (Kelly, 2008). Theory of dependency explains how poor counties depend on rich countries and finally they become victims due to transferred trade shocks. The rich critically exploit the raw materials of the poor nations leading these countries in debt burden, unstable and weak economy.

It promoted a growth strategy that is inward-looking and expanded government

involvement in enforcing trade restrictions that prevent local investment. Dependency theory also originates from publications of Hans Singer and one by Raul Prebisch who were observing trading terms in third world nations relative to first class nations which had declined over time. These economists contend that in exchange for a set amount of their raw material exports, developing countries can buy less and fewer manufactured goods from richer ones which is a detrimental impact on many economies.

According to Motolani & Petri (2017), the increased rates of dependency in African countries decline their economic growth rate due to their vulnerability to external trade shocks. In their study, Motolani & Petri (2017) opined that a fluctuation in commodity prices affecting African countries is because of increased dependency rate among the LDCs. Review of literature shows that poor economies depend so much on developed economies for both capital and consumption that it is not possible to escape from debt even in foreseeable future.

Dependency theory provides basic knowledge on why rich countries remain rich while underdeveloped countries struggle to unplug from poverty which forces high dependency rate to developed countries inducing vulnerability and exposure to external shock. According to Wambua (2021), dependency theory indicates macroeconomic factors such as product prices and capital flows which contribute directly and indirectly to underdevelopment in Kenya. The major contribution of this theory is that it focuses on individual nation and unequal relationships between the developed and developing countries exchange which is the cause of poor economic improvement among the LDCs.

Importance of the theory to this research is that it gives nature and scope of relations between poor and developed nations and the influence of dependency to product prices, capital inflows and economic growth. High dependency level between countries results to

spread and persistence of economic shocks around the globe, (Kariuki, 2020). This theory enabled the researcher to relate the causes of economic shocks and their effects on economic growth in Kenya. Many developing nations like Kenya, rely on foreign investors for capital inflows and importation of commodities.

However, foreign investors rely on the nature and status of business environment for investment decisions. This reliance means, if one country is affected, other countries become major victims. The study of Kariuki, (2020) regarding COVID-19 shows that, the Sino-Africa dependency caused implications in all economies inducing increased commodity price shock and decline in foreign capital inflows. Underdeveloped countries suffer sudden changes in interest and exchange rates which also affects capital flows due to high risk in investments.

Dependency theory offers a critical lens for understanding how external trade shocks disproportionately impact developing economies by emphasizing the structural imbalances in global trade, (Dos Santos 1970). Dependency theory also contributed to linking up dependency rate and fluctuations in commodity prices and their effects on economic growth in Kenya. This theory was however criticized because it leads to generalization of shocks resulting from dependency without considering the history and development of every country, (Farny 2016). The current study overcame the criticism by examining the vulnerability of external shocks in a single country (Kenya) before generalizing the effects to other LDCs.

2.2.3 Purchasing Power Parity (PPP) Theory

Cassel (1918), originated the term PPP but three years earlier he had presented his purchasing power parity theory as a “theoretical rate of exchange.” According to this theory, the equilibrium rate of exchange is determined by the equal purchasing power of two non-

convertible paper currencies. This implies that the internal price level in both countries determines the exchange rate of their currencies and interest rates. Wang (2014) explained that during the international policy debate, years after World War 1 the terminology of PPP was introduced, concerning nominal exchange rates' appropriate level after long-high inflations among highly industrialized countries, during and after World War one.

According to this theory, the nominal exchange rate between two currencies should be similarly reflected in the ratio of aggregate price levels between the two countries, meaning that the purchasing power of a unit of currency in one country is the same in another. This theory aims at determining the adjustments needed to be made in the exchange rates of two currencies to make them at equilibrium with their purchasing power. This means when exchange rate is accounted, the expenditure prices on a similar commodity must be same in both currencies.

Exchange rate equilibrium is defined by purchasing power parity theory in two propositions at the short run where it is defined as freely floating system and at long run where the rates are fixed and managed over a period, (Lawrence 1976). The PPP theory is in two forms: the relative and absolute version. Absolute version states that exchanging rate should have a reflection relation between the internal powers of purchasing of different units of national currency. This means that a given certain unit of currency should buy same unit of commodities in foreign as in domestic country. While the relative version relates the fluctuation in equilibrium due to change in exchange rate.

However, the use of PPP theory has been criticized because exchange rates are more erratic than average for commodity prices and interest, but the current study considered exchange rate at a span of fourteen years which is long enough for prices to adjust, to show clearly depreciation and appreciation trends of local currencies. However, this theory is limited

because it does not hold into real world due to volatility of exchange rate. The study prevailed over this criticism by assessing the variables for period of fourteen years which is long enough to expose the volatility and the adjustment of prices.

Taylor & Taylor, (2004) emphasized that the role of PPP in understanding long-term exchange rate adjustments in response to trade imbalances caused by external shocks. Research literature in recent decades that has been published on PPP are econometric problems related to stationarity estimations for specific prerequisites for long-term absolute PPP to determine if there is any trend for the real exchange rate to stabilize at a level of long-term equilibrium, (Liou, (2022), Taylor, Obstfeld, & Shambaugh, (2005). Therefore, this theory is pertinent to this investigation since it describes the equilibrium of exchange rates trading partners and interest rates as comparison and fluctuations of commodity prices came out clearly. Further, PPP theory helped in explaining the moderating fluctuating currency rates' impact on economic expansion and macroeconomic variables in a nation.

2.3 Conceptual Review

This part reviewed previous research giving the notion of existing studies related to independent variables (capital inflows, commodity price and interest rate shock), dependent variable (economic growth) and moderating variable (exchange rate) as well their indicators. The study has given detailed discussion of the variables used by previous scholars and some figures of current data trends on the variables.

2.3.1 Capital Inflows Shock

This involves sudden change or shift of capital inflows in an economy. Capital flows is the movement of currency purposely for business operations, trade, investment and other

productive economic purposes. Capital is essential for economic growth and development regardless of its origin. Therefore, developing countries with deficient capital have taken heavy recourse to foreign capital as a primary way to achieve economic growth. However, many developing have less satisfying growth experience and face huge-recurring external shocks. These shocks pose negative impacts on capital inflows in these economies, (Nyang'oro, 2017).

During this study, capital inflow shock was indicated by data trends on FDI inflows. Raess, D. (2023) stated that, unlike other proxies for capital inflows, such as portfolio investments or loans, FDI involves a long-term commitment and ownership stake in the receiving country which makes FDI a substantial and impactful form of capital inflow. World Bank, (2021) defined foreign direct investment (FDI) is a cross-border investment in which a resident of one economy has a significant degree of influence over the management of an enterprise based in another economy. According to Ong'ondo (2018), foreign inflows such as debts have resulted to decline of economic growth due to fall in capital inflow in Kenya. Nyang'oro (2017), posits that capital inflow is an icon of financing in Sub-Saharan countries which supports investments hence promoting growth and development of the recipient country.

World Bank, (2022) reported that Kenya has been experiencing fluctuations and low contribution of FDI inflows to GDP despite relieve from COVID 19 surge. The pandemic resulted in widespread disruptions to economic activities, travel restrictions, and uncertainty which led to decline in FDI flows. The review of current economic outlook clarifies that the ongoing Russia-Ukraine war has resulted to huge economic contractions and sanctions complicating investment climate and financial flows among countries. UNCTAD (2022), reported that only 5% of all FDI inflows come to Africa.

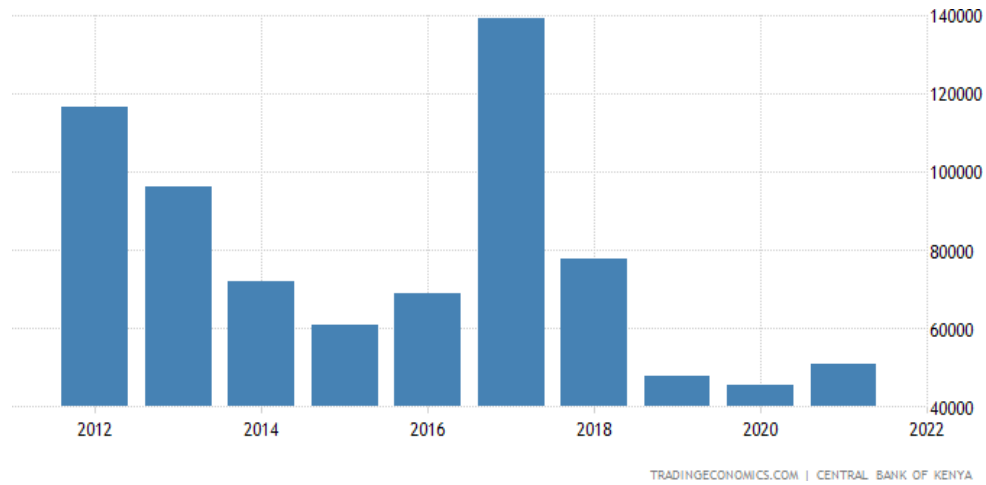


Fig 2. 1: Current Trends of Capital Inflows in Kenya

Source; Central Bank of Kenya, (2022).

From the current trend shown above, it is evident that the decreasing side of capital inflows in Kenya over the years is more active than increasing side. According to KNBS, the statistics of foreign investors has been declining even before COVID-19 occurrence.

2.3.2 Commodity Price Shock

Commodity price is the general amount of payment per unit of goods while commodity price shock involves sudden change in unit price of goods. Globalization has caused world economies to over experience effects of fluctuating commodity prices due to high economic dependence. Unstable commodity prices can negatively affect income distribution and poverty reduction tactics in a nation, hence hindering economic growth. In the past few decades, commodity prices have experienced volatility and sudden fall resulting to decline in consumer price index in most economies, (Inoue & Okmoto 2017).

According to Lonwabo (2021), stability of commodity price is based on high rate of dependency on trade partnership and is vital as it can devastate a continent. World Bank (2020) stated that COVID-19 pandemic caused divergent effects on prices of various groups of commodities. Qi *et al.*, (2022), quoted that changes in prices of commodities

significantly affect operations and development of sustainable macroeconomics and well-being of the economy. The study considered consumer price index to proxy fluctuations on commodity prices shock. Currently, CPI in Kenya has been elevating at double margin, (KNBS overview, 2022).

The quarterly reports of KNBS, (2022) show that consumer price index of general commodity prices has been hiking to unaffordable level in 2022 alone. CPI increased to 127.87 points in October 2022 from 126.73 points in September 2022. According to KNBS' recommendations on price shock, the existing economic policies need to be adjusted and reformed to reduce the cost of living and the rate of dependency from external economies which has been spurring commodity prices at a higher margin.

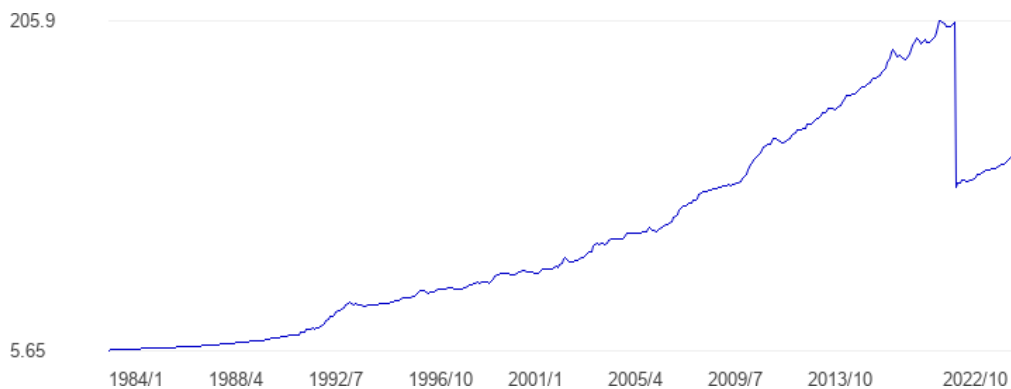


Fig 2. 2: Historical data on CPI trends in Kenya

Source: Kenya National Bureau of Statistics, (2022)

The graph shows the consumer price index trends as reported by Kenya National Bureau of Statistics. Figure 2.2 shows clearly that CPI has been elevating, later in 2019 declining trend when the world was affected by COVID-19 which started rising steadily in 2022. The figure shows there is need for intervention otherwise the country may go back to previous years of 205 index points.

2.3.3 Interest Rate Shock (IR)

An interest rate shock occurs when there is a sudden fluctuation on real lending rates in an economy. Economic analysis undertaken by Essayed (2015), explains that changes in interest rates could take a year to go up while the same rate could take more than thirty years to decrease. IR affects the borrowing and lending cost by inducing the saving and investment costs and benefits in a nation. Batte & Matovu (2016), suggested that strong interest rates cause appreciation of currency which attracts foreign investors in the country while the cost of borrowing will go high causing people to reduce unhealthy borrowing and consumption level.

Uribe (2017) posited that interest rate shock is the primary source of economic fluctuations experienced in developing nations. Tejvan (2021), critically examined the effects of interest rate shock and quoted that World Bank increases interest rate to supersede rising inflationary pressures. According to Matarr & Momodou (2021), research and debates on interest rate and economic growth remain inexhaustible.

Below is an overview of interest rates analyzed by the World Bank group between 2007 and 2023 showing series of fluctuations on national lending rates.

Table 2. 1: Kenya Lending Rate Data

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Interest Rate (%)	13.3	14.0	14.8	15.0	15.0	19.7	17.3	16.5	11.5	10.0	10.0	9.0	8.5	7.0	6.7	12.2	13.6

Source; World Bank Group, (2024)

2.3.4 Exchange rate

Exchange rates regimes from the previous literature shows underlying believe that stable rates result to improvement in economic growth. According to Tejvan (2017), exchange rate can control effectively growth of a nation and similarly the economic growth can also influence exchange rate. Olofsson (2019), stated that exchange rate has capacity to explain economic growth by not only determining the country's GDP but also shows the moderation actions of other international agents and partially the net exports.

A study on fiscal monetary policy interactions and economic performance in small open economies, 1981-2018 was conducted by Ayobami and Olalekan, (2020). The external variables included in the study were oil prices, exchange rates, inflation, and foreign interest rates. The objectives were examined using generalized method moment (GMM). Empirical results revealed that nominal exchange rate shocks affect economic growth and development plans negatively and contemporaneously. Recommendation from the study was that there is a need for coordination of macroeconomic policy among the authorities in Nigeria to protect the economy against the anticipated external shocks,

In this study, the exchange rate indicator, (TWI) reflects the strength of local currency relative to USD. TWI shows the depreciating rate or appreciating rate of local currency against trading partner in major economy. Reports given by World Bank shows that TWI has highly fluctuated from 91 in 2008 to 122 in 2022. The figure below shows the trend of KSH in terms of USD from 2018 to 2022. The trend show that Kenya's currency has been depreciating in value and worst is yet to happen if wise strategies and mitigation policies are not formed and implemented.

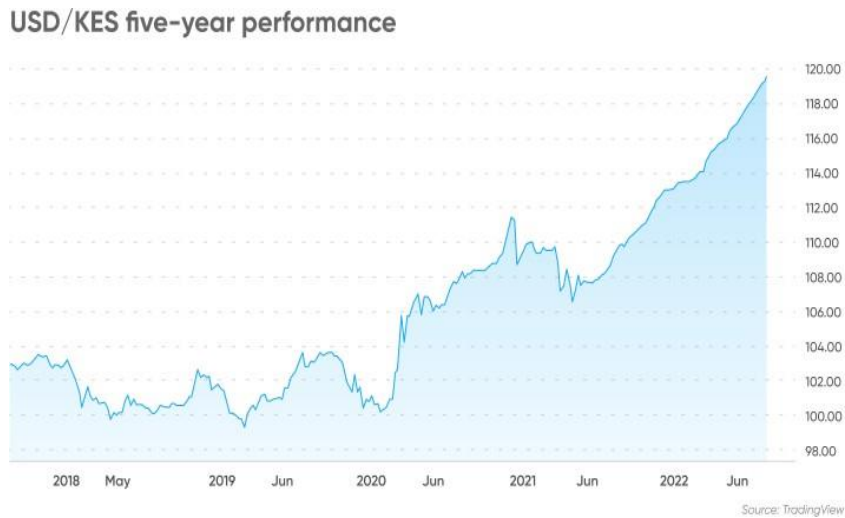


Fig 2. 3: Recent Trends of Trade Weighted Index in Kenya

Source: Trading view report, (2022)

2.3.5 Economic Growth

From previous literature, this is hike in production of services as well as goods in a certain period in an economy. The continuous- persistence of economic shocks in sub-Saharan countries is of great concern causing decline in growth yet most of previous studies on trade shocks have concentrated on aggregate variables such as inflation, (World Bank, 2019). Movements of GDP indicate the expansion, contraction, peak and trough phases of economic growth, (Potters 2021).

The current study measured expansion and contraction of economic growth using the real GDP on quarterly growth at an annual rate. According to KNBS (2022), quarterly report Kenya’s economy is growing at a slower rate despite recovery from health crisis. Below is data of current trend on economic growth in Kenya between 2004 and 2022.

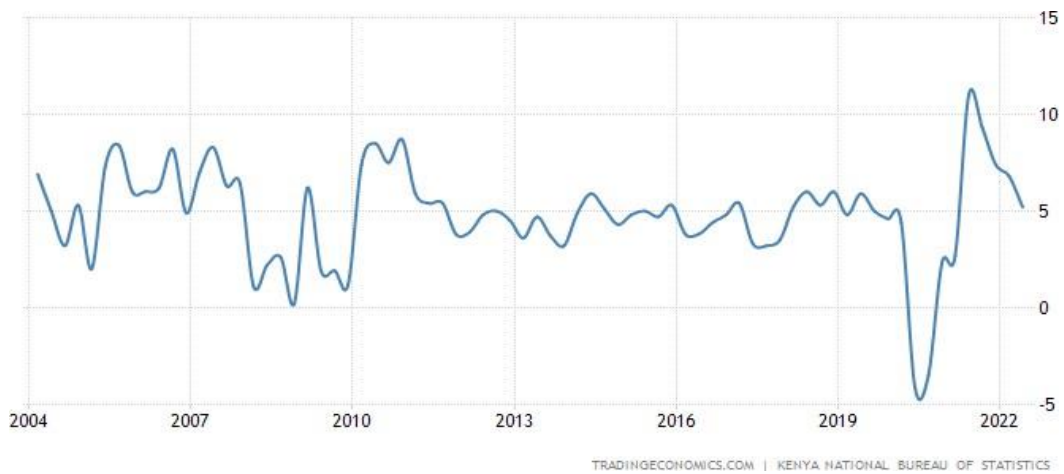


Fig 2. 4: Recent Trends of Economic Growth in Kenya

Source: Kenya National Bureau of Statistics (2022).

Figure 2.4 above revealed that the current trend of economic expansion in Kenya has been declining even after recovery from COVID-19. The report also shows the adjustment of economic growth in 2020 which the weakest expansion since 2008. This maybe a result of other uncertainties including exchange rate fluctuations, commodity prices and decline in foreign investments.

2.4 Empirical literature review

Review of earlier research related to the goals of the current study was included in the earlier studies. It draws attention to how foreign trade shocks generally affect Kenya's economic expansion. This study analyzed the few prior investigations carried out in various developing nations, despite many earlier researchers concentrating on cases of rich countries. However, there is scarcity of past studies that majored on effects of external shocks on Kenyan economy especially since the nation graduated to a middle-income country.

2.4.1 Capital Inflow Shock and Economic Growth

Nyang'oro, (2017) carried research on how a shock to capital influx affects economic expansion in Sub-Saharan Africa. The purpose of the research was to establish the degree to which the volatility rate of capital inflow shock affects economic growth, applying generalized method of moments (GMM). The result suggested that improving financial markets in a nation can help in attaining growth and development while debt market should address capital inflow issues. It recommended that improved surge of capital inflows cannot be influenced by domestic policy reforms alone. Meaning that sudden stop of capital inflow (shock) in an economy is uncertain and emerges exogenously, hence it requires combined efforts from different nations to recover.

Reinhart & Rogoff (2009) conducted a study on incidence of financial issues (such as banking, sovereign debt and, currency). The independent variables of focus were, capital inflows (measured by capital account openness, FDI, portfolio investment, and external debt), and GDP growth. This study employed historical analysis and descriptive statistics, examining data from a wide range of countries over centuries to identify patterns and triggers of financial crises. The authors used event studies to compare periods of high capital inflows with the incidence of financial crises. Findings Periods of rapid capital inflows are often followed by financial crises, particularly in countries with weak financial institutions and inadequate policy frameworks. Sudden stops or reversals of capital inflows often trigger crises, leading to severe economic contractions.

Lonwabo (2021), undertook a study on impacts of external trade shock on South Africa's economic growth. The variables involved in the study were, oil price shock, capital inflow shock, terms of trade shock and interest rate using structured vector autoregressive model and revealed that capital inflows have a negative impact on South Africa's economic

development. Findings revealed that capital inflow shock had negative and contemporaneous effect on economic growth in South Africa.

Waweru & Ochieng (2017), carried a study on the impact of capital inflows on Kenya's economic growth. Time series data set covering the years 1984–2014 was employed, using ARDL model. Results of the study posit that FDI inflows and portfolio investment flows are statistically insignificant and influence negatively economic expansion. Olaleye (2015) conducted a study on impacts of capital inflow shock on economic growth in Nigeria. The objectives of the study were to examine the effects of: FDI net inflow, government expenditure, trade openness, and exchange rate on economic growth in Nigeria. Olaleye used Vector auto-regressive model and found a unique longrun equilibrium nexus between FDI net inflow and economic growth in Nigeria.

2.4.2 Commodity Price Shock and Economic Growth

Previous reports by UNCTAD (2021), notes that external trade shocks are induced by dependency among nations. UNCTAD referred developing countries as commodity-dependency developing countries (CDDCs). Therefore, if commodity price shoots than expected, it lowers policy space and fiscal balance hence low public spending on essential social projects thereby hindering efforts of poverty reduction and economic development. Reviewed studies stated that commodity- import dependency in LDCs can cause imported inflation due to hiking of prices which erodes income and increases poverty level.

Van der Ploeg & Poelhekke, (2010) conducted a study on economic growth with the variables of Focus being economic growth (measured by GDP per capita growth), commodity price volatility, resource dependence (measured by the share of natural resource exports in GDP), and economic diversification. The authors used a panel data set covering 138 countries from 1970 to 2007, applying both fixed-effects and random-effects

models to capture the impact of commodity price volatility on growth. They also used interaction terms to explore the role of economic diversification in mitigating the negative effects of commodity price shocks. The study found that commodity price volatility negatively impacts economic growth, particularly in countries that are heavily dependent on a few commodities. However, the negative impact is less severe in countries that have diversified their economies, suggesting that diversification can mitigate the risks associated with commodity price shocks.

Lonwabo (2021), projected a study on impact of external trade shocks on economic growth in South Africa. The variables involved in the study were, commodity price as oil price shock, capital inflow shock, terms of trade shock and interest rate using structured vector autoregressive model and found that capital inflows have a negative impact on South Africa's economic development. This specific study concluded that commodity prices(CP shock) such as oil rents have significant, positive impact on country's economic growth.

Hegerty (2016) held a study on impact of fluctuations in commodity prices on economies. Variables of focus were, economic growth indicators (such as GDP growth rates), commodity price indices for specific commodities relevant to the economies studied (e.g., oil, metals, agricultural products), global economic activity indicators and country-specific variables like interest rates and fiscal policies. The study focused on nine economies with varying levels of dependence on commodity exports. Impulse response functions (IRFs) and variance decomposition were used to analyze how shocks to commodity prices affected each economy over time. The analysis used time-series data, likely covering several decades to account for different phases of the global economy and commodity price cycles. The study revealed that the impact of commodity price fluctuations on economic indicators varied significantly across the nine economies studied. Generally showed a stronger sensitivity to commodity price shocks, particularly those heavily reliant on commodity exports. Negative price shocks led to significant slowdowns in economic growth, deteriorations in trade balances, and inflationary pressures.

Similarly, D'Angelo (2020) carried out a study on commodity prices and global economic activity. Global economic activity (measured by global GDP growth, industrial production indices, and global trade volumes). Sectoral economic performance (e.g., manufacturing, services). Commodity prices (oil, metals, agricultural products) and commodity price indices and geopolitical risk indices and policy uncertainty measures were key variables. The study used a global econometric model, likely a Global Vector Autoregression (GVAR) model, to capture the interconnectedness of economies and the transmission of commodity price shocks across borders. The output revealed that commodity price shocks have significant but heterogeneous effects on global economic activity.

On a different study, Tiawara (2015), focused on effects of commodity prices on African economic growth. The study employed a panel modeling and construct impulse responses using panel trends. The data collected was a span fifty years ranging from 1999 to 2014. From the findings of the study, functions of the impulse response indicated that hiking of commodity prices was likely to benefit the African countries rather than hurting them.

2.4.3 Interest Rate shock and Economic Growth

From review of literature, Khan & Senhadji (2001) majored on threshold effects in the link between inflation and growth. Variables of focus included, economic growth, real interest rate, which is adjusted for inflation, investment indicated by the gross fixed capital formation as a % GDP and human Capital. The study analyzed data from 140 developed and developing countries over the period from 1960 to 1998. The authors employed fixed-effects and random-effects models to control for country-specific factors that could influence the relationship between the variables. The study found that in economies with low to moderate inflation, positive nexus between economic growth and interest rates was portrayed. This suggests that when inflation is controlled, higher interest rates can cause a rise in savings, which in turn fosters greater investment and economic growth.

Matarr & Momodou (2021) carried out a study on effects of interest rate on economic

growth in Gambia, for the period between 1993 and 2017. The independent variables were real interest rate and real exchange rate which were examined using Vector Error Correlation Model (VECM) both in the short run and long run. The findings conclude that the association only exists in the long run. Their paper recommended that the government should avoid unnecessary expenditures which lead to deficits in the budget.

Ayobami & Olalekan (2020), examined the external shocks and output composition in Nigeria using structural impulse response function and the study revealed that foreign interest rate had negative and significant effects on composition and investments which are indicators of development in Nigeria. Similarly, Moyo and Pierre (2018) did an extensive study on impacts of interest rate reforms on performance of economies of SADC countries (1990-2015) and results opined that the reforms have positive effects on economic performance of SADC countries. Empirical literature done by McCarrick and Rees (2017), suggests that moderation of real interest rate results to full employment and stabilizes economic development activity by holding steady inflation.

In a different study, Maiga (2017), evaluated the effects of interest rate on economic growth in Nigeria for period of twenty-three years (1990-2013). Variables of focus were, economic growth, (GDP) growth rate, interest rate, represented by lending rates or the central bank's policy rate, investment, indicated by Gross Fixed Capital Formation (GFCF) % of GDP. The study utilized time-series data from 1990 to 2013, covering a period of 23 years. The study employed an Autoregressive Distributed Lag (ARDL) model to examine the long-run and short-run dynamics between interest rates and economic growth. From the output, the study suggested a significant negative relationship between interest rates and economic growth in Nigeria, implying that higher interest rates tend to reduce economic growth during the period studied.

2.4.4 Exchange rate and Economic Growth

Keyamo, Emmanuel & Endurance, (2021) undertook a study on econometric analysis of external shocks variables and economic growth in Nigeria. Using the generalized impulse response function and the vector error correction approach, the study's goal was to investigate how Nigeria was affected by global oil prices, terms of trade, and the real exchange rate (a moderator). According to their analysis, the real exchange rate significantly modifies GDP in a beneficial way. This implied that exchange rate had a statistically significant moderating effect on GDP growth rate.

Oladipo *et al* (2020), carried a study on the interest rates and economic growth in Nigeria from 1989 to 2019. The independent variables of their study were external borrowing, inflation rate, and interest rate. The study also adopted exchange rate as a moderating factor. The model adopted was auto-regressive distributed lag and the study concluded that there was no significant moderating effect of exchange rate on nexus between and economic growth in Nigeria. Oladipo *et al* (2020) recommended that government should embark on growth-enhancing reforms.

Odhiambo, N. M. (2009) energy consumption and economic growth nexus in Tanzania applying an ARDL bounds testing approach. Although focused on Tanzania, Odhiambo (2009) provided insights applicable to Kenya, showing that exchange rate fluctuations can moderate the impact of external energy price shocks on economic growth. The study concludes that managing exchange rate volatility is key to mitigating the negative effects of external shocks on economic growth. Exchange rate stability is essential for mitigating the adverse effects of external trade shocks, particularly in sectors like energy, which significantly influence economic growth.

Sheehan, Sweeny, Rasmussen, Wills, Friedman, Mahon, & Laski, (2017) carried a study

on moderating exchange rate instability and Economic growth in Nigeria and their variables were GDP, government expenditure, external reserve and FDI. The study employed Generalized Auto-Regressive Conditional Heteroscedasticity (GARC) model. Findings posit that fluctuating exchange rates can have both negative and positive effects on economic growth activities depending on pre-existing economic conditions.

Nyamongo & Schoeman (2010) focused on the role of monetary policy in the economic development of Kenya. The study highlighted that exchange rate policy is crucial in moderating the effects of external trade shocks on Kenya's economic growth. The study found that appropriate exchange rate adjustments could cushion the economy from adverse shocks, thereby supporting growth. The exchange rate serves as an important tool for moderating external trade shocks. Effective monetary policy, including exchange rate management, is vital for sustaining economic growth in Kenya.

Further study on fiscal and external shocks in Nigeria was undertaken by Ologbenla (2019). VAR model was used to examine oil output, oil prices, exchange rate, government revenue, government expenditure and non-oil export in Nigeria. The study revealed that, external shocks have significant effect on fiscal policy in Nigeria. According to Fazhul (2021) who carried a study on impact of exchange rate on economic growth in Bangladesh using time series data 1990-2020, exchange rate and FDI have really affected economic growth. The study's goals were to determine how unanticipated shocks from FDI, inflation, and nominal exchange rates affected economic development. The results of the OLS model showed that nominal exchange rate, inflation, and foreign direct investment all positively affect economic growth.

2.5 Research Gaps Summary

The empirical literature review identifies several gaps from the previous studies in this phenomenon. To begin with, there appears an evident gap in the related literature concerning the nexus between the explained variables of the study (capital inflows shock, commodity price shock and interest rate shock) and dependent variable (economic growth). Empirical study by Nyang'oro (2017), stated that gross and net capital inflows have negative impacts on economic growth while their volatility have negative impact. Duodu & Tawiah (2020) revealed that FDI in the long run affects economic growth positively. Review of similar study by Shafiq & Hafiz (2016), realized a positive, significant effect of net FDI on economic growth. Waweru & Ochieng' (2017), found that FDI has a negative-insignificant effect on economic growth in Kenya.

Adegoke *et al* (2021); Keyamo *et al* (2021); Matarr & Momodou (2021), found a positive nexus between exchange rate and GDP performance while Ping (2011); Olofsson (2019), concluded that there is a negative effect of exchange rate volatility on economic growth and Ipeleng & Rufaro (2021), suggested that exchange rate and real GDP have negative relationship. According to Babarr & Kanwal (2017), exchange rate shock has no impact on economic growth due to absence of shock ability on GDP.

Similarly, Ipeleng & Rufaro (2021), stated that commodity price induces economic growth positively while Babar & Kanwal (2017) suggested that commodity price can destabilize the economy due adverse effect on economic welfare. Jinan & Apostolos (2021) concluded that, there is no statistical significance between commodity price and growth output in advanced and upcoming economies. From the study of Tiawara (2015), there was a statistically insignificant estimate on the relationship between commodity prices and economic growth.

The previous studies have failed to address the contradictions in the findings on variables under study and therefore results cannot be generalized unless other studies are undertaken to give more clear results. There is also a population gap in this research field concerning the effects of external economic shocks on economic growth in developing countries since most studies are based on developed economies. The current study research relates external trade shocks and economic growth in Kenya which is one of the lower-middle-income countries.

Table 2. 2: Summary of Research Gaps

Authors/year	Topic/Objectives	Research design/ methodology and objectives	Findings	Research gaps	How the study filled the gaps
Wambugu (2016)	Impact of external shocks on economic growth and welfare in Kenya -Terms of trade shock -Policy shock -Capital inflows	Computable general equilibrium models (CGEM)	-Negative effect of oil shock on economic welfare -FDI inflows affect positively economic growth and welfare	- Methodology gap was pointed out since Wambugu employed CGEM different from current study. -The study was conducted before Covid-19 shock	-This study applied OLS method and covered the pre and post pandemic period to establish the trend during and after COVID-19. - Knowledge gap was filled by diversifying to other factors of external trade shocks
Murach & Helmut (2021)	Effects of external shocks on business cycle and economic growth in China	Dimensional Vector-Auto Regressive models -Impulse Response functions	-Negative response of external shock to Chinese real GDP growth -No significant response of external shocks on Chinese GDP -Demand and financial shocks were tested using impulse responsive functions and results were	- Methodology gap The authors used small dimensional VAR models -Murach and Helmut explored on effects of demand and financial shocks on Chinese	-This study used correlation research designs. -Effects of capital inflows, commodity price and interest rate shocks on economic growth in Kenya, to fill the knowledge and population gap

			indicating that impact of shocks was increasing over time.	GDPgrowth.	
Matarr & Momodou (2021).	Effects of interest rate on economic growth in Gambia, for the period between 1993 and 2017	Vector Error Correlation Model (VECM) both in the short run and long run.	The findings concluded that the association only exists in the long run	There exists population gap because the study was carried out in Gambia with fewer and different Variables.	-The current study was conducted in Kenya, with different target objectives.
Sena (2022)	-Effects of external shocks on predictability of remittance flows in developed countries	-Baseline model	-External shocks enhance predictability in LDCs but reduces remittance predictability in developed economies	-The study was based on developed countries and therefore cannot be generalized due to wide inequality gap.	-The study was narrowed in Kenya, a developing country which will also keep authorities in these countries more informed on trade shocks.
Olamide et al (2022)	Monetary policy, external shocks and economic growth dynamics in EAC	Structured-Vector Auto-Regressive model	There was significant effect between monetary policy, exchange rate and economic growth -Oil prices were found to have no effect on economic growth	Methodology gap- The study employed SVAR model in data set of EAC as a whole	-This study was narrowed in Kenya and other different variables like capital inflow shock and general commodity price shock were included.
Babar & Kanwal (2017)	Impacts of external shocks on economy in Pakistan	Regression analysis using statistical tool, E-views	TOTs and economic growth show a negative relationship with GDP	Their study was undertaken in Pakistan with different objectives.	-The study was to examine the effects of capital inflow shock and commodity price shock and interest rate shock on economic growth in Kenya
Cheptis, A. (2022)	The effects of external shocks on economic growth (Czech, Romania and Hungary)	Structured-Vector Auto-regressive models -External debt, external, interest rate, producer price index and	-Negative insignificant effects of external shocks on economic growth -External production explains economic growth in a larger variance	-Knowledge, methodology and population gaps are highly notable in the study.	-The current study was narrowed in Kenya, to determine the effects of capital inflows, commodity prices and interest rate shocks correlation design

		external output			
Kensuke, Prasiwi & Lagrine (2021)	Growth resilience to large external shocks on emerging Asia countries	P-lag Vector Auto-Regressive model -Large-scale Natural disasters (COVID-19 shock)	External shock has negative impact on GDP in India, Thailand and Philippines	- Methodology and geographical gaps	-The current study was carried out in Kenya specifically to fill the knowledge gap by examining other large-scale external shocks.
Batte and Matovu (2016)	Growth and welfare effects of macroeconomic shocks in Uganda (2010-2017)	Computable general equilibrium models -Changes in TOTs, changes international oil prices, and development assistance inflows	-Large positive impacts of the shocks on agricultural sectors and negative impact on the industrial sector which causes fluctuation in GDP growth	Narrower timeframe -Research gap in the model employed (CGEM)	-The current study used time series data for a period of fourteen years which is wide enough to uncover fluctuating trends of the external shocks in Kenya.
Ologbenla (2019)	Fiscal and external shocks in Nigeria	Vector Auto-Regressive model	-External shocks have significant effects on fiscal policy	The study did not examine the impacts of capital inflow shock and general commodity price shock on economic growth.	The objective and geographical gaps were filled by the current study in Kenya. A different research design was adopted in the current study

Source: Author 2022

2.6 Conceptual Framework

The expected relationship between the variables under research was visualized using a conceptual framework. It is a figure representing the correlation with a moderating variable between predictors and predicted variables. The main consideration in this framework is the selected external shocks and their effect on economic growth. The selected explanatory variables include capital inflow shock was proxied by FDI inflows, commodity price shock was measured by CPI, and interest rate measured by real lending rate. The moderator, exchange rate was measured by gauging the annual exchange rate using TWI and economic growth was measured by percentage gross domestic product. The conceptualized nexus was between the independent variables and the dependent variable with exchange rate.

**Independent variables
(External Trade Shocks)**

Dependent variable

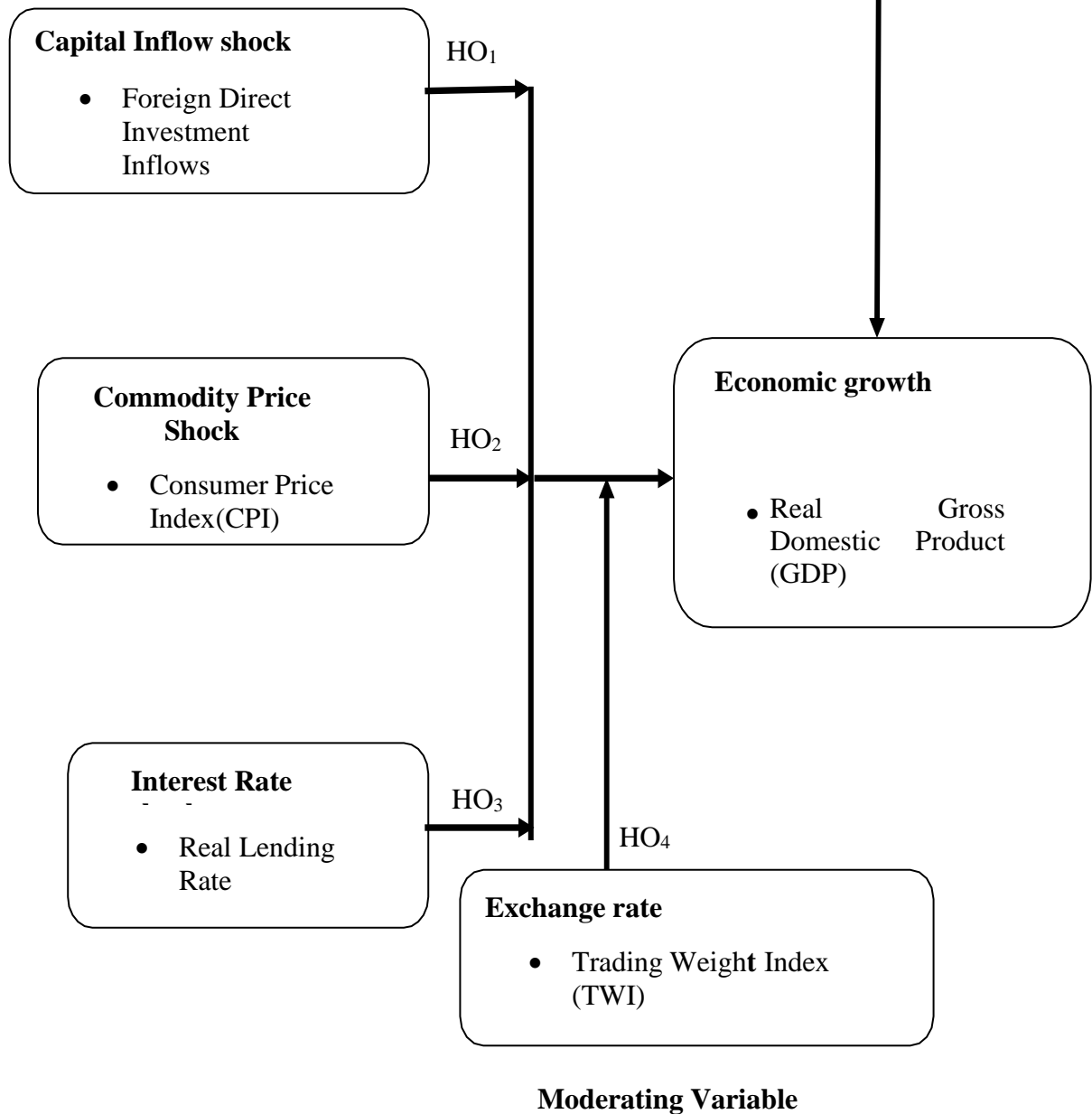


Fig 2. 5: Conceptual Framework

Source: Researcher, (2022)

Despite the past efforts and thorough analysis of why and how economic shocks occur, their effects persist especially in developing nations and need to be examined further. East African regions predominantly depend on exports of primary commodities whose prices are subjected to external dictation. Therefore, the diagram above shows the association

between external shocks and economic growth. Independent variables included the selected external trade shocks which effects economic growth of a nation. Similarly, dependent variable is the predicted by the control objectives. From the figure, $H0_1$ shows the how capital Inflow shock influence economic growth.

UNCTAD (2021), reported that the flows of investment to and from EAC region was expected to remain stagnant in ending of 2021 and the recovery of inflows in 2022 remain unexpected, owing to slow economic development. $H0_2$ shows the effect of commodity price shock on economic growth while $H0_3$ shows the effect of interest rate shock on economic growth. Additionally, a fluctuating exchange rate can cause depression in economic growth due to imbalance in terms of trade and macroeconomic factors, (Tavjan, 2017). According to IMF reports, devaluation of nation's local currency may accelerate economic activities through the initial increase in price of foreign goods relative to domestic goods which has been so evident in most Sub-Saharan countries. Further, $H0_4$ shows the moderating effect of exchange rate on the nexus between external trade shocks and economic growth in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section entails the methodology employed by this study for collection of data, analysis, and presentation. It involves systematic ways of addressing and carrying out the study to meet the established research objectives. Discussion of data sources and diagnostic-estimation tests applied, are also given to get more ascertained information on the objectives.

3.2 Research Design

This is an approach adopted in research to gather, measure, examine critically, and analyze data (Apuke, 2017). Descriptive and correlational approaches were adopted during this study to demonstrate the direction and strength of the connection between external trade shocks and economic growth in Kenya. Before analyzing data, descriptive summary was obtained to get comprehensive information on objectives under study which would aid in generalizing the results in an externally valid manner, and real-life situations.

The study adopted time series statistics for the period of fourteen years obtained from secondary sources, (2008-2022). This study period enabled the researcher to analyse the effects of external trade shocks before and after major economic phenomena such COVID-19, geopolitical tensions as well as the Russia-Ukraine crisis affecting macroeconomic indicators. Similarly, Kenya has been experiencing economic difficulties due to frequent hiking of commodity prices leading to unsteady growth of the economy, (KNBS, 2022).

3.3 Study Area

A study area refers to specified section or region within the site boundaries where inquiries and investigations are conducted (Clark, 2019). This research was done in Kenya, which is among the developing nations, which are highly vulnerable to external trade shocks (United Nations, 2024). Kenya is in the Eastern part of Africa, encompassing a region of 582, 646 sq.km. Countries bordering Kenya include Uganda, Sudan, Somalia, Ethiopia, and Tanzania. Kenya falls between latitudes 5°S-5°N and longitudes 34°E-42°E.

Kenya was preferred purposely due to practical considerations on study area. First, outdated, and limited comparable studies, hence inadequacy of enough, concrete information on the effects of external trade shocks on expansion and stability of economy in Kenya. Secondly, in 2008, Kenya launched its Vision 2030 Initiative with a goal of boosting economic growth and turn the country to middle-income. However, among other third world countries, Kenya has experienced a higher rate of depreciation of local currency despite the control policies put in place, (World Bank 2022).

Thirdly, Kenya has been experiencing fluctuations in economic growth and structural transformation due to high hit by commodity price shock and exchange rate levels even in post COVID-19 and election period, despite having the largest economy in East Africa. Therefore, this study was necessary in Kenya as the research findings provide appropriate guidelines on the existing and new policy measures to push forward the solution from these recurring challenges in the country.

3.4 Data Validity and Reliability

According to Middleton (2019), validity of data means, the rate to which the findings measure what is expected by revealing how well the findings correspond to instituted concepts and theories on the same field. Data reliability refers to the accuracy, consistency, and dependability of data

collected from internationally and locally authorized sources. Reliable sources are typically those with a strong reputation in their field and crucial for ensuring accurate and credible research outcomes. The study ensured the use of verified data sources, methodology, and quality of the data, to uphold the integrity of the findings. The study used time series data derived from secondary sources which are internationally and locally trusted. These sources included the World Bank annual reports, Central Bank of Kenya, and Kenya National Bureau of Statistics (KNBS).

Specifically, GDP data was derived from the KNBS website to measure trend for economic growth. Capital inflow shock data was indicated by FDI inflows extracted from the World Bank. Commodity Price shock data was derived from the consumer price index on the Kenya National Bureau of Statistics website, Interest rate shock was measured by real lending rate data derived from Central Bank of Kenya and trading-weighted index data was derived from the World Bank website. These different sources are reliable, authentic, and accurate enhancing data triangulation and verification.

3.5 Data Type, and Data Sources

This research used data from secondary sources which was readily available and easily accessible. The study adopted time series data because of successive order and numerical sequence of the data points. The data was derived from different reliable and accurate sources; Annual abstracts from KNBS, World Bank, and Central Bank of Kenya. Economic growth was indicated by the Gross Domestic Product (GDP) which gives more comprehensive details on the size and performance of a country. GDP was the most preferred because it tracks the changes in the size and health of entire economy.

3.5.1 Data Collection Methods

The research focused on secondary quarterly data. Capital inflow shock was substituted by foreign direct investments inflows (FDI), commodity price shock measured by consumer price index (CPI) and interest rate was measured by the real lending rate. Moderating variable, exchange rate shock was proxied by Trade Weighted Index (TWI). The researcher compiled the statistics of the specific indicators for every variable and sorted them for analysis. The study included use of natural logs during measurements to evade the problem of large or too small numbers during data analyses. The researcher obtained quarterly data of individual variables under study for a period of fourteen years spanning from 2008 to 2022.

3.6 Data Analysis and Presentation Techniques

3.6.1 Data Analysis

Analysis of data involves systematic application, statistical approaches to describe, illustrate, condense and evaluate data. E-views software version 10.0 was used in the current study to analyze data for both descriptive and inferential statistics. Descriptive statistics gave values of the mean, standard deviation, minimum, maximum and skewness. The study adopted inferential statistics to test the assumption of hypotheses specified and to analyze data where regression model was formulated using Ordinary Least of Squares (OLS) to assess the connection between the explanatory and the explained variables. The multivariate model was established showing how changes in the selected external trade shocks affect economic growth. Correlational analysis was conducted to reveal the statistical significance and direction between external trade shocks and economic growth. Data output was presented in tables and figures.

3.7 Measurement and Description of Variables

The table below displays the variables under study, the indicators, measurement using natural logs and priori expectations from the researcher.

Table 3. 1: Variable Descriptions

Variable	Identifier	Measurements (Using Natural Logs)	Description	Priori Expectedsign
Capital Inflow Shock(CAPI)	Foreign Direct Investment Inflows (Annual %)	LNFDI	Value of inward direct investments made by non-resident investors	+/-
Commodity Price Shock (CP)	CPI (Annual %)	LNCPI	Average variation in prices per unit of goods and services	+/-
Interest Rate shock (IR)	Real Lending Rate (RLR)	LNRLR	Cost of lending money	+/-
ExchangeRate (ER)	Trade Weighted Index (TWI)	LNTWI	Price of one country's currency against another	+/-
Economic Growth (EC)	Gross Domestic Product (Annual %)	LNNGDP	Increase in size of economy. (Percentage change in real GDP)	Dependent variable

Source; Author, (2023).

3.8 Specification of Econometric Model

To evaluate the connection between the explained and explanatory variables, the study used a specific model which displayed economic growth as a function of capital inflow shock, commodity price shock and interest rate shock.

$$EC=f(CAPI, CP, IR).....i$$

EC=Economic Growth CAPI=Capital Inflow shock CP=Commodity Price shock

IR=Interest rate shock

Multivariate model was presented as follows;

$$Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \mu_t \dots \dots \dots \text{ii}$$

Where; Y- Economic growth overtime t X₁– Capital inflow shock

X₂-Commodity price shock

X₃–Interest rate shock

β₀ -constant

β₁-β₃ coefficients

μ- Disturbance value

t- Time

The quantification of the R-squared was used to denote the change in Y_t (economic growth over time) explained by the variance in capital inflow shock (X₁), commodity price shock (X₂), and interest rate shock (X₃) over time span in model (ii).

In the problem under study, hierarchical regression analysis was done to determine the moderating effect of exchange rate (M) on the effect of capital inflow shock, commodity price shock and interest rate shock on the growth of Kenya’s economy. The study established significance of the moderator by comparing R-squared, adj R-squared and significance level before and after adding moderator (M) in the model.

The following model was established with moderating variable.

$$Y_t = \beta_0 + \beta_1 X_1 M_t + \beta_2 X_2 M_t + \beta_3 X_3 M_t + \mu_t \dots \dots \dots \text{iii}$$

Where; Y_t- Economic growth over time t X₁ – Capital inflow shock

X₂- Commodity price shock X₃ -Interest rate shock

M- Exchange rate (moderator) β_0 –constant

β_1 - β_3 coefficients

μ - error term

t- Time

Interaction Terms= $\beta_1 X_1 M_t + \beta_2 X_2 M_t + \beta_3 X_3 M_t$

Model (iii) shows the moderating effect of the exchange rate (M) on the predicted objective explored by explained variables under study. All the variables were transformed into natural logs (LN) to avoid problems of too large/small values.

3.9 Diagnostic Tests

Different estimation tests were undertaken to detect distributional assumptions and problems before and after the regression analysis. Both pre-estimation and post-estimation diagnostic tests for data preparation, verifying model issues and improvements. The study was a correlational study that sorted fourteen-year data spanning from 2008 to 2022.

3.9.1 Pre- Estimation Diagnostic tests

Tests before analysis were crucial for model specification and preparation of data on individual variables. Pre-estimation tests such as; descriptive statistics, inferential statistics, and stationarity tests were undertaken before running the overall analysis.

3.9.1.1 Descriptive Statistics

These are indices applied to describe characteristics and behavior of a given variable. These statistics enabled the study to describe meaningfully the distribution of measurement of variables using a few indices. Descriptive statistics summary of a data set includes skewness, mean, kurtosis, standard deviation, maximum and minimum values of the variables. E-views software version 10.0 was used since it is more easy, accurate and

comprehensive for time series analysis.

3.9.1.2 Inferential statistics

Inferential statistics was used to draw inferences on specified aspects and test the study assumptions. Findings were applied to compare the variations between the variables. Inferential statistics also incorporated the analysis of multivariate regression using E-views version 10.0. The effect of capital inflow shock, commodity price shock, and interest rate shock on economic growth was examined through inferential statistics.

3.9.1.3 Unit root test

This is a problem of non-stationarity in data set due to lack of permanent, fixed level of macroeconomic variables in shift of time. The current study applied time series data which is highly prone to unit root problem. Therefore, to estimate stationarity level of the dataset over the period under study, the researcher carried out the two-unit root tests and compared the results. These tests included Augmented Dickey Fuller (ADF), and DF-GLS test. These tests were preferred for this study because they handle bigger-complex models, and they are not greatly influenced by errors.

If the results from the tests show a p-value less than 0.05 statistical significance, then no unit roots. In cases where unit root resulted, the researcher undertook differencing to correct the problem and achieve stationarity.

3.9.1.4 Determination of Optimum Lag length

Regression models used to establish the nexus between macroeconomic variables are always sensitive to the number of lags. According to Asghar and Abid, (2007), there is no specific way of choosing the correct lag length when there are system shocks or regime variations, however, SIC works best for big samples. Before fitting the model, the study

used the Schwarz Information Criterion (SIC) to ascertain the ideal lag duration of the unconstrained (VAR) order. This criterion is flexible for lag selection in time series analysis since it can be used on small and large number of observations. The optimum lag length determined was one and SIC was selected since it had the lowest value across all the criteria at lag one. Therefore, the vector error correction model was undertaken to revealing a cointegrating equation.

3.9.1.5 ARDL Bounds Cointegration test

To evaluate the cointegrating link between the ARDL Bounds test and mixed orders of integration in time series data in the long run. ARDL Bounds test compared to other cointegration tests, it allows for several cointegrating relationships and avoids the problems that arise when errors are carried on to the next stage. The F-test was used in this study to see if there was a long run association between the variables.

3.9.2 Post-Estimation Diagnostic Tests on Regression Residuals

Discussed below are the conducted post-estimation tests to examine the stability and performance of the established model after regression analysis.

3.9.2.1 Multi-collinearity test

The study undertook multi-collinearity diagnosis to test the problem of inter-correlation between the independent variables under study. The researcher used the Variance Inflation Factor (VIF) to test the problem of multi-collinearity. To show the absence of this problem, VIF should be less than ten. However, when the independent variables exhibit a great percentage of correlation under examination, the researcher would exclude one complicating explanatory variable to correct the fluctuation of the regression coefficient.

3.9.2.2 Autocorrelation Test

The problem of autocorrelation occurs when residuals from regression are highly

correlated. According to Flick (2020), the error term in subsequent observations of a regression model, should not have a high relationship. However, most of times series data results to problem of autocorrelation due to fluctuations of the data trends. Thus, the researcher applied the basis of autocorrelation to examine whether the residuals in preceding observations have high correlation or not. The problem was tested using LM Breusch-Godfrey test which is more general than Durbin Watson. Where, if Chi-square probability is higher than 0.05 or the Chi-square values exceed the threshold statistical significance level of 0.05, then there is no problem of autocorrelation.

3.9.2.3 Normality Test

This refers to a test used to examine if the data trends follow the regular distribution flow over study period. To avoid the problem of incompatible results in examining normality, skewness and kurtosis may be used because they are relatively correct in both small and large samples, (Hae-young Kim, 2013). The researcher undertook normality test to evaluate whether the data trend was normally distributed along the period understudy. Jarque-Berra was adopted to test the normal distribution assumption of variables under study. According to Gujarati (2009), data is regularly distributed if the p-value is >0.05 .

3.9.2.4 Heteroscedasticity Test

Heteroscedasticity involves unequal variance of residuals. It occurs when the standard deviations of a dependent variable evaluated over different value of explanatory variable, related to different trends are non-constant. Heteroscedastic situations may result due to variance of the population of the independent variable varies with the variance of the population of the dependent variable. The Breusch- Pagan- Godfrey test was applied in establishing the presence of heteroscedasticity in the model. According to this test, if the p-value of the observed R- squared is above 0.05, it implies the absence of heteroscedasticity in the model.

3.9.2.5 Test for Model Stability

A stable model is vital for policymaking, hence the researcher checked if the model adopted was stable based on Cumulative Sum (CUSUM) test. A model is stable if it is contained between 5% upper and lower boundary.

3.10 Ethical Considerations

Observance of ethical principles and standards was ensured throughout the study. The researcher obtained permission to undertake this study from National Council of Service (NACOSTI) and School of Postgraduate, Masinde Muliro University. Similarly, the statistics obtained was used for the purpose which was originally intended protecting the rights of the organizations associated with the data.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This part entails information on pre-estimation and post-estimation diagnostic tests and their discussions. The section also displays statistical analysis results on descriptive statistics, inferential statistics, and their interpretations. The analysis assessed the nexus between economic growth in Kenya and external trade shocks (capital inflow shock, commodity price shock, interest rate shock, and exchange rate (moderator)). The findings are presented in sections starting with the preliminary findings from pre-estimation diagnostic tests, vector error-correction model (VECM), regression analysis, the moderating effect of the exchange rate and finally results from post-estimation tests.

4.2 Diagnostic Tests

These are assessment procedures and tests carried out before and after regression analysis to obtain information, confirm characteristics and measurements of the dataset. Discussed below are the pre-estimation and post-estimation tests undertaken during this study. Pre-estimation diagnostic tests include diagnostic tests conducted on residuals before running a general regression analysis to check whether the data meets the pre-analysis assumptions. Discussed below are the tests conducted displaying the behaviors of individual variables and identify any pre-existing potential issues that would require alternative approaches.

4.2.1 Descriptive Statistics

To establish basic characteristics of the dataset, descriptive analyses were undertaken. Additionally, descriptive statistics helped in identifying the outliers in the dataset and

establishing the potential nexus on the variables of focus. Measurements of association, dispersion, and central tendency were performed. This research applied quarterly data from the CBK, the KNBS, and World Bank sources of the data for the variables under study. Standard deviation was used to determine how data deviates from the mean, whereas to ascertain the relative frequency distribution's centre, mean was employed. Table 4.1 displays the descriptive characteristics of variables under the study.

Table 4. 1: Descriptive Statistics Summary

Descriptive Analysis Summary					
	LNEC	LNCAPI	LNCP	LNIR	LNER
Mean	0.637137	0.044433	1.903622	0.640616	1.969259
Median	0.681241	0.222296	1.913228	0.648333	1.988930
Maximum	1.041393	0.538636	2.108531	0.946943	2.086182
Minimum	0.000000	-0.920618	1.648653	0.301030	1.798098
Std. Dev.	0.202596	0.460968	0.129993	0.151369	0.064046
Skewness	-1.261337	-0.985291	-0.297481	-0.390554	-0.466583
Kurtosis	4.811386	2.576325	1.867541	2.394154	2.625812
Jarque-Bera	0.106230	6.035610	4.091109	2.442946	2.527040
Probability	0.070163	0.106230	0.129308	0.294796	0.282657
Sum	38.22825	2.659773	114.2173	38.43694	118.1555
Sum Sq.	2.421660	12.53701	0.996990	1.351836	0.242008
Dev.					
Observations	60	60	60	60	60

Source: (Author 2023)

Where:

LNEC= Natural log of Economic growth, measured by % of GDP

LNCAPI=Natural log of Capital inflow shock, indicated by FDI net inflows as % ofGDP

LNCP=Natural log of commodity price shock, indicated by Consumer price index

LNIR=Natural log Interest Rate shock, proxied by real lending rate as % of GDP

LNER=Natural log of exchange rate, measured by trading weighted index.

The descriptive summary shown above consists of 60 observations of variables studied (Economic growth, capital inflow shock, commodity price shock, interest rate shock, and moderating variable, exchange rate) in the form of natural logs. The standard deviation measures how far the data deviates from the mean, and the mean displays the average distribution of the dataset for each variable in the table above. Low standard deviation posits that data points are relatively clustered together while a large standard deviation shows how the points of the data have been scattered, (Gujarati, 2009).

In the summary, Economic growth (LNEC) has a mean of 0.637137 indicating the mean rate economic growth within the period studied, a minimum of 0.0000 showing the lowest growth rate, which was attributed to the great economic phenomena like effects of the COVID-19 pandemic, (WIR, 2020). While maximum value shows the highest performance reached during the study period was 1.041393 which was a result of shrinking growth caused by the pandemic in the previous period, (KNBS, 2022). A standard deviation of 0.202596, shows the variation of the values from the mean. This suggests that in the dataset, the individual data points deviate from the mean by approximately 0.202596 units on average. Notably, capital inflow shock (LNCAPI) had a mean of 0.44433, which on average indicates the magnitude of CAPI which may cause implications on investment strategies and economic policy, a minimum of -0.920618, a maximum of 0.538636, and a standard deviation of 0.460968 indicating greater variability of the capital inflow data points (foreign direct investment inflows) along the period under study.

Additionally, commodity price shock (LNCP) has a mean of 1.903622. This suggests that the natural logarithm of the shock to commodity prices typically lies around 1.9036 units on average. LNCP findings also reveals a minimum of 1.648653, which is the smallest observed value of LNCP in the dataset, while the highest commodity price shock was

2.108531, and a standard deviation of 0.129993 which suggests that the data points are relatively close to the mean, with deviations of around 0.129993 units on average. Output on interest rate shock (LNIR) shows an average of 0.640616, minimum of 0.301030, a maximum of 0.946943, and a standard deviation of 0.151369. Exchange rate (LNER) shows a mean of 1.969259, a minimum of 1.798098, a maximum of 2.086182, and a standard deviation of 0.064046. LNER had the lowest standard deviation, a confirmation that the data points are tightly clustered together within the average.

4.2.2 Normality Test

Normality is the measure of how well observations approximate a normal distribution along a certain period. It approximates the likelihood that random variable of the underlying data is distributed normally. According to Maniagi (2018), a dataset is distributed normally if skewness value lies below two, kurtosis value below six and probability of Jarque-Bera test lies above 0.05. This study used skewness and kurtosis which supports Jarque-Bera to test for normality. The correspondence of distribution of a random variable is shown by the skewness which indicates the skew direction and the magnitude while kurtosis shows the size and position of the peak. Table 4.1 displays skewness values are less than 2 and the kurtosis values lies below 6 which is clear confirmation of a normal distribution of the data in all the variables studied. From table 4.1, p-value of all the variables studied was greater than 0.05 significance indicating a normal spread of the data for the period under study.

4.2.3 Correlational Analysis

Correlational diagnostic was adopted to assess the direction and degree of the relationship on the objectives under study. This analysis also measures the correlation coefficient (R) which lies between a positive one and a negative one. It is also used to indicate the presence of problem of multicollinearity which happens when the explanatory variables studied are

highly correlated. The purpose of the study was to evaluate the range to which the predicted variable (Economic growth) correlates with the predictors (Capital Inflow shock, Commodity Price shock and interest rate shock). Table 4.2 reveals the correlational computation results.

Table 4. 2: Correlational Analysis Results

Correlation t-statistic probability	LNEC	LNCAPI	LNCP	LNIR	LNER
LNEC	1.000000				
LNCAPI	0.700051* [7.466010] (0.0000)	1.000000			
LNCP	-0.263873* [-2.083437] (0.0416)	0.049338 0.376207 0.7081	1.000000		
LNIR	0.429982* [3.627059] (0.0006)	0.038053 0.290010 0.7728	0.722700* 7.963297 0.0000	1.000000	
LNER	0.294543* [2.347303] (0.0223)	0.083156 0.635499 0.5276	0.760810* 26.39659 0.0000	0.738967* 8.353051 0.0000	1.000000

*Note. Values in [] indicate t-Statistic and P-values are indicated by values in parenthesis (), and significance at the 5% level of significance, or p-value < 0.05, is indicated by the *.*

Source: (Author, 2023)

Pairwise correlation was performed before test for unit root and the findings are displayed in table 4.2. The correlational outcome revealed the absence of high collinearity among the residuals. From the findings, capital inflow shock has a positive significant (0.700051,

$p < 0.05$) relationship with economic growth. This is a clear indication that when CAPI increases by one-unit, economic growth rate shoots by 0.7001 units and vice versa. Commodity price (CPI) shows a negative significant association with economic growth (-0.263873 , $p < 0.05$). This implies that, commodity price shock reduces economic expansion in Kenya such that, when commodity price increases by one percent, economic growth reduces by 26.4%.

Interest rate (IR) results indicate a strong and positive correlation with economic growth (0.429982 , $p < 0.05$). This means that when interest rate increases by one-unit, economic growth goes up by 0.429982 units. This implies that interest rates are a common instrument used by central banks to control general inflation rate, hence achieving economic growth. Thus, a rise in interest rates is a sign that the central bank's tightening monetary policy is boosting the economy if it results in more economic growth, (Hoffmann & Lemke, 2021). Additionally, high interest rates attract savings through investors who expect higher returns on their deposits. This creates capital accumulation increasing funds available for investments in productive sectors of the economy, (Gurvich, E., & Petronevich, A. 2020).

The correlational results show a direct positive nexus between the moderator, exchange rate and growth economy (0.294542 , $p < 0.05$). This suggests that a stronger exchange rate may increase a nation's export competitiveness by making its commodities affordable for external consumers. This can cause higher export volumes, earnings, and ultimately contribute to economic growth.

These findings corroborate with studies on econometric analysis of external trade shocks and economic growth conducted by previous researchers. From the summary table 4.2, we confirm that CAPI and IR significantly and favourably affect economic growth. This

concur with the result of Munene (2017); Wambugu (2016); Duodu & Tawiah (2020); Shafiq & Hafiz (2016); Nyang'oro (2017) who found that FDI inflow as a measure of CAPI had positive effect on economic growth. Keyamo et al (2021); Moyo and Pierre (2018) also found that IR has a positive connection with economic growth. This is because increased interest rates enhance a country to combat inflation and attracts more saving and investment rather than consumption. High interest rate can lead to stronger domestic currency which boosts export-oriented sectors and attracts investors with an expectation to reap more.

According to Maniagi (2018), when interest rates risks are high, banking sectors are likely to reap much and evade from unhealthy borrowings and lending which helps in balancing the economy. Similarly, the studies done by Ipeleng & Rufaro (2021); Babar & Kanwal (2017); Jinan & Apostolos (2021); Tiawara, (2015) and Nyang'oro (2017) suggests that commodity price shock has a negative nexus with economic growth which corroborates with the outcome of this study.

However, the results contradict, Waweru and Ochieng' (2017); Lonwabo (2021); Ayobami & Olalekan (2020); Maiga (2017) who found that CAPI and IR have negative influence on economic growth. Contrary to this study, Lonwabo (2021) and Tiawara, (2015) revealed positive association between commodity price shock and economic growth. These repudiations on the results may be as a cause of time frame context, variability in study area, methodological differences or confounding variables in various studies. Additionally, there was a noteworthy link between the independent variables and not highly correlated since none of them exceeded 0.9 hence ruling out the problem of multicollinearity.

4.2.4 Test for Unit Root

Time series data is prone to unit root problem because of non-Stationary behavior. This

means that the variable is not integrated of order 0 and so inference is not applicable, and it can also result to a spurious regression. Therefore, stationarity must be attained to allow the model to predict future occurrences. To achieve robustness of the results, the research applied both ADF, and DF-GLS test to test unit root on individual variables. The tests were carried out at levels as well as first difference to achieve stationarity. Table 4.3 below shows the stationarity test summary at levels.

Table 4. 3: Augmented Dickey-Fuller Test for Stationarity

Augmented Dickey-Fuller test statistics						
Variables At Levels	t- statistics	Prob- Value	1% critical Value	5% critical Value	10% critical Value	Conclusion
LNEC	-2.602637	0.0986	-3.555023	-2.915522	-2.595565	Unit root
LNCAPI	-3.884003	0.0373	-3.654013	-2.082402	-2.001340	Stationary
LNCP	-1.745385	0.4036	-3.546099	-2.911730	-2.593551	Unit Root
LNIR	-1.616632	0.4679	-3.546099	-2.911730	-2.593551	Unit Root
LNER	-1.285697	0.6307	-3.546099	-2.911730	-2.593551	Unit Root

Source: (Author, 2023)

The findings of the ADF test are revealed on table 4.3. The alternative hypothesis notes that time series data does not have a unit root, while the test's null hypothesis claims that time series data has unit root problem. All the variables apart from LNCAPI, demonstrated unit root problem at levels; LNEC (p-value 0.0986 > 0.0500), LNCP (p-value 0.4036 > 0.0500), LNIR (p-value 0.4679 > 0.0500) and LNER (p-value 0.6307 > 0.0500). These results confirmed the null hypothesis that there is unit root problem, and the alternative hypothesis was only accepted under LNCAPI which was stationary at levels (p-value <0.05). This demonstrated that at levels there existed unit root problem among other variables.

However, as the probability values demonstrate, the non-stationary variables also became

stationary after the first differencing as shown in table 4.4 below. LNEC, LNCP and LNER variables had (p-values < 0.0500.) and the Z-test values higher than 1%, and 5% critical values.

Table 4. 4: Augmented Dickey Fuller Unit root test at first difference

Augmented Dickey-Fuller test statistics						
Variables At 1st difference	t- statistics	P-Value	1% critical Value	5% critical Value	10% critical Value	Conclusion
DLNEC	-4.153648	0.0019	-3.568308	-2.921175	-2.598551	Stationary
DLNCP	-6.219138	0.0000	-3.548208	-2.912631	-2.594027	Stationary
DLNIR	-7.575877	0.0000	-3.548208	-2.912631	-2.594027	Stationary
DLNER	-6.816799	0.0000	-3.548208	-2.912631	-2.594027	Stationary

Source: (Author, 2023)

Table 4.4 shows that the statistics on all other variables became stationary at first differencing except LNCAPI which was found to be stationery at levels. P-value of all other variables in their natural logs is less than 0.05 significance level and t-statistics greater than all the critical values (1% and 5%) indicating stationarity. Therefore, the null hypothesis is rejected after initial differencing while the alternative hypothesis was accepted.

Table 4. 5: DF-GLS Test for unit Root

Elliot-Rothenberg-stock DF-GLS test statistics					
Variables	Att-statistics	1% critical Value	5% critical value	10% critical Value	Conclusion
LNEC	-0.627046	-2.607686	-1.946878	-1.612999	Unit root
LNCAPI	-2.676168	-2.604746	-1.946441	-1.613238	Stationary
LNCP	-2.576169	-2.604746	-1.946447	-1.613238	Unit root
LNIR	-0.406272	-2.604746	-1.946447	-1.613238	Unit root
LNER	0.603399	-2.604746	-1.946447	-1.613238	Unit root

Source: (Author, 2023)

Table 4. 6: DF-GLS at First Difference

Elliot-Rothenberg-stock DF-GLS test statistics					
Variables	At t-statistics	1% critical Value	5% critical Value	10% critical Value	Conclusion
1st difference					
DLNEC	-4.556005	-2.605442	-1.946549	-1.613181	Stationary
DLNCP	-6.946292	-2.605442	-1.946549	-1.613181	Stationary
DLNIR	-6.751331	-2.605442	-1.946549	-1.613181	Stationary
DLNER	-3.254840	-2.605442	-1.946549	-1.613181	Stationary

Source: (Author, 2023)

From the Elliot Rothenberg-stock unit root findings in table 4.5, every variable apart from LNCAPI, had unit root problems at levels as shown by DF-GLS t-statistics which are less than DF-GLS 1%, and 5% critical values at levels. However, in table 4.6 upon first differencing, all variables became stationary as demonstrated by DF-GLS t-statistics values greater than 1%, and 5% DF-GLS critical values. Thus, the alternative hypothesis was accepted while null hypothesis was rejected and it was thus, concluded that the series were

stationary at first difference.

4.2.5 Determination of Optimum Lag Length

Before estimating the VAR and VEC models, it is vital to ascertain the lag length of the unrestricted Vector Autoregressive (VAR) order and the Vector Error Correction (VEC) order. This is due to the fact that in order to fit cointegration in the VECM model or look at the number of cointegration ranks the lag length needs to be supplied. According to Engle and Granger (1987), selecting the lag length for a VAR model with stationary variables can be done in several ways. The lag length for this multivariate model was one lag, as revealed by the outcome in table 4.7 below. This was because the SIC: Schwarz information criterion indicated that, for lag length of one, the criterion's optimal number of lag orders was chosen, which was pointed by the asterisk (*). SIC criterion was most selected since it showed the lowest value amongst another criterion with one lag.

Table 4. 7: Lag Length Determination summary

Lag	LogL	LR	FPE	AIC	SC	HQ
0	98.28532	NA	3.81e-07	-3.428557	-3.282569	-3.372103
1	304.6465	375.2021	3.76e-10*	10.35078*	9.620842*	10.06851*
2	314.0745	15.77057	4.83e-10	-10.11180	-8.797911	-9.232025
3	326.0632	18.31002	5.73e-10	-9.965936	-8.068094	-9.232025
4	340.1319	19.44037	6.44e-10	-9.895707	-7.413913	-8.935977
5	365.3299	31.15382	4.99e-10	-10.23018	-7.164432	-9.044629

Source; Author, 2023

*= lag order selected by the criterion

The lag length is determined using a variety of parameters, as shown in the table 4.7. Final prediction error (FPE), sequential modified LR test statistic (LR), Lag-order selection statistics for an order series of vector auto regression (each test at 5% level) using the AIC

(Akaike Information Criterion), SC (Schwarz Information Criterion), and HQ (Hannan-Quinn Information Criterion) lag-order selection criteria. For every complete VAR of order less than or equal to the maximum lag order, a series of likelihood-ratio test statistics is also provided. When there are fewer than sixty observations, FPE are more acceptable; when there are more than 120 observations, Hannan-Quinn is favoured (Liew 2004). (Lutkepohl, 2005). According to Lutkepohl's (1993) theory, choosing more order lag raises the residuals' average square variance, but choosing a lower order lag results in an autocorrelation issue (Ozcicek, 1999). The SIC criterion was chosen since it had the lowest value despite all the criteria displaying the same latency.

4.2.6 Cointegration Test- Bounds Estimation

The goal of the co-integration estimation was to ascertain the linear combinations of variables' long-run nexus. In this case, the variables were able to be employed in the model in the case of levels, and the presence of cointegration between them considering the test findings may be proposed as a true long-term connection, (Talas, Kaplan & Ali 2013). To empirically analyze the short run and the long run association between the variables of interest (Economic growth, capital inflow shock, commodity price shock, and interest rate shock, ARDL bound test was adopted. The Bound test was preferred since the variables had mixed results on stationarity and therefore the researcher could not apply Johansen test. Cointegration test is conducted on level form of variables and on the log transformation of the raw variables. The rejection of null hypothesis is made on decision criteria at 5%, 2.5%, and 1% levels considering the lower bounds $I(0)$ and the upper bounds $I(1)$.

According to Wolde-Rufael (2010), the null hypothesis is rejected if the F-statistic is greater than the critical values for the upper bounds $I(1)$ and presence of cointegration can be confirmed implying that there is a long-run association. In case null hypothesis is

rejected; vector error correction model is estimated in the long run. Notably, if the F-statistic calculated is lower than the critical value of the lower bound, it is concluded that no existence of cointegration and long run relationship and the researcher may fail to reject null hypothesis. Further, if the calculated F-statistic is in between the lower and the upper bounds then it is inclusive. Summary output was presented below.

Table 4. 8: Bound Test for Cointegration

F-Bounds Test Null Hypothesis: No levels relationship				
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	18.89621	10%	3.47	4.45
K	3	5%	4.01	5.07
		2.5%	4.52	5.62
		1%	5.17	6.36

Source: Author, (2023)

Table 4.8 above shows that the calculated F-statistic (18.89621) is more than the critical values 5.07, 5.62, and 6.36 of upper bound I (1) at 5%, 2.5% and 1% significance levels respectively. Thus, this research favored the alternative hypothesis and concluded the presence of cointegration and a long-term connection between the variables under study hence, the acceptance of alternative hypothesis and VECM matrix was conducted.

4.3 Vector Error Correction Matrix (VECM)

This study employed VECM to demonstrate the level at which the independent variables (CP, IR, and CAPI) affect the dependent variable (economic growth), and also to pinpoint the short- and long-term connection within the variables. As suggested by Lutkepohl & Kratzik (2004), and Lutkepohl (2005), the variable coefficients in the VECM model represent short-run variance. To establish the long-term relationship between variables, cointegrating equations must have a negative and significant sign at a 5% confidence level

(Lutkepohl and Kratzik, 2004; Lutkepohl, 2005). Table 4.9 below shows the Vector error correction equation and the output of the lagged values.

The table 4.9, shows the estimated error correction in the VECM of the cointegrating equation as -0.1793219 to justify that (VECM) has a long run relationship. This also demonstrated that errors from past year was repaired within the current year at a 17.932% convergence rate. According to the absolute value, the lag period of the error shock accounts for 17.932% of the long-run disequilibrium. A verification that, in the short term, the variables' historical values influenced their current values. (Gujarati, 2009). It was discovered that the cointegrating equation was statistically significant with the t-statistics of 2.60029 (P-value<0.05) which further confirms the long run relationship between the independent and the dependent variables in the study.

The section two of the VECM output revealed the short run association. It displays the lagged values of Capital inflow shock; commodity price shock and interest rate shock and how they affect economic growth in Kenya. The lagged values primarily to demonstrate the impact of previous outcomes current. Table 4.9 reveals that the coefficient of the fourth lagged difference in economic growth rates is -2.63149, which is statistically significant because the t-statistics was >2. This implies that *ceteris paribus*, economic growth in the past fourth last quarter still affects economic performance in the present by 2.631. From the results, capital inflow shock, commodity price shock, and interest rate shock from the first to fourth lagged last quarters affects the current economic growth rate since the coefficients of the four quarters are statistically significant, (*see appendix III*).

Table 4. 9: Vector Error Correction Output

VECM statistics				
Standard errors in () t-statistics in []				
Cointegrating Eq:	CointEq1			
LNEC (-1)	1.000000			
LNCAPI(-1)	-0.543315			
	(1.14137)			
	[-3.84331]			
LNCP(-1)	-1.193044			
	(0.49262)			
	[-2.42186]			
LNIR(-1)	0.440541			
	(1.49262)			
	[-3.95866]			
C	-9.394313			
Error Correction:	D(LNEC)	D(LNCAPI)	D(LNCP)	D(LNIR)
CointEq1	-0.179322	0.438714	0.018909	-0.100356
	(0.03213)	(0.22507)	(0.02743)	(0.04408)
	[-2.60029]	[1.94920]	[1.19873]	[-2.27674]
D(LNEC(-1))	-0.240278	-0.232725	0.011045	0.173432
	(0.21414)	(0.38178)	(0.01261)	(0.07477)
	[-1.072021]	[-0.464021]	[0.18293]	[2.31961]
D(LNEC(-2))	-0.395022	-0.174422	-0.016906	0.322276
	(0.22068)	(0.37590)	(0.01241)	(0.07362)
	[-0.88371]	[-0.46402]	[-1.29224]	[4.37779]
D(LNEC(-3))	-0.244629	-0.041170	-0.119052	0.113929
	(0.26213)	(0.44649)	(0.10474)	(0.08744)
	[0.93323]	[-0.09221]	[-1.29224]	[1.30290]
D(LNEC(-4))	0.619427	-1.586924	-0.905250	0.205983
	(0.30641)	(0.40099)	(0.41324)	(0.07853)
	[-2.63149]	[-3.95751]	[-0.39664]	[2.62296]

Source: (Field Data, 2023)

4.4 Regression Analysis

The crucial aim of the research was to assess the impact of external trade shocks on Kenya's economic growth. From pre-diagnostic tests conducted, the explanatory variables (capital inflow shock, commodity price shock, and interest rate shock) are statistically significant in elaborating economic growth in Kenya.

Table 4. 10: Summary output on Multiple Regression analysis

Dependent Variable: DLNEC, Method: Least of Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob
LNCAPI	0.302163	0.034237	8.825617	0.0000
DLNCP	-0.201914	0.09390	-2.150304	0.0321
DLNIR	0.665800	0.150668	4.418978	0.0000
C	0.058158	0.027312	2.129403	0.0376
R-Squared	0.661003	Mean dependent	0.637138	
Adjusted R-Squared	0.642842	S.D dependent	0.202596	
		var		
S.E of Regression	0.121077	Akaike info criterion	-	
Sum squared Resd	0.820937	Schwarz criterion	-1.180821	
Log Likelihood	43.61331	Hannan-Quinn criter.	-1.265829	
F-statistic	36.39766	Durbin-Watson Stat	1.973016	
Prob (F-stat)	0.000000			

Source: (Author, 2023)

In table 4.10, the regression output displays a PV 0.0000, meaning that at the 5% level of significance, the variables in the model are collectively important in elaborating the fluctuation in Kenya's economic growth rate. From the findings, the goodness of fit (R^2) value is 0.661003 which implies that the variance in external trade shocks, jointly explains 66.1% of the variance in economic growth. The output above also indicated that there is absence of autocorrelation as the level of Durbin-Watson (1.973016) is within the range of 1.5 to 2.5.

The following is the regression equation obtained.

$$DLNEC_t = 0.058158 + 0.302163LNCAPIt - 0.201914DLNCP_t + 0.665800DLNIR_t$$

Where;

DLNEC = the first difference of natural log of Economic growth
LNCAPIt = the natural

log of capital inflow shock

DLNCP = First difference of natural log of commodity price shock
DLNIR = the first

difference of natural log of interest rate shock

t = Time

From regression results, the model confirms that when other independent factors are held constant, the economic growth in Kenya will increase at 5.8158%. The results also reveal that, holding other variables constant in the study, CAPI shock will explain up to 30.2163% of economic growth, while Commodity price shock will reduce economic growth by 20.1914% and interest rate will cause an increase in economic growth by 66.58% holding other variables in the study constant, this indicates a strong positive connection.

4.5 Result Discussions

4.5.1 Effect of Capital Inflow Shock on Economic growth in Kenya

Determining how a shock to capital inflows affects Kenya's economic growth was the study's primary goal. As expected, the influence of the capital influx shock on Kenya's economic growth is statistically significant and exhibits a positive sign, as indicated by the coefficient results for the capital inflow shock in Table 4.10, which have a p-value of $0.0000 < 0.05$. From the regression outcome, *ceteris paribus* an increase in FDI inflows (an indicator of CAPI), by 1% it will cause an increase in economic growth rate in Kenya by 30.2163%. This can be elaborated by the fact that moderate presence of foreign investors is associated with a faster economic growth of up to 30%. Capital inflow shock is vital in establishing economic growth and therefore a need to strategically form an effective business surrounding to attract foreign investors for economic effectiveness and growth.

Given appropriate host country policies and favorable environment, foreign direct investments will lead to employment creation, technology transfer, innovation, human capital development through employees training in new business ventures, trade integration, flows of ideas and global business standards resulting to competitive in a country and increased capital inflows from corporate taxes on profits and capital gains generated by these foreign direct investments. It is anticipated that each of these advantages will boost the host nation's GDP, making it a useful instrument for bringing about progress in the economy.

This outcome conquers with of numerous scholars who believe that the benefits of capital inflow shock through foreign investors, may include the innovations of new technology, the creation of employment, the development of humancapital, the contribution to the integration of international trade, the improvement of domestic investment, and an increase

in tax revenue generated from external investors significantly enhances economic growth (Hailemariam, Sakutukwa, & Dzhumashev. 2020). The findings also corroborate with study done by Olaleye (2015) who found positive long-run nexus between capital inflow and economic growth. However, the result contradicts with Lonwabo (2021), who noted that capital inflow had a negative significant effect on economic growth. While Waweru and Ochieng' (2017) revealed that FDI inflow has negative insignificant influence on economic growth.

4.5.2 Effect of Commodity Price Shock on Economic growth in Kenya

From the regression analysis presented in Table 4.10, commodity price shock coefficient values are (-0.201914), $p < 0.0321 < 0.05$. This suggests that the impact of the commodity price shock on Kenya's economic growth is statistically significant and shows a negative trend. According to the regression analysis, if commodity prices hike by one, it will cause a 20.1914 drop in Kenya's economic growth rate, assuming all other variables remain same. Therefore, the study rejected the null hypothesis that states that there is no statistically significant connection of commodity price shock and economic growth. This can be explained by the fact that sudden increase of commodity prices is associated with a slower economic growth. The model shows that commodity price shock indicated by CPI has a deteriorating outcome on economic growth rate. This negative association can also be confirmed by the fact that a rise in commodity prices leads to inflation which hinders inflow of foreign capital in Kenya hence stagnation on economic growth, (Shah, M. A., Aleem, M., & Arshed, N. 2014).

This effect can be attributed to the fact that commodity prices has been connected to the increase in inflation, which has created negative outcome on living costs in developing nations. As a result of high reliance on external economies, developing countries suffer

when external countries escalate the price levels of their products hence causing much strain in third world countries. Citizens in lower income groups in third world countries are disproportionately affected by hike in commodity prices from the external trading partners. According to Shah, Aleem, and Arshed, (2014), the inflation rate increases because of food and non-alcoholic beverage costs. Commodity price shock contributes to inflation which slow economic growth and worsen Kenyans' degree of poverty (Kiganda, 2014).

The outcomes are in line with research done by Inoue & Okimoto (2017); Filippo *et al* (2020); Jinan & Apostolos (2021); Ofori. Becker & Grace (2017) who found negative impact of commodity price shock which leads to inflation which affect manufacturers, and the volume of goods produced as they expect more fluctuation on input costs resulting to economic uncertainty and reduced growth. Similarly, high commodity prices reduce the propensity to save making it hard for investors and firm innovations in Kenya which ultimately results to reduced economic growth. The outcome of this study contradicts, Lonwabo (2021); Tawara (2015); Ipeleng and Rufaro (2021) who found that commodity price had a positive statistically significant effect with economic growth. Apostolos, (2021) concluded that there is no statistical significance between commodity price and economic growth. This means that the researchers applied different methodology design, confounding variables

4.5.3 Effect of Interest Rate Shock on Economic growth in Kenya

Objective three of this research was to establish the nexus between interest rate and economic growth in Kenya. Result from regression analysis in table 4.10 shows that interest rate had r of 0.665800 and a p -value of 0.0000 which is <0.05 . The t -statistics of interest rate is 4.418978 which is more than 2 hence, displaying positive significant effect on economic growth. The coefficient value reveals that interest rate is highly significant to

economic growth in Kenya. This means that *ceteris paribus*, when lending rate increase by 1%, then economic growth increases by 66.58% and viceversa. This can be defined by the fact that higher interest rates result to higher lending rates which is a sign of boom economy.

High interest rates incentivize individuals and businesses to save more as they expect higher returns on their deposits. This creates a large pool of funds available for investment in productive sectors of an economy, (Bianchi, F., Melosi, L., & Rottner, M. 2022). Consequently, high lending rates enhances the banking sectors to avoid risky and unhealthy borrowings. This strengthens financial sector by preventing excessive buildup of debts, hence creating a resilient system promoting sustainable growth. Schmidt-Hebbel, K. (2019) posited that escalation of interest rate enhances economic growth since it helps in taming general inflation rate especially in developing countries. Fisher Effect (1993), noted that nominal interest rates reflect expected inflation. By raising interest rates, central banks aim to signal their commitment to controlling inflation, which can lead to lower inflation expectations and, consequently, reduced actual inflation. The findings concur with Khan, M. S., & Senhadji, A. S. (2001); Moyo and Pierre (2018); Mccririck and Rees (2017); Mutinda (2014) who also found a positive relationship. The contradicting result by Ayobami and Olalekan (2020), who suggested that interest rate has a negative effect on economic growth.

4.6 Moderating Effect of Exchange Rate on the Relationship between External Trade Shocks and Economic Growth

The final goal was to determine how the exchange rate affected the nexus between external trade shocks and Kenya's economic growth. The findings of the independent factors' direct impacts on the dependent variable, which includes the moderator, are shown in Model (ii). Devi, C., & Biduri, S. (2021); Baron and Kenney, (1986) state that it is critical to evaluate the moderating variable's considerable impact on the model. A moderating variable (M) in

correlational analysis is an extra variable that can alter the direction or level of association between exploratory variables (X) and explained variable (Y) (Baron & Kenney 1986). The way in which X and M interact might demonstrate the impact of a moderator (M) (WU & KO (2013 and Kang et al., 2015)).

Table 4. 11: Testing the Moderating Effect of Exchange Rate on R²

DLNEC				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-statistic	Prob.
LNCAPIM	0.155280	0.017328	8.961157	0.0000
DLNCPM	-0.099867	0.067572	-2.779437	0.0145
DLNIRM	0.343547	0.077012	4.460951	0.0000
C	0.056254	0.188231	2.988611	0.0042
R-squared	0.664954	Mean dependent var	0.637138	
Adj. R-squared	0.647006	S.D dependent var	0.202596	
S.E of regression	0.120369	Akaike info criterion	-1.332170	
Log likelihood	43.96509	Hanna-Quinn Criter.	-1.277555	
F-statistic	37.04715	Durbin-Watson stat	1.9920579	
Prob (F-statistic)	0.000000			

Source: (Author, 2023)

Upon addition of the moderating factor, (exchange rate), the goodness of fit (R-squared) increases from 0.661003 to 0.664954, which is a negligible positive effect of 0.3951%. This implies that the moderating effect of exchange rate increased the variation in economic growth explained jointly by capital inflow shock, commodity price shock and interest rate shock hence the R² increased by 0.3951%. Similarly, after inclusion of exchange rate (M), all independent variables were seen to be significant with p-value < 0.05.

Consequently, on addition of the moderator, exchange rate, the p-value was (0.0000) which was less than (0.05), a significant level. It implies that fluctuations in the value of the currency have a significant and quantifiable effect on the result of economic growth. Thus, the fourth hypothesis of this study was rejected and concluded that exchange rate

has a significant moderating effect on variables under study. The value of Durbin Watson was 1.9921 indicating the absence of serial autocorrelation since it ranges between 1.5 and 2.5.

Moderating equation generated;

$$DLNEC_t = 0.056254 + 0.155280LNCAPIM_t - 0.099867DLNCPM_t + 0.343547DLNIRM_t \dots\dots\dots (ii)$$

4.7 Results Post-estimation diagnostic tests

4.7.1 Multicollinearity

To assess existence for Multicollinearity, Variance Inflation Factors test (VIF) was undertaken. For Variance inflation factor value higher than 10, Multicollinearity is considered existing (Laurens, 2018). The Variance inflation factor was calculated as shown in the table 4.12 below.

Table 4. 12: Test for Multicollinearity

Variance Inflation Factors (VIF)			
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LNCAP	0.001172	1.011880	1.002452
DLNCP	0.030811	459.0758	2.09441
DLNIR	0.022701	40.22355	2.093372
C	0.074596	305.3130	NA

Source: (Author, 2023)

Summary output in Table 4.12 above confirmed that no variable was highly collinear since there is no variable with centered VIF exceeding 10.

4.7.2 Serial correlation Test

Uyanto (2019), confirmed that serial correlation of the noise phrases is inconsistent with the assumptions of the OLS that in regression analysis, error terms are uncorrelated. When an error term crosses into a new period of time series data, autocorrelation occurs.

Alternatively, it is also possible that error term of one observation to be modified by the error term of another observation. According to Flick (2020), the successive values of the disturbance terms in linear regression are supposed to be independent subsequently. The presence of autocorrelation was investigated by applying Breusch-Godfrey Serial correlation LM test. The alternative hypothesis asserts that there is autocorrelation, whereas the null hypothesis claims that there is no serial correlation. The summary output was shown as follows.

Table 4. 13: Breusch-Godfrey Serial Correlation LM Test

Null hypothesis: No Serial correlation at up to 4 lags			
F-statistic	3.509711	Prob. F (4,52)	0.1362
Obs *R-squared	5.75507	Prob. Chi-Square (4)	0.0525

Source: (Author, 2023)

From table 4.13, the observed R-squared displayed prob. Chi-Square value of 0.0525 which is greater than 0.0500 hence acceptance of null hypothesis that there is absence of serial correlation.

4.7.3 Normality

The residuals in an econometric study should display a regular distribution. This study used Jarque-Bera test to evaluate the normality in the model acquired after regression. According to study done by Okamoto, Koizumi and Seo (2009), the null hypothesis is that residuals are normally distributed. This implies that the probability value should be higher than 0.0500 while the alternative hypothesis has a p-value less than 0.0500. The figure below (4.1) displays the results from Jarque-Bera test.

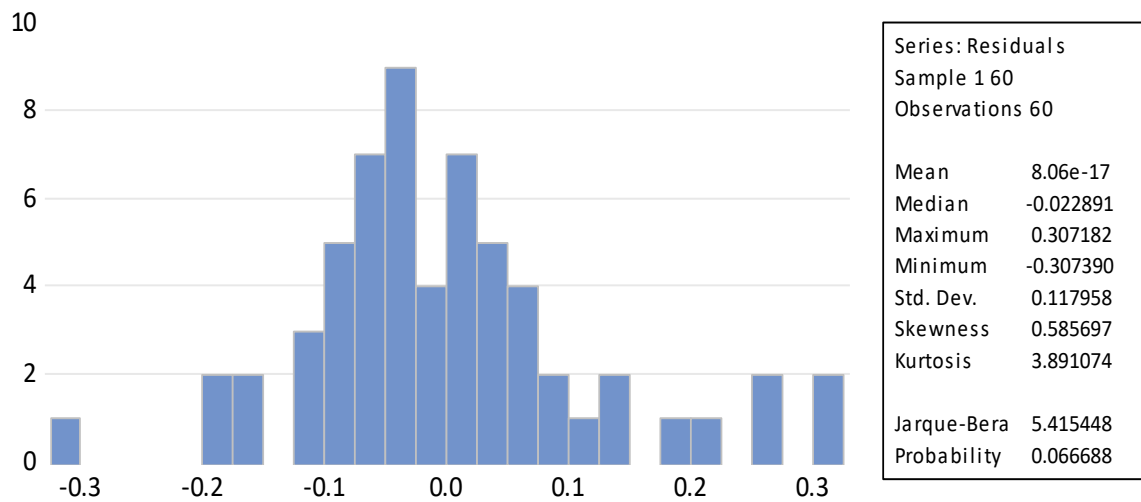


Fig 4. 1: Normality Test

Source: Author, (2023)

Figure 4.1 shows that the p-value from Jarque-Bera test is 0.066688 which is greater than 0.0500 significance level. Hence, the null hypothesis is accepted based on this output.

4.7.4 Heteroskedasticity

According to Uyanto (2019), the Breusch–Pagan test determines if the variance of the errors from a regression model depends on the values of the independent variables. Heteroscedasticity is the state in which the variance of the disturbance term varies with each value of the independent variable. Rosopa, Schaffer, & Schroeder, (2013), posits that future conclusions can be made with greater validity if the homoscedasticity assumption is violated, and its biasing effects are reduced. The size of the independent variables determines the variance of the error term since the error term might vary from one observation to the next. Even though it renders the Ordinary Least Squares estimator wasteful, the presence of heteroscedasticity has no effect on the estimator's independence. This is since the OLS estimator will not have the smallest variance among the class of unbiased estimators for small sample sizes, and it will be asymptotically inefficient for

high sample sizes. The Breusch-Pagan Godfrey test was utilized in this investigation to ascertain the existence of heteroscedasticity. The resulting results displayed in Table 4.13

Table 4. 14: Breusch-Pagan-Godfrey Output

Heteroskedasticity Test: Bresuch-Pagan-Godfrey			
F-statistic	5.367996	Prob.F(3,56)	0.0825
Obs *R-squared	6.400631	Prob. Chi-Square (3)	0.08384
Scaled explained SS	7.874394	Prob. Chi-Square (3)	0.1075

Source: (Author, 2023)

By looking at the Prob> chi-square (3) value shown by the observed R-squared, heteroscedasticity can be verified. If the value is less than 0.05, the alternative hypothesis (H1-error variance is multiplicative of one or more variables) was accepted and the null hypothesis (that the HO-error variance is equal) was rejected. The null hypothesis was accepted, and the alternative hypothesis is rejected because, as table 4.13 makes it evident, the Prob > chi-square (3) value is 0.08384, which is more than 0.05 and indicates the absence of heteroscedasticity.

4.7.5 Stability of the Model

According to Phong (2021), the sequence of CUSUM test statistics is a sensitive feature used to detect harm in a control chart scheme. A flaw in the model is present if, after a few cycles of recursive regression, the sequence passes either the upper or lower critical line (0.05). A stable model should lie within the upper and lower limit of 0.05 level of significance. An evaluation of the derived model's stability was conducted using the Cumulative Sum Test (CUSUM). CUSUM test enables more robust estimations, and it provides more information about a model (Talas, Kaplan & Ali 2013. Figure 4.2 below indicates that all the variables lie within the 5% significance level both at the lower and

upper boundary. This attests to the fact that the analysis's regression model was stable and appropriate for the research.

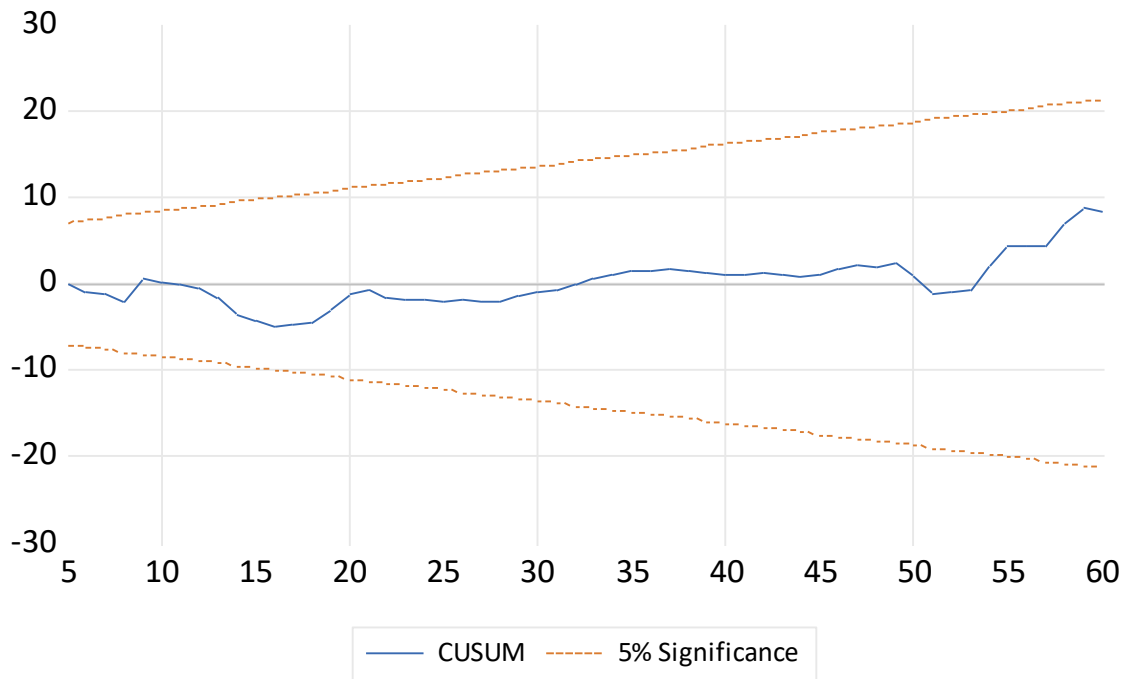


Fig 4. 2: CUSUM Test stability Output

Source: (Author, 2023)

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The upshot of the results from the preceding chapter is displayed in this section and several conclusions and suggestions are drawn based on the study outcomes and observations. Further, avenues of future and further studies to researchers, scholars and academicians are given.

5.2 Findings' Summary

This study's primary aim was to examine how external trade shocks affect Kenya's economic growth. Key interest variables were capital inflow shock, commodity price shock, interest rate shock, and exchange rate which was considered as a moderating variable. The study utilized correlational research design incorporating quarterly time series data in a stochastic model. Descriptive statistical analysis was generated from the natural logarithms of the variables to assess for any outliers and define basic characteristics of the dataset.

The descriptive summary displayed positive means for all variables and a normal distribution in Jarque-Bera test since probabilities were beyond 0.05 significance level. Correlation analysis revealed positive significant associations between CAPI, IR, ER and EC while CP displayed a negative nexus. Both ADF test and DF-GLS were undertaken to assess for the unit root problem among all variables. These tests were used together for robustness where they displayed mixed outcome since CP, IR and ER indicated the existence of non-stationarity at levels and stationery when differenced once while CAPI was found to be stationery at levels.

ARDL Bounds test was also conducted to assess for cointegration and the findings revealed that the objectives were cointegrated thus, Vector Error Correction model was determined. The post-diagnostic estimations were performed and confirmed that OLS hypotheses and sufficiency of the established model. The VIF test for multicollinearity displayed absence of multicollinearity while in normality test, Jarque-Bera revealed a regular distribution of dataset. Breusch-Godfrey autocorrelation LM test was conducted to examine existence of autocorrelation, and it was found that there was no autocorrelation up to the fourth lag length specified. Breusch-pagan-Godfrey test for heteroscedasticity revealed the homoscedasticity.

Further, regression analysis was conducted to assess the change of explained variable in respect to change in explanatory variables. As per the outcome, CAPI and Interest Rate had escalating influence on economic growth rates whereas commodity price had decreasing effect on economic growth. The CUSUM test showed that all values lie within the given lower and upper boundaries at 5% significance level which confirmed that the model applied for regression analysis was highly firmly fixed. Below is an overview of the findings according to particular purpose.

5.2.1 Effect of Capital Inflow Shock on Economic Growth in Kenya

The primary target of this research was to determine the influence of capital inflow shock (CAPI) on Kenya's economic growth. Foreign direct investment inflow was presented to indicate CAPI. After correlation analysis, CAPI revealed a strong non-negative connection with economic growth. Results from regression model revealed that CAPI positively correlates with economic growth. Capital inflows boost economic levels in Kenya as confirmed with the direct, statistically significant R in the equation.

The result could be explained by the truth that foreign investments and pool of funds from

external trade boosts economic growth and open job opportunities resulting to development. According to the standard newspaper, pg18 (2023.06.28), the better way to achieve employment and economic growth in Kenya, is the government to promote FDI inflows. Consequently, increased foreign investment results to appreciation of local currency as foreigners invest in local assets, which increases the demand of converting into local currency. In addition, increased capital inflows, provides additional funds for investment in businesses as well as infrastructure. When capital inflow goes down, it can lead to devaluation and weakening of country's currency relative to other currencies, which greatly affects country's balance of trade and economic stability.

5.2.2 Effect of Commodity Price shock on Kenya's Growth of the Economy

The study's objective number two was to ascertain how commodity price shock (CP) affected Kenya's economy. Commodity price shock was quantified by the consumer price index. From the correlational analysis correlation coefficient of commodity price shock (CP) negative with a p-value was less than 5%. Regression analysis also confirms that commodity price shock decreases economic growth. This may be expounded by the fact that commodity prices significantly rise the vulnerability rate of developing countries due to high dependency rate to well off economies.

Increased commodity prices also reduce propensity investors to save as well as causing inflation pressures. The commodity prices through unaffordable raw materials also affect production sectors, and economic expansion projects which are significantly more successful in boosting growth directly. When prices of commodities go high, it leads to reduced consumer spending causing potential slowdown on economic growth. Rapid raise of general commodity prices can also lead to unstable global economy with some countries experiencing boom while others struggle with depression crises reducing economic growth.

Increased commodity prices also cause reduced competitiveness making it harder for business to compete due to high prices for inputs hence reduced investment, productivity and growth of the economy.

5.2.3 Effect of Interest Rate Shock on Economic Growth in Kenya

The third objective of this research was to examine the influence of interest rate shock on the Keny's economic growth. Lending rate was adopted to proxy interest rate shock. Findings from the correlational analysis shows that interest rate was statistically significant. While the probability value from correlational output was less than 5% significance level. From the findings in the regression model, interest rate increases the rates of extreme economic growth rates.

This coefficient displays a positive strong influence of interest rate shock on growth of economy. This means, *ceteris paribus*, raise in interest rate by 1% increases economic growth by 66.58% and vice versa. This may be because increased lending rate improves the strength of currency adding it value to foreign investors and also help in improving a nation's balance of trade, hence boosting economic growth. This favours foreign investor as they can earn more returns on their investments therefore increased investments and economic growth. High lending rates enables the central bank to lessen the rate of supplying money in the economy which can help in controlling inflation. Consequently, too low interest rates may cause devaluation of local currency which is risky to foreign investors and results to deficit balance of payments due to high importing rating lowering economic growth.

5.2.4 The Moderating Effect of Exchange Rates on the Relationship between Capital Inflow Shock, Commodity Price Shock, and Interest Rate Shock on Economic Growth

Finding out how exchange rates affect the relationship between capital inflow shock, commodity price shock and interest rate shock on growth of economy in Kenya was the final goal of this research. The findings revealed presence of significant mediating impact of exchange rates on the nexus between capital inflow shock and commodity price shock and economic growth. The addition of moderator in the model increased the coefficient of determination (R^2). This suggests that the inclusion of exchange rate as a moderator causes the explanatory variables to jointly explain the variation of explained variable by an increase of 0.3951%. P-value of F-statistics was less than 0.05 significance level, concluding that the moderator had a weak significant influence on economic growth.

5.3 Conclusions

Considering the results and discussions that preceded, it was concluded that, there is a connection between capital inflow shock, commodity price shock, interest rate shock and economic growth in Kenya. The outcome demonstrates that, along the period studied, all predictors denote a statistical relevance on the predicted variable. Based on the findings and discussions of empirical evidence, the conclusions for each research variable are as follows.

5.3.1 Effects of Capital Inflow Shock on Economic Growth

The null hypothesis of this study states that, capital inflow shock has no statistically significant influence on the growth of the economy in Kenya. From the preceding discussions, it can be concluded that capital inflow shock (CAPI) had a direct favorable and statistically significant impact on economic growth in Kenya. This clarifies that when

foreign direct investment inflows increase, it results to a rise in economic growth rate and vice versa. The researcher therefore accepted alternative hypothesis while null assumption was rejected.

5.3.2 Effects of Commodity Price Shock on Economic Growth

Under this objective, the assumption of a null hypothesis was that commodity price shock had no effect on growth of economy. The analysis of the quarterly secondary data for the consumer price index shows that when commodity price shock rises high, economic growth reduces. This is due to the negative association between commodity price shock and growth rate of the economy. When prices of general commodities reduce rapidly, it greatly encourages importing by challenging the producers and exporters in non-developed countries. Consequently, a rapid rise in general prices resultsto reduced profits due to reduced consumer spending, which increases inflation. To conclude,commodity price shock had a negative significant influence on economic growth in Kenya hence rejection of null hypothesis.

5.3.3 Effects of Interest Rate Shock on Economic Growth

Interest rate shock was measured by real lending rates which revealed a favorable relationship on economic growth in Kenya. This posits that when central bank increases lending rates high rate of borrowing is regulated which enables in controlling money supply, inflation pressures and risky-unhealthy borrowings hence promoting stability of financial institutions as well as the economy. High lending rates discourages investment on low return and more speculative projects. This promotes efficient investments and effective environment for economic growth. Banks also gain high profits due to increased lending rate facilitating economic growth. Therefore, it was concluded that interest rate shock has positive and favorable nexus on economic growth in Kenya and alternative

hypothesis was accepted.

5.3.4 Moderating Effects of Exchange Rate on the Relationship Between Capital Inflow Shock, Commodity Price Shock, Interest Rate Shock and Economic Growth in Kenya

The null hypothesis under this variable state that, exchange rate has no significant moderating effect on the relationship between CAPI, commodity price, interest rate and economic growth rate. However, both correlational analysis and regression model estimated, clarifies significant effect on the inclusion of exchange rate. Thus, the null hypothesis is untrue leading to acceptance of alternative hypothesis. Though exchangerate affected the model slightly hence the conclusion, the moderator had favorable effect on capital inflow shock, commodity price and interest rate shock hence slight impact on economic growth in Kenya.

5.4 Recommendations of the Study

From the findings, the following suggestions were made by this study.

5.4.1 Effect of Capital Inflow Shock on Economic Growth in Kenya

Findings demonstrated that capital inflow shock promotes economic growth since it was found to be statistically significant. According to the analysis, the government ought to adopt sound policies such as streamlined regulations that will spur more capital inflow through foreign investors into the Kenyan economy as it will provide resources vital for economic growth. The government must create an environment that would draw in international investors through initiatives like public-private partnerships (PPP), advantageous tax laws, and incentives to increase capital inflows if Kenya is to meet the goals of the millennium development plan.

The researcher also recommends that Kenya should retool the existing policies to favor foreign investors and mitigate so much dependency on external economies to reduce susceptibility to external shocks. Government is also recommended to enhance digital connectivity and energy systems to improve infrastructure which can attract investor and spur economic growth. Kenya can also consider investing in value-added processing, expanding into new markets, and enhancing product quality to attract more foreign buyers. Implementing targeted, temporary protectionist measures while pursuing trade liberalization and competitiveness enhancement is one balancing tactic that policymakers should take into consideration to strike a balance between advancing open and equitable trade and safeguarding homegrown industries.

5.4.2 Effect of Commodity Price Shock on Economic Growth in Kenya

Commodity price shock revealed a negative significant influence on economic growth in Kenya, therefore it is suggested that, the government should facilitate clustering of related industries as per different geographic regions so as to achieve economic scale, synergies, and a conducive ecosystem for growth and innovation. Similarly, specialization within these clustered industries will create resilience and competitiveness enhancing domestic industries to collectively mitigate risks associated with external trade shocks.

Based on the finding the CBK should adopt monetary policies that will check the commodity prices in Kenya. This is because, low commodity price shock will improve the stability of the economy by lowering inflation which in turn leads to increased consumer spending that increases the aggregate demand for goods and services in the economy. Researcher also suggests that the government of Kenya should reviving and establishing local industries to avoid over reliance on external economies which are victims of escalating prices.

The government could incentivize collaboration and partnerships between local industries to enhance efficiency, promote innovation, and strengthen supply chains. Businesses can better navigate challenges and capitalize on opportunities in the domestic market, by encouraging industries to work together, share resources, and exchange knowledge, on economic growth in Kenya. The CBK can work with fiscal authorities such as parliamentary committees to guarantee a well-coordinated strategy for controlling inflation. This could entail coordinating monetary policy with the goals of fiscal policy, which include preserving fiscal restraint, cutting budget deficits, and putting supply-side reforms into place to boost competitiveness and productivity in important sectors.

5.4.3 Effect of Interest Rate Shock on Economic Growth in Kenya

Results show that interest rate shocks have a favourable and considerable influence on Kenya's economic growth. The study therefore suggests that Central Banks should strengthen monetary policy framework by assessing and monitoring the implication of interest rate shock to economic growth. Specifically, Central Bank of Kenya by maintaining a sound monetary policy rate (MPR) framework can respond proactively to ever-changing economic conditions, ensuring that interest rate adjustments are well-calibrated to support sustainable growth while controlling the inflation rate. The Kenyan government ought to concentrate on implementing policies that enhance transparency, impose the rule of law, achieve political stability, and combat corruption to instil confidence to investors and encourage long-term economic development. Taking advantage of the positive impact of interest rate shocks on economic growth, policymakers in Kenya should support export-oriented industries through trade promotion programs, and targeted incentives.

In addition, the government and policymakers can make efforts to improve healthy competitiveness of domestic industries in international markets which can strengthen the

Kenyan Shilling, hence boosting growth. Considering the circumstances of post COVID-19 pandemic, government of Kenya should enhance international cooperation which is vital for economic recovery through collaboration, bilateral partners, and multilateral institutions to access financial assistance, technology transfer and knowledge sharing hence enhancing implementation of effective policies and promotion of sustainable economic growth.

5.4.4 Moderating Effect of Exchange Rate Capital Inflow Shock, Commodity Prices Shock, and Interest Rate on Economic Growth in Kenya

Currency exchange rate was found to have a positive statistically mediating influence on the nexus between external trade shock and economic growth in Kenya. This research advises that Central Bank of Kenya to adopt monetary mechanism that will ensure a stable value of the Kenyan Shilling to improve overall economic expansion and reduce inflation. The study recommends that the government should insist on achieving competitive policies on trade and foreign exchange in order to pursue a more effective economic growth. According to Bräuer, L., & Hau, H. (2022), use of currency hedging instruments by businesses engaged in international trade reduces exchange rate risks. The government of Kenya needs to promote the adoption of currency hedging tools by companies that trade internationally as well offer guidance and instruction on how to use forward contracts, options, and futures as effective hedges against exchange rate risk.

5.5 Areas for Further Studies

This research looked at how foreign trade shocks affected Kenya's economic growth. Since this research only focused in one country, a cross-sectional analysis using panel data from other countries, particularly developing countries, could provide deeper insights into the influence of external trade shocks on growth of an economy and provide more concrete

conclusion. The current study focused mainly on capital inflow shock, commodity price shock and interest rate shock as key factors of external trade shocks. Upcoming researchers can focus on other elements of external trade shocks such as external debt shock, and technological shock.

A similar study can be conducted using different proxy measures on the variables to expand the knowledge and compare the results for more concrete conclusion and recommendation policies in African nations. Upcoming studies can also focus on causes of external trade shocks especially on countries that highly depend on external economies for stability to create more awareness concerning external shocks and their effects on dependent nation. Research can also be conducted on internal macroeconomic shocks such corruption shock, unemployment shock, distribution networks and Political shock to expound the knowledge and determine how they affect economic growth on third world nations.

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APPENDICES

APPENDIX I: Data

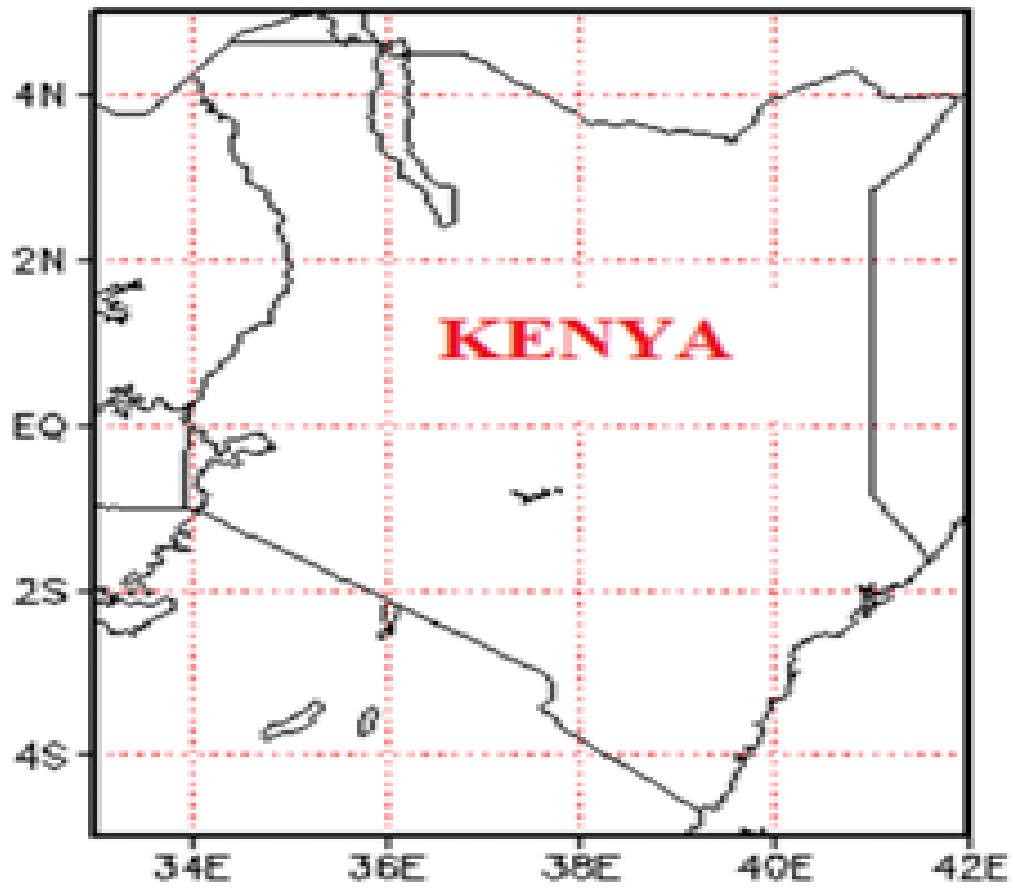
year	EC	CAPI	CP	IR	ER
2008Q1	1.1	0.1254666	44.53	2.2	67.82
Q2	2.2	0.262927	47.06	2	62.82
Q3	2.5	0.26442	47.89	2.4	68.77
Q4	3.3	0.271164	49.23	2.4	77.48
2009Q1	6.4	2.6745367	50.83	4	79.56
Q2	2.1	0.24974863	52.06	3.8	78.4
Q3	1.9	0.146724	52.56	3.3	76.09
Q4	2.5	0.350176	53.16	3.3	75.15
2010Q1	4.8	0.146724	53.64	3.9	76.48
Q2	6.1	2.43562789	53.96	3.7	78.66
Q3	7.2	2.978465	54.31	3.2	80.76
Q4	6.5	2.73755207	55.2	3.1	80.52
2011Q1	5.1	2.6745367	57.42	3.3	82.24
Q2	3.5	2.945673	61.07	3.2	86.12
Q3	4	3.167489	63.28	3	93.02
Q4	3.2	3.45649583	65.79	2.9	93.86
2012Q1	3.5	3.14536	67.1	2.7	84.14
Q2	3.3	2.978465	68.16	2.4	84.12
Q3	4.7	2.46478	67.13	2.4	84.28
Q4	5.5	2.73755207	68.11	2.4	85.58
2013Q1	6.1	2.13678	69.84	4.4	86.72

Q2	4.3	2.13678	71.24	4.4	84.61
Q3	4.4	1.89745	72.02	4.3	87.25
Q4	4.8	2.030853	73.17	4.5	85.91
2014Q1	5.2	1.89845	74.57	5.8	86.36
Q2	6	1.938734	76.25	5.9	87.25
Q3	4.6	1.43567835	77.44	5.7	88.24
Q4	5	1.33593816	77.69	5.8	89.88
2015Q1	5.8	1.278645	78.9	6.1	91.53
Q2	5.6	1.145367	81.58	6.2	94.51
Q3	6.1	2.030853	82.2	6.3	102.97
Q4	5.8	0.95605671	83.4	6.5	102.38
2016Q1	5.3	0.88354678	91.92	5.6	101.91
Q2	6.2	2.46478	95.22	5.6	101.04
Q3	5.2	1.034567	93.98	5.7	101.34
Q4	4.9	0.98107096	93.24	5.8	101.73
2017Q1	4.7	1.1784456	96.05	5.2	103.4
Q2	4.5	1.34567	99.01	5.2	103.25
Q3	4.5	1.556789	98.39	5.2	103.1
Q4	4.7	1.60314043	98.47	5.3	103.33
2018Q1	5.2	1.74567	96.05	5.6	101
Q2	6.1	1.99678	99.01	5.8	100.8
Q3	5.3	1.99678	98.39	5.9	100.55
Q4	5	1.85214778	98.47	5.9	101.6
2019Q1	4.8	1.7362789	100.24	4.8	100.95
Q2	6	1.89845	102.99	4.7	101.23

Q3	5	1.48973378	104.02	4.8	103.38
Q4	4.2	1.3947644	105.21	4.8	102.52
2020Q1	4.4	1.14567	107.05	4.1	101.06
Q2	1.3	0.135989619	108.45	4	106.45
Q3	1	0.1200556	108.5	4.2	107.4
Q4	2.1	0.262927	110.75	4.2	109.49
2021Q1	2.7	0.55174426	113.25	4	109.35
Q2	11	3.45649583	114.95	4.1	107.76
Q3	9.3	3.167489	115.74	4	109.18
Q4	7.4	3.14536	117.39	6.7	111.9
2022Q1	6.8	2.945673	119.29	7	113.79
Q2	5.2	0.1254666	123.16	7.3	116.32
Q3	4.7	0.1200556	125.79	7.75	119.4
Q4	4	0.313201	128.39	8.85	121.95

Source: Field Data, (2023)

APPENDIX II. Map of Kenya Showing the Longitude and Latitude



Source: KNBS, (2022)

APPENDIX III. Vector Error Correction Summary Output

Table 4. 15: Vector Error Correction Output

Vector Error Correction Estimates				
Standard errors in () t-statistics in []				
Cointegrating Eq:	CointEq1			
LNEC (-1)	1.000000			
LNCAP(-1)	-0.543315			
	(1.14137)			
	[-3.84331]			
LNCP(-1)	-1.193044			
	(0.49262)			
	[-2.42186]			
LNIR(-1)	0.440541			
	(1.49262)			
	[-3.95866]			
C	-9.394313			
Error Correction:	D(LNEC)	D(LNCAP)	D(LNCP)	D(LNIR)
CointEq1	-0.179322	0.438714	0.018909	-0.100356
	(0.03213)	(0.22507)	(0.02743)	(0.04408)
	[-2.60029]	[1.94920]	[1.19873]	[-2.27674]
D(LNEC(-1))	-0.240278	-0.232725	0.011045	0.173432
	(0.21414)	(0.38178)	(0.01261)	(0.07477)
	[-1.072021]	[-0.464021]	[0.18293]	[2.31961]

D(LNEC(-2))	-0.395022	-0.174422	-0.016906	0.322276
	(0.22068)	(0.37590)	(0.01241)	(0.07362)
	[-0.88371]	[-0.46402]	[-1.29224]	[4.37779]
D(LNEC(-3))	-0.244629	-0.041170	-0.119052	0.113929
	(0.26213)	(0.44649)	(0.10474)	(0.08744)
	[0.93323]	[-0.09221]	[-1.29224]	[1.30290]
D(LNEC(-4))	0.619427	-1.586924	-0.905250	0.205983
	(0.30641)	(0.40099)	(0.41324)	(0.07853)
	[-2.63149]	[-3.95751]	[-0.39664]	[2.62296]
D(CAPI(-1))	0.145223	0.073843	0.006819	-0.105277
	(0.02886)	(0.17447)	(0.00587)	(0.03482)
	[4.41779]	[1.42324]	[1.16143]	[-3.24771]
D(CAPI(-2))	0.053126	-0.002560	0.011765	-0.058145
	(0.00438)	(0.17780)	(0.03725)	(0.04299)
	[2.50895]	[-0.01440]	[1.62320]	[-1.35262]
D(LNCAPI(-3))	0.045363	0.157760	0.011765	-0.058145
	(0.02886)	(0.21950)	(0.00725)	(0.04299)
	[3.35202]	[2.71873]	[1.62320]	[-1.35262]
D(LNCAPI(-4))	0.018243	-0.036667	0.008137	0.030100
	(0.01086)	(0.18884)	(0.00624)	(0.03698)
	[3.16456]	[-0.19417]	[1.30500]	[-0.81389]
D(LNCP(-1))	-2.133001	3.086126	0.228391	0.042350

	(0.00633)	(0.09563)	(0.15346)	(0.92954)
	[-2.76545]	[0.74089]	[1.45726]	[0.04558]
D(LNCP(-2))	-4.214105	-4.704717	-0.52377	-0.186379
	(0.00633)	(0.95042)	(0.16346)	(0.97441)
	[-3.44997]	[-1.75838]	[-0.93218]	[-0.24667]
D(LNCP(-3))	0.390922	0.315662	-0.079560	-0.186379
	(0.02106)	(0.95042)	(0.16426)	(0.97441)
	[2.13383]	[-1.75838]	[-0.48426]	[-0.19127]
D(LNCP(-4))	-0.802079	-3.650783	0.085920	-0.070764
	(0.03559)	(0.79513)	(0.15161)	(0.89920)
	[-3.29755]	[-1.79513]	[0.56671]	[-0.07870]
D(LNIR(-1))	-0.294866	-0.805790	0.009536	-0.033850
	(0.03698)	(0.63004)	(0.02080)	(0.12333)
	[-3.79717]	[-1.27894]	[0.45839]	[-0.27434]
D(LNIR(-2))	0.355770	-0.499563	0.012618	-0.265910
	(0.00774)	(0.64297)	(0.02123)	(0.12692)
	[-2.94249]	[-0.77712]	[0.59430]	[-2.11174]
D(LNIR(-3))	0.287018	-0.366201	-0.017166	-0.003380
	(0.03668)	(0.62494)	(0.02064)	(0.12239)
	[2.78228]	[-0.58598]	[0.83185]	[-0.02761]
D(LNIR(-4))	0.496256	0.053894	-0.00173	0.200765
	(0.00687)	(0.62803)	(0.02074)	(0.12239)
	[3.34592]	[-0.58598]	[-0.08345]	[1.63231]

C	0.152409	0.090045	0.026629	0.014637
	(0.04279)	(0.07288)	(0.00241)	(0.01427)
	[2.22490]	[1.23555]	[-2.75478]	[0.32486]

R-squared	0.499120	0.675818	0.377994	0.530546
Adj. R-squared	0.391376	0.526869	0.270859	0.466472
Sum sq. residuals	0.810594	2.351771	0.042564	0.190200
S.E. equation	0.148013	0.252114	0.018325	1.095690
F-statistic	1.438803	9.537254	0.796824	2.043219

Source: (Field Data, 2023)

APPENDIX IV: Approval Letter



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

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Kenya

Directorate of Postgraduate Studies

Ref: MMU/COR: 509099

20th February 2023

Kilaku Faith Wanja
ECO/G/01-70218/2021,
P.O. Box 190-50100,
KAKAMEGA.

Dear, Ms. Wanja,

RE: APPROVAL OF PROPOSAL

I am pleased to inform you that the Directorate of Postgraduate Studies has considered and approved your Masters proposal entitled '*Effect of External Trade Shocks on Economic Growth in Kenya*' and appointed the following as supervisors:

1. Prof. John Byaruhanga - SOBE, MMUST
2. Dr Umulkher Ali - SOBE, MMUST

You are required to submit through your supervisor(s) progress reports every three months to the Director Postgraduate Studies. Such reports should be copied to the following: Chairman, School of Business and Economics Graduate Studies Committee and Chairperson, Economics Department. Kindly adhere to research ethics consideration in conducting research.

It is the policy and regulations of the University that you observe a deadline of two years from the date of registration to complete your Master's thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.


We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours Sincerely,

Prof. Stephen O. Odebero, PhD, FIEEP
DIRECTOR, DIRECTORATE OF POSTGRADUATE STUDIES

APPENDIX V: NACOSTI Letter

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REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

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