MACROECONOMIC DRIVERS, GOVERNMENT EFFECTIVENESS AND HORTICULTURAL EXPORT PERFORMANCE IN KENYA

BY

JONATHAN LEMURT

A RESEARCH THESIS SUBMITTED TO THE SCHOOL OF BUSINESS AND ECONOMICS, DEPARTMENT OF ECONOMICS IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN ECONOMICS

2023

DECLARATION

Declaration by Student

I hereby declare that this is my original work, and has not been presented to any other university for the award of any degree. All sources used in the study have been acknowledged for the ideas borrowed from other scholars and authors in its compilation.

Signature…… Date……

Lemurt Jonathan

SBE/PGE/16/12

Declaration by Supervisors

This research thesis has been submitted for examination with our approval as the university supervisors.

Signature : …… Date : ……

Dr. Elvis Kiano

Department of Economics

School of Business and Economics,

Moi University

Signature : …… Date : ……

Dr. Thomas Agak

Department of Economics

School of Business and Economics

Moi University

DEDICATION

I dedicate this research to my father Mr. Pore Lemurt and my mother Mrs. Komeyian Lemurt whose invaluable support and encouragement have been a constant source of strength and inspiration. To my lovely wife Janet Naisiae, my son Tillerson Tipatet, my daughter Lenah Tinaipei and all my family members, your unwavering belief in me has been my motivation. I also extend my heartfelt gratitude to my colleagues at the Parliamentary Budget Office, Kenya, for their continuous support and collaboration.

ACKNOWLEDGEMENT

Special appreciations are to my academic supervisors; Dr. Elvis Kiano, and Dr. Thomas Agak. Special thanks also go to my Lecturers during the coursework series from which I received a great deal of knowledge that helped me to learn how to synthesise the real world. I am a better person because of their efforts.

In a special way, I delightfully appreciate the moral, academic, and financial support rendered by my family affiliates and my wife. I acknowledge the high-level academic advice that was provided to me from time to time by all my mentors in my academic journey.

I also thank my classmates for their assistance in making my master's experience a worthwhile journey. May the Almighty God bless them all inexhaustibly.

ABSTRACT

Horticultural exports, alongside tea and coffee, are major contributors to Kenya's agricultural sector, driving economic growth and stability. The Kenyan horticultural sector in 2022 faced some challenges but still played a significant role in the economy. Export value of horticultural products dipped slightly compared to 2021, with Kenya earning roughly 152.3 billion Kenyan shillings, which translates to around 1 billion US dollars, from fresh produce exports. The general objective of this study was to assess the effect of macroeconomic drivers and the moderating role of government effectiveness on Kenya's horticultural export performance. The study was guided by the following specific objectives; To assess the effect of terms of trade on horticultural export performance in Kenya; to investigate the effect of interest rates on horticultural export performance in Kenya; to investigate the effect of inflation on horticultural export performance in Kenya, to determine the effect of Exchange rate on horticultural export performance in Kenya and lastly to investigate the moderating role of government effectiveness on the relation between exchange rates, terms of trade, inflation, interest rates and horticultural performance in Kenya. The study utilized annual secondary time series data obtained from Kenya National Bureau of Statistics and the World Bank governance indicator spanning the period 1990 to 2021. Comparative advantage theory is the theory that underpinned this study. The Vector Error Correction model was used to test for cointegration and to determine short run and long run relationship with respect to each of the variables in this study. Data was analyzed using STATA software version 14. The findings from this study indicated that exchange rate ($\beta_1 = -.487$, p<0.05), inflation rate had a negative significant relationship with horticultural export performance while interest rate ($\beta_3 = .441$, p<0.05) and terms of trade ($\beta_4 = 1.024$, p<0.05) had a positive significant relationship with horticultural export performance. Government effectiveness had an enhancing moderating relationship between exchange rate (β= 0.630, p<0.05), inflation (β= 1.131, p<0.05) and interest rate (β= $.112p < 0.05$) and horticultural export performance. Further, it had a buffering moderating effect on the relationship between terms of trade (β= $-.719$, p<0.05) and horticultural export performance. The study concludes that there is significant relationship between exchange rate, inflation rate, interest rate and terms of trade and horticultural export performance since the null hypothesis formulated in the study were rejected. The study's conclusions have implications for policy makers and regulators. First, the study recommends that there should be sound and solid macroeconomic policies in place that do not dislodge macroeconomic variables. These include effective fiscal and monetary policies and come up with export promotion and import substitution policies that could see more producers producing more horticultural products for exports and source for new markets for local horticultural products and elimination of tariffs and quotas for local producers that are involved in production of horticultural products. Additionally, the government may promote government effectiveness by promoting inclusive political and economic institutions. Finally, future research should consider doing a comprehensive analysis by expanding the scope to other countries such countries in East Africa or Sub-Saharan Africa.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

AOA -	Agreement on Agriculture
ARDL-	Autoregressive Distributed Lag
CAP –	Common Agricultural Policy
E.C. –	European Commission
E.U. –	European Union
EAC –	East African Community
FDI –	Foreign Direct Investment
FEPA -	Framework Economic Partnership Agreement
GDP –	Gross Domestic Product
GDP-	Gross Domestic Product
GEMS –	Growth Enterprise Market Segment
HCDA-	Horticultural Crop Development Authority
HCU-	Horticultural Co-operative Union
IMF –	International Monetary Fund
IPO –	Initial Public Offer
KHDP-	Kenya Horticultural Development Program
KHEA-	Kenya Horticultural Export Authority
KIPPRA –	Kenya Institute for Public Policy Research and Analysis
KNBS –	Kenya National Bureau of Statistics

KRA –	Kenya Revenue Authority
NGO –	Non-Governmental Organizations
OECD –	Organization for Economic Co-operation and Development
PPP-	Purchasing Power Parity
UK –	United Kingdom
UNCTAD –	United Nations Conference on Trade and Development
UNDP –	United Nations Development Program
USA-	United States of America
WTO -	World Trade Organization

OPERATION DEFINATION OF TERMS

Exchange rate: refers to the degree of variation or fluctuation in the value of one currency in relation to another over a specific period of time (Ikechi & Nwadiubu, 2020).

Inflation: is a sustained increase in the general price level of goods and services in an economy over a period of time, leading to a decrease in the purchasing power of a currency (Musa, 2021).

Interest rate: is the cost of borrowing money or the return on investment for lending money, expressed as a percentage of the principal amount (Eisenshmidt & Smets, 2019).

Terms of Trade: refer to the relative value or ratio at which a country can exchange its exports for imports with other nations (Gruss & Kebhaj, 2019).

Government effectiveness: refers to the ability of a government to efficiently and competently implement and deliver public policies, services, and goods to its citizens. It encompasses the government's capacity to formulate and execute policies, enforce laws, and provide public services in a manner that meets the needs of the population and contributes to the overall well-being of the society (Marks-Bielska et al., 2020).

Horticultural export performance: refers to the evaluation and measurement of the outcomes and efficiency of a country's or region's horticultural (horticulture-related) products in international trade (Clarke, 2023).

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter presents the background of the study, statement of the problem, the study objectives, hypotheses of the study, justification and limitations of the study.

1.1 Background of the Study

1.1.1 Overview of Agricultural Sector in Kenya

Agriculture is a critical sector of the Kenyan economy since it provides employment, a source of food, a source of foreign exchange earnings, and links to other sectors of the economy (Salami & Arawomo, 2013). Agriculture remains the backbone of the Kenyan economy, contributing one-third of GDP (Nyoro, 2019). Statistics show that 75% of Kenya's population is employed in the agricultural sector, including livestock and pastoral activities (KNBS, 2020). The agricultural sector, mainly made up of horticulture, is the backbone of Kenya's exports, which plays a major role in economic growth. Activities in export act as a catalyst of growth in various ways, with demand linkages, production, increased effectiveness, economies of scale because of great markets internationally, embracing of improved technologies epitomized in capital goods produced internationally, effects in learning and betterment of human resources, increased productivity through specialization and employment creation (Ndungwa, 2013).

Agriculture was devolved to county governments with the adoption n of the new constitution in 2010 (Mwenda, 2010). Kenya's currency was relatively stable during this period when compared to its major trading currencies (Asongu, Folarin, & Biekpe, 2020). Agricultural and horticultural export activities stimulate improvement in numerous ways including demand linkages and production, embracement of superior

technologies incorporated in goods produced internationally, all have significant effects in learning and improvements of human resources, creation of employment and productivity increase through specialization (Tessema & Alemayehu, 2010).

The performance of the agricultural sector directly reflects that of the overall economy Awokuse (2009). A decrease in agricultural production in Kenya implies a decrease in overall economic growth, and vice versa (Michler & Josephson, 2017). Since 2007, the agricultural sector's performance has been steadily declining, culminating in a negative growth rate in agricultural production and, as a result, a decrease in horticultural exports and performance.

1.1.2 Horticultural Subsector and the Kenyan Economy

The leading agricultural subsectors in 2020, according to the Kenya Economic Survey 2020, were Dairy, Horticulture, and Tea, in that order. Horticultural exports are one of Kenya's most important economic drivers, contributing significantly to the GDP and directly and indirectly employing more than six million Kenyans (Nzomoi, Mutua, Kiprop & Kathambi, 2022). The sector also provides raw materials to the manufacturing sector and has higher farm profitability due to increased production and foreign exchange earnings (Sindi, 2008). Furthermore, the sector provides numerous opportunities in international, regional, and domestic markets. Together with tea and tourism, the horticulture sector has become one of the most important foreign exchange earners for the Kenyan economy (KNBS 2017). Furthermore, the sector provides much-needed employment and income to a large number of Kenyans.

Horticultural production in Kenya dates back to the early 20th century, with the cultivation of coffee, tea, and pyrethrum (Dijkstra, 1997). In the 1960s, the country began exploring the export potential of fresh flowers, initially focusing on carnations

(Whitaker & Kolavalli, 2006). This marked the beginning of Kenya's involvement in the global cut flower market. In the 1970s, the flower industry experienced significant growth, with the introduction of new flower varieties and improved production techniques (Weiss, 2002). The favorable climate and fertile soils in areas like Naivasha, Thika, and Nairobi contributed to the sector's expansion (Chege, 2015). Roses emerged as a dominant flower crop, and Kenya became a key player in the global flower market (Adeola, Meru & Kinoti, 2018). In the 1980s and 1990s, the horticultural sector in Kenya diversified, with the introduction of new crops such as French beans, snow peas, mangoes, avocados, and passion fruits. This expansion was driven by market demand, favorable agro-ecological conditions, and efforts to reduce overreliance on specific crops (Raikes and Gibbon, 2000).

During the 1990s and early 2000s, Kenya focused on improving market access and compliance with international quality standards. The country worked to meet the requirements of importing countries, particularly in Europe, and obtained various certifications such as GlobalGAP (Good Agricultural Practices) and Fairtrade (Jaffee & Henson, 2004). In recent years, there has been a growing emphasis on sustainable horticulture practices, including organic farming, water conservation, and waste management. Efforts have also been made to promote value addition and agro-processing within the sector, aiming to reduce post-harvest losses, increase product shelf life, and enhance market competitiveness (WTO, 2020).

The leading agricultural subsectors in 2020, according to the Kenya Economic Survey 2020, were Dairy, Horticulture, and Tea, in that order. Horticultural exports are one of Kenya's most important economic drivers, contributing significantly to the GDP and directly and indirectly employing more than six million Kenyans. The sector also

provides raw materials to the manufacturing sector and has higher farm profitability due to increased production and foreign exchange earnings. Furthermore, the sector provides numerous opportunities in international, regional, and domestic markets. Together with tea and tourism, the horticulture sector has become one of the most important foreign exchange earners for the Kenyan economy (KNBS 2017). Furthermore, the sector provides much-needed employment and income to a large number of Kenyans.

Kenya's horticultural export sector began to develop in the 1960s with a focus on cut flowers, primarily carnations (Nyangweso & Odhiambo, 2004). The country's favorable climate and suitable agro-ecological conditions in regions like Naivasha and Thika played a crucial role in the sector's early growth (KNBS 2021). The industry saw the introduction of new flower varieties and improved production techniques (UNIDO, 2015). According to the Kenya Flower Council report, Kenya's horticultural sector diversified in the 1980s and 1990s, with the introduction of new crops such as French beans, snow peas, mangoes, avocados, and passion fruits. This diversification aimed to reduce reliance on specific crops and cater to market demand. Kenya later focused on improving market access and complying with international quality standards to meet the requirements of importing countries. The country obtained certifications such as Global GAP and Fairtrade to enhance market competitiveness (World Bank, 2021). There has been an increased emphasis on sustainable practices in the horticultural sector. Efforts have been made to promote organic farming, water conservation, waste management, and sustainable packaging. Value addition and agro-processing have also gained importance to reduce post-harvest losses and increase product value (Ministry of Agriculture Report, 2019).

Kenyan agricultural productivity has remained low over the last few decades, with the horticulture sector providing the only economic dynamism (World Bank, 2018). Horticultural dynamism is the result of agricultural reforms implemented in the 1980s to accelerate growth and development through private sector and market-driven export of non-traditional crops (Gertz, 2007; Tyce, 2020). The reforms aimed to increase productivity by integrating smallholder farmers into export markets and to create jobs. Vegetables, fruits, and flowers are the most important horticultural exports, with small-holder farmers accounting for 70-80% of total export value for vegetable and fruit exports, compared to only 5% for flower exports (Heher & Steenbergen, 2021). Job creation is estimated to supply over 350,000 jobs directly and supports over 6 million people in the different stages of the supply chain (KNBS, 2020)

According to Bulgari *et al.* (2021), Kenya is known for exporting various horticultural products, including cut flowers, fruits, vegetables, and herbs. The horticulture industry has experienced substantial growth in recent years. According to the Kenya National Bureau of Statistics (KNBS, 2020), the value of horticultural exports increased from Ksh 115 billion (approximately USD 1.05 billion) in 2015 to Ksh 153 billion (approximately USD 1.39 billion) in 2019. This growth has been primarily driven by increased demand for Kenyan horticultural products in both traditional markets, such as Europe, and emerging markets, including Asia and the Middle East. The cut flower industry is a key component of Kenya's horticulture sector. Kenya is one of the largest exporters of cut flowers globally. The Kenya Flower Council reports that the country accounts for about 38% of the European Union's flower imports. The export value of cut flowers alone reached Ksh 113 billion (approximately USD 1.03 billion) in 2019. Moreover, the fruit and vegetable sub-sector has also experienced significant growth.

The Kenya Horticultural Council indicates that the export value of fruits and vegetables increased from Ksh 13.3 billion (approximately USD 121 million) in 2015 to Ksh 25.4 billion (approximately USD 231 million) in 2019. The horticulture industry has played a vital role in Kenya's economic development by creating employment opportunities, particularly in rural areas. According to the KNBS, the sector provided employment to over 500,000 people directly in 2019 and an estimated 2 million people indirectly.

1.1.3 Exchange rates and Horticultural Export Performance

Exchange rates are important determinants of horticultural export performance in Kenya because they have a direct impact on exporters' competitiveness, profitability, and market dynamics. The value of one currency in relation to another is referred to as its exchange rate. Exchange rate fluctuations can have both positive and negative effects on horticultural export performance (Samoei & Kipchoge, 2021). A depreciation of the domestic currency (a weaker exchange rate) can increase the competitiveness of horticultural exports in international markets. It reduces export prices in foreign currency terms, potentially increasing demand and export volumes (IMF, 2020). A stronger exchange rate, on the other hand, can make horticultural exports relatively more expensive, potentially reducing competitiveness and export volumes. To mitigate exchange rate risks, exporters must closely monitor and manage exchange rate risks and to mitigate potential negative impacts (IMF, 2018).

1.1.4 Interest rates and Horticultural Export Performance

Interest rates influence the cost of borrowing and investment decisions, which can have an indirect impact on horticultural export performance. Higher interest rates may raise the cost of financing for exporters, limiting their ability to invest in production expansion, technological upgrades, and market development. This has the potential to

limit export growth and competitiveness. Lower interest rates, on the other hand, can stimulate investment and support export-oriented activities, facilitating growth and improving export performance (Manova et al., 2018). Affordable financing options and favorable lending conditions can encourage exporters to invest in quality improvement, value addition, and market diversification, ultimately increasing their competitiveness and export potential. It is important to remember that exchange rates and interest rates are influenced by a variety of factors such as macroeconomic conditions, monetary policy decisions, and global market dynamics. Regular monitoring and analysis of these factors is required for horticultural exporters to make informed decisions and develop effective strategies (African Development Bank, 2014).

1.1.5 Terms of Trade and Horticultural Export Performance

The terms of trade equally play a significant role in shaping the horticultural export performance of a country, including Kenya. The terms of trade refer to the ratio at which a country can exchange its exports for imports. When the terms of trade are favorable, it means that a country can obtain a greater quantity of imports for a given quantity of exports, indicating a positive impact on the export sector (Sarris, 2000).

Favorable terms of trade can have several effects on horticultural exports in Kenya. Firstly, they can lead to increased export revenues and foreign exchange earnings for the country. This, in turn, can support economic growth and development by providing resources for investment in infrastructure, technology, and capacity building within the horticultural sector. Secondly, favorable terms of trade can incentivize producers and exporters to expand horticultural production and invest in improving the quality and competitiveness of their products. With higher export revenues, businesses can allocate resources towards research and development, adopting new technologies, and

implementing best practices, ultimately enhancing their export performance. Additionally, favorable terms of trade can stimulate investments in value-added activities within the horticultural sector. This includes activities such as processing, packaging, and branding, which can increase the value and marketability of horticultural products. Value addition not only contributes to higher export earnings but also creates employment opportunities and promotes economic diversification (World Bank, 2019).

It is important to note that the terms of trade are influenced by various factors, including global market conditions, exchange rates, tariffs, and non-tariff barriers. Fluctuations in these factors can impact the profitability and competitiveness of horticultural exports. Therefore, it is crucial for the government and industry stakeholders to closely monitor and analyze the terms of trade to make informed decisions regarding market strategies, pricing, and trade policies (IMF, 2018).

1.1.6 Inflation and Horticultural Export Performance

According to Ulimwengu and Wouters (2016), inflation play a crucial role in shaping the horticultural export performance in Kenya. Fluctuations in inflation can have direct and indirect effects on export performance. Inflation directly influence the competitiveness of horticultural exports. Lower inflation can make Kenyan horticultural products more attractive to international buyers by offering competitive pricing compared to other exporting countries. This can increase the demand for Kenyan exports and potentially lead to higher export volumes. Conversely, higher inflation may make Kenyan horticultural products relatively more expensive compared to competitors, potentially reducing their competitiveness and export volumes (Omiti *et al.*,2009).

Maintaining price competitiveness is crucial for horticultural exporters to attract buyers and expand market share. Strategies such as efficient production processes, cost optimization, and economies of scale can help manage inflation and enhance export performance. Inflation of inputs, such as labor, fertilizers, pesticides, and energy, can also influence horticultural export performance indirectly. Fluctuations in input costs can impact the production costs for exporters. Higher input costs can reduce profit margins and potentially affect the competitiveness of horticultural exports (World Bank, 2020). According to WTO (2020), Government policies, subsidies, and incentives that support affordable and accessible inputs can help mitigate cost pressures and improve the competitiveness of horticultural exports. Efficient resource management, innovation in production techniques, and access to affordable inputs are essential for horticultural exporters to maintain competitiveness and achieve sustainable export performance.

1.1.7 Government effectiveness and Horticultural Export Performance

Government effectiveness plays a crucial role in shaping the horticultural export performance in Kenya. Through various measures, policies, and initiatives, the government can significantly influence the growth, competitiveness, and sustainability of the horticultural sector. Several key aspects highlight the role of government effectiveness in this regard. According to the World Bank (2016), the government's policy framework and regulation are instrumental in creating an enabling environment for horticultural exports. Clear and supportive policies provide stability and predictability for market participants, while effective regulation ensures compliance with quality standards, phytosanitary requirements, and market access conditions.

These measures enhance the confidence of international buyers and facilitate smooth trade transactions.

Kenya's Ministry of Foreign Report (2021) also indicates that government's efforts in market access and trade promotion are vital for expanding export opportunities. Through trade agreements, negotiations, and diplomatic efforts, the government can reduce tariffs, address non-tariff barriers, and foster strong trade relations with importing countries. By actively promoting horticultural exports through trade missions, exhibitions, and marketing campaigns, the government can help raise the profile of Kenyan produce in global markets and attract potential buyers. Infrastructure development on the other hand is another crucial aspect influenced by government effectiveness. Adequate transportation networks, cold storage facilities, and logistics systems are essential for ensuring the timely and efficient movement of horticultural products from farms to export markets (KNBS, 2021). By investing in infrastructure, the government can reduce post-harvest losses, maintain product quality, and enhance the competitiveness of Kenyan exporters.

Moreover, the government plays a critical role in capacity building and technical support. By providing training programs, extension services, and access to information and innovation, the government can enhance the skills and knowledge of horticultural stakeholders (Kenya's Ministry of Agriculture, 2020). This supports the adoption of best practices, sustainable production methods, and compliance with market requirements, ultimately improving productivity and quality. Further, according to UNIDO (2015), financial support and incentives from the government are also significant in driving horticultural export performance. Access to affordable credit, insurance schemes, and investment incentives encourages investment, innovation, and

expansion in the sector. These measures particularly benefit smallholder farmers and export-oriented enterprises, enabling them to overcome financial constraints and scale up their operations.

From the forgoing discussions, it is clear that the government's effectiveness in horticultural export performance in Kenya is multifaceted. The government can significantly contribute to the growth and competitiveness of the horticultural sector by creating a favorable policy environment, facilitating market access, investing in infrastructure, providing capacity building assistance, and providing financial incentives.

Further, despite the fact that Kenya's horticulture sector brought in KSh154 billion in 2021, with flowers alone bringing in KSh110 billion, there has been a number of challenges. The flower exporters for instance have complained that rising taxes and charges, logistical difficulties, and additional operational costs have drained the gains they would have made from high sales after exporting to foreign markets as a result of the dollar's strengthening against the Kenyan shilling. Their main gripe is a recent increase in water charges from KSh0.5 to between KSh2 and KSh6 for irrigation and commercial use, as well as an increase in employers' National Social Security Fund (NSSF) contributions from KSh200 to KSh.1, 080. These increases, therefore, compounds the existing situation in the sub-sector since energy cost have also recently been increased. Against this backdrop, the adoption of government effectiveness as an additional variable; moderator for better study results and reasonable policies to improve horticultural export performance in Kenya was considered in this study.

1.2 Problem Statement

Horticulture in Kenya is one of the main foreign exchange earners providing livelihood to millions of citizens either directly or indirectly hence accounting for a great portion of countries GDP (Ngutu, 2018). Horticultural exports, alongside tea and coffee, are major contributors to the agricultural sector, driving economic growth and stability. In an ideal situation, the export value of horticultural products would consistently increase, reflecting robust international demand, especially from key trading partners such as the East Africa Community. This would ensure substantial revenue generation, employment opportunities for millions of Kenyans, and overall economic resilience (Matthew, 2020). However, in 2022, the Kenyan horticultural sector faced several challenges, leading to a slight decrease in export value compared to 2021. Kenya earned roughly 152.3 billion Kenyan shillings (approximately 1 billion US dollars) from fresh produce exports, reflecting an 8.8% decrease from the year 2021 (CBK, 2023).

Interest rates charged by commercial banks have proved to have a direct impact on performance of this Sector as it is counted as expense in doing business (Ongore & Kusa, 2013). Since the sector is a large economic sector, movements in the rate of inflation will always affect the performance of the horticultural earnings. In this context, macroeconomic variables namely; exchange rate, terms of trade, inflation and interest rate are thought and this perception supported by empirical studies to have effect on financial performance of horticultural export and the sector at large in Kenya. Both Kenya Shillings (KES) and the hard currency (US Dollar) are bound to fluctuate depending on local and international trade dynamics respectively (Oranga, 2022). The total value of horticultural produce exported in 2021 from January to November rose from Sh136.7 billion in 2020 to Sh145.4 billion in 2021 representing a six percent

increase (Nzomoi, Mutua, Kiprop & Kathambi, 2022). The total volume of exports increased by 85 million kilos, representing a 30 percent rise that was attributed to increased demand especially flowers and vegetables (Aseto et al., 2022).

However, in the previous year, the total value of horticultural produce exported increased by 5.2 percent from Kshs142.72 billion in 2019 to Kshs150.16 billion in 2020 (Nzomoi, Mutua, Kiprop & Kathambi, 2022). The value of flower exports increased by 3.2 percent in 2019, from Ksh104.14 billion to Ksh107.51 billion (Nzomoi, Mutua, Kiprop & Kathambi, 2022). Fruits exported value increased by 39.7 from Kshs13.19 billion in 2019 to Kshs18.43 billion in 2020. During the same period, the value of vegetable exports fell by 4.6 percent, from Kshs25.39 billion in 2019 to Kshs24.23 billion in 2019. Despite an increase in total export value of 5.2 percent, total export volumes decreased by 4.5 percent from 328,335,450 Kgs in 2019 to 313,668,506 Kgs in 2020 (Nzomoi, Mutua, Kiprop & Kathambi, 2022). This indicates that the horticultural export performance has not been consistent both in total export value and total export volume hence a basis for this study.

Agriculture Food Authority. (2021) said there is a need for Kenya to diversify its market as reliance on the European market could have a negative impact in the event of a volatile market. There is therefore a gap in knowledge to inform how a mix of macroeconomic variables would affect prices of flowers and other horticultural export performance in Kenya (Ng'ethe, 2022). Although Kenya's economy is dependent on agricultural exports, its market stability has not been guaranteed. The markets are volatile due to currency fluctuations in exchange rates and a decline in global income over the last decade (White, 2009). Given these interconnected factors, consumption of high-priced agricultural commodities such as fresh fruits and vegetables has been static

if not declining causing market demand to stagnate while supply has been abundant (Rikken, 2011).

With increasing liberalization and regional integration, the horticultural industry in Kenya has witnessed the saturation of cheap horticultural exports from other competing countries such as South Africa (Ridolfi, Hoffman, & Baral, 2018). This situation has impacted the expected benefits of players in the horticultural sector. This situation has been exacerbated by high production costs, particularly the adoption of modern technologies, rising electricity costs, transportation and storage costs, changes in consumer preferences, and other consumer concerns. This has had a significant impact on production, with output dropping from 8.127 million tons in 2015 to 7.983 million tons in 2016 (KNBS, 2015/2016).

Horticultural commodities have been subjected to multiple taxation; national and local levels with no corresponding provision for necessary interventions (Nyoro, 2019). This has contributed to a decrease in net farm income and created distortions in marketing structures, without necessarily improving local government revenues. As a result, horticultural prices have fallen, affecting the livelihoods of Kenyans involved in the horticultural industry(Alila & Atieno, 2006). Kenya has benefited greatly from several agreements, including Economic Partnership Programmes Agreements which have resulted in an increase in Kenya's agricultural exports to European markets Gathii (2013). Despite this, the sector continues to face challenges in both domestic and international markets, with market regulation, legislation, and standards being implemented in order to gain access to international markets (Tschirley, Muendo & Weber, 2004).

According to KNB (2022) data, Kenya's horticultural export earnings fell by 9.7 percent in 2022 due to higher inflation in key markets and weaker currencies. According to preliminary export statistics, revenue from horticultural sales abroad totaled Sh120.26 billion last year, down from Sh133.23 billion the previous year. Kenyan exporters had complained that rampant inflation was eroding consumer purchasing power in the Eurozone and the United Kingdom, the primary markets for cut flowers, fruits, and vegetables. According to preliminary data compiled by the Central Bank of Kenya, earnings from the sale of vegetables fell by nearly a quarter to Sh27.34 billion, while the value of cut flowers fell by 10.21 percent to Sh54.25 billion. Further, the Kenya Flower Council called 2022 a horrible year that worked against flower growers, citing persistent inflationary pressures on European households as a result of the Russia-Ukraine war.

It therefore remains clear that macroeconomic drivers that are responsible for horticultural export performance have not been fully given much attention thus have to be investigated especially on exchange rate, inflation, inflation, interest rates and the terms of trade. This research further investigated how policies and programs are implemented and how they affect horticultural performance. Government effectiveness which reflects such public perception of the government's ability to implement policies such as the government's economic strategies and goals, which can be found in documents such as the annual Budget Policy Statement, annual budgets, the Debt Management Strategy and the Central Bank of Kenya's stated monetary policy objectives (CBK) was incorporated. This is an area and variable that, at least in the reviewed literature, has been ignored and given limited attention in such studies,

making it one of the most significant contributions of this current study to the existing literature.

Despite the strategic importance of the horticultural industry, questions linger regarding the consistency and efficacy of government policies, regulatory frameworks, and institutional support (Henderson et al., 2002). Inconsistent implementation of policies, bureaucratic hurdles, and potential governance gaps may impede the industry's ability to fully capitalize on its export potential. The overall export performance of Kenya's horticultural sector is contingent on various factors, including product quality, market access, and competitiveness (Gachukia & Muturi, 2017). These factors, in turn, are influenced by macroeconomic conditions and the effectiveness of government interventions. Despite the significance of these interconnected elements, a notable gap exists in the current literature. While individual studies have addressed aspects of macroeconomic factors, government effectiveness, and horticultural exports, there is a dearth of research that integrates these components into a cohesive framework, particularly within the context of Kenya. If the decrease in export value and demand for key products like cut flowers is not addressed, the horticultural sector’s contribution to the economy could further decline, leading to reduced revenue generation, loss of employment for millions of Kenyans, and potential economic instability.

1.3 Study Objectives

The general objective of this study was to assess the macroeconomic drivers, government effectiveness and horticultural export performance in Kenya.

1.3.1 Specific Objectives

The specific objectives of this study were as follows:

i. To determine the effect of Exchange rate on horticultural export performance in Kenya

ii. To investigate the effect of inflation on horticultural export performance in Kenya

iii. To investigate the effect of interest rates on horticultural export performance in Kenya

iv. To assess the effects of terms of trade on horticultural export performance in Kenya

v. To determine the moderating role of government effectiveness on the relationship between:

   a) Exchange rate and horticultural export performance in Kenya

   b) Inflation and horticultural export performance in Kenya

   c) Interest rates and horticultural export performance in Kenya

   d) Terms of trade and horticultural export performance in Kenya.

1.4 Research Hypotheses

The study sought to test the following null hypotheses as derived from study objectives enumerated in section 1.4.1.

H_{01}: Exchange rate does not significantly affect horticultural export performance in Kenya

H_{02}: Inflation in Kenya do not significantly affect horticultural export performance in Kenya

H_{03}: Interest rate does not significantly affect horticultural export performance in Kenya

H_{04}: Terms of trade does not have a significant effect on horticultural export performance in Kenya

H_{05}: Government effectiveness does not moderate the relationship between:

H_{05a}: Exchange rate and horticultural export performance in Kenya

H_{05b}: Inflation and horticultural export performance in Kenya

H_{05c}: Interest rate and horticultural export performance in Kenya

H_{05d}: Terms of trade and horticultural export performance in Kenya

1.5 Significance of the Study

Kenya as an economy is highly dependent on agriculture as the main GDP contributor, cheaply exporting unprocessed or crude farm products, and in return importing expensive processed goods. The horticultural sector is among the leading agricultural subsectors in the economy, with tea and coffee proving undisputable leaders in agricultural income generating activities.

The findings of this study may therefore help stakeholders in zeroing in on the sensitive and critical macroeconomic drivers that enhance horticultural export performance. This will aid in determining areas of emphasis during the appraisal of loan applications and financing and increase the market share. Ultimately market share will be increased to acceptable levels and performance of the exports will be improved as there will be focus on specific variables. The findings may form an input into the formulation of policies aimed at improving horticultural export performance. It will also help in implementing measures to ease cost of inputs on the farmers.

Academic and other researchers may wish to do further research to establish whether there are other factors that enhance horticultural export performance. This will lead to an addition to the existing universe of knowledge in the field of horticulture. Furthermore, the findings will be generalized to form a theoretical framework to describe, explain, control, or predict the likelihood of enhancing horticultural export performance.

1.6 Scope of the Study

The study was carried out in Kenya. The study focused on the moderating effect of government effectiveness on the relationship between macroeconomic determinants and horticultural export performance in Kenya.

This study used of explanatory research design. Data was secondary in nature on the study variables for the period between 1990 and 2021 was collected by use of a data collection schedule. This period was considered because of numerous reforms that took place in Kenya from this time. Explanatory research designs were used to ascertaining the status and nature of macroeconomic variables and establishing causal relationships between the independent and dependent variables respectively. The results of VECM model were used to test the moderating effect of government effectiveness on horticultural export performance.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

This chapter discusses the theoretical literature, the empirical literature, the variables under research and the conceptual framework.

2.1 Concepts of the Study

2.1.1 Concept of Exchange rate volatility

Exchange rate volatility is a concept that encapsulates the degree of fluctuation or variation in the value of one currency relative to another over a specific period (Aly & Hosni, 2018). In financial markets, exchange rates serve as a crucial benchmark for international trade and investment. The volatility in exchange rates can be influenced by a myriad of factors, including economic indicators, geopolitical events, market speculation, and central bank policies. High levels of exchange rate volatility introduce uncertainty and risk for businesses engaged in cross-border trade, as the relative value of currencies can experience rapid and unpredictable shifts (Umaru, Sa'idu & Musa, 2013).

The measurement of exchange rate volatility often involves statistical analyses, such as calculating standard deviations or assessing historical price movements (Tarawalie et al., 2013). Traders, investors, and policymakers closely monitor exchange rate volatility as it has significant implications for various economic activities. Excessive volatility can lead to challenges for businesses in planning and decision-making, affecting pricing strategies, profit margins, and overall financial stability. On the other hand, moderate volatility can provide opportunities for traders and investors to capitalize on currency movements (Sharma, 2020).

In the context of global economics, exchange rate volatility plays a critical role in shaping international competitiveness and trade balances (Chit, Rizov & Willenbockel, 2010). A country experiencing sharp and unpredictable currency fluctuations may find it challenging to maintain stable trade relationships and attract foreign investment. Central banks often employ monetary policy tools to manage exchange rate volatility, seeking to strike a balance that promotes economic stability and facilitates international trade. Understanding and effectively managing exchange rate volatility is, therefore, essential for fostering a conducive environment for global economic interactions and ensuring the smooth functioning of international financial markets.

2.1.2 Concept of Inflation

Inflation is a fundamental economic concept that refers to the persistent and general increase in the overall price level of goods and services in an economy over time (Aye & Odhiambo, 2021). It is typically expressed as an annual percentage, representing the rate at which the purchasing power of a currency declines. Inflation can be caused by various factors, with demand-pull and cost-push inflation being common drivers (Dua & Goel, 2021). Demand-pull inflation occurs when the overall demand for goods and services exceeds their supply, leading to increased prices. Cost-push inflation, on the other hand, results from rising production costs, such as increased wages or higher prices for raw materials, causing businesses to pass these costs on to consumers.

Inflation and horticultural performance are interconnected elements within the broader economic landscape, influencing each other in various ways (Aye & Odhiambo, 2021). Inflation, as a sustained increase in the general price level of goods and services over time, can impact the horticultural sector in several ways. Rising inflation can lead to increased production costs, affecting expenses related to inputs such as fertilizers,

pesticides, and labor. This cost-push effect may, in turn, influence the pricing of horticultural products, potentially reducing profit margins for producers. Additionally, inflation can affect consumer purchasing power, altering patterns of demand for horticultural goods and influencing market dynamics (Peersman, 2022).

Conversely, the horticultural sector itself can contribute to or mitigate inflationary pressures within an economy. Horticultural products, including fruits, vegetables, and flowers, are essential components of the consumer basket. Fluctuations in the supply and pricing of these goods can have a direct impact on overall inflation rates. Moreover, the export performance of horticultural products can play a role in a country's balance of trade, influencing the value of its currency and potentially contributing to broader economic factors that affect inflation (Balcilar & Bekun, 2020).

2.1.3 Concept of Interest rate

Interest rates play a crucial role in shaping the economic environment and can significantly impact the performance of the horticultural sector (Njoroge, 2012). The interest rate, representing the cost of borrowing or the return on investment, influences the financial decisions of businesses within the horticultural industry. Changes in interest rates can affect the cost of capital for horticultural enterprises, impacting their ability to invest in equipment, technology, and infrastructure. Higher interest rates may lead to increased borrowing costs, potentially constraining the expansion and modernization efforts of horticultural businesses (Nyachae, & Warue, 2020).

Moreover, the interest rate environment has implications for consumer behavior, which directly influences the demand for horticultural products. Changes in interest rates can affect mortgage rates, consumer loans, and overall household finances. In periods of high-interest rates, consumers may experience a reduction in disposable income,

potentially leading to adjustments in spending patterns, including the consumption of horticultural products (Meme, 2015). Conversely, lower interest rates might stimulate consumer spending, positively influencing the demand for fruits, vegetables, and ornamental plants.

In addition to their direct impact on the financial aspects of horticultural enterprises and consumer behavior, interest rates also influence currency values and trade dynamics. Central banks use interest rates as a tool to manage inflation and support economic stability. Changes in interest rates can affect exchange rates, influencing the competitiveness of horticultural exports in the global market (Samoei & Kipchoge, 2021).

2.1.4 Concept of Terms of Trade

Terms of trade, which reflect the relative value of a country's exports to its imports, play a pivotal role in shaping the economic conditions for the horticultural sector (George, 2022). Positive terms of trade imply that a country can obtain more imports for a given quantity of its exports, providing economic benefits. For the horticultural industry, favorable terms of trade mean that the value of exported fruits, vegetables, and other horticultural products can be exchanged for a greater quantity of imported goods and services, contributing to economic growth and improved living standards (Rusali, 2012).

The horticultural sector's performance is intricately linked to changes in terms of trade. When a country experiences an improvement in terms of trade, horticultural exporters may find it more cost-effective to acquire necessary inputs, such as agricultural machinery or technology, which can enhance productivity and competitiveness (Maqbool, Ahmad, Mobeen & Nasim, 2021). On the other hand, a decline in terms of

trade can pose challenges for the horticultural industry by reducing the purchasing power derived from exports, potentially limiting the sector's ability to invest in innovation or maintain quality standards.

Moreover, terms of trade are influenced by various factors, including global market dynamics, commodity prices, and the competitiveness of a country's horticultural products (Maqbool, Ahmad, Mobeen & Nasim, 2021). As the horticultural sector is often export-oriented, fluctuations in terms of trade can impact the sector's profitability, trade balances, and overall contribution to the national economy (Ikiara, 1992). Policymakers and stakeholders in the horticultural industry need to monitor and understand changes in terms of trade to formulate strategies that enhance the sector's resilience and ensure its continued growth in international markets.

2.1.5 Concept of government effectiveness

Government effectiveness is a critical factor that significantly influences the performance of the horticultural sector. The effectiveness of government policies, regulatory frameworks, and institutional support plays a pivotal role in shaping the operating environment for horticultural businesses (Garcia-Sanchez, Cuadrado-Ballesteros & Frias-Aceituno, 2013). A well-functioning and supportive government can create an environment conducive to growth by implementing policies that facilitate access to markets, provide necessary infrastructure, and ensure fair competition. Conversely, inefficiencies, bureaucratic hurdles, and inadequate governance may hinder the sector's development and competitiveness (Lee & Whitford, 2009).

In the context of the horticultural industry, government effectiveness is particularly crucial in areas such as trade regulations, quality standards, and agricultural extension services. (Moiseev, et al., 2017). Clear and consistent regulations that facilitate trade

and uphold quality standards are essential for horticultural exporters to access international markets. Government support through extension services, research, and development initiatives is vital for enhancing the productivity and competitiveness of horticultural producers. The effectiveness of these measures directly influences the sector's ability to meet global market demands and maintain high-quality standards.

Additionally, government effectiveness is intertwined with issues of corruption and transparency, which can significantly impact the horticultural performance (Kim & Voorhees, 2011). Transparent and corruption-free governance ensures that policies are implemented fairly and that resources are allocated efficiently. This, in turn, fosters a level playing field for horticultural businesses, allowing them to thrive in a transparent and accountable regulatory environment (Duho, Amankwa & Musah-Surugu, 2020)

2.2 Theoretical Literature

Various theories have been modeled to explain the effect of selected macroeconomic drivers on Kenya's horticultural export performance. Listed below, are a few of the most widely used theories to explain the phenomena.

2.2.1 Comparative advantage Theory

The Comparative Advantage Theory, developed by economist David Ricardo, provides insights into how countries can benefit from specialization in producing goods or services in which they have a lower opportunity cost compared to other nations (Gabriel, 2023). Kenya's comparative advantage in horticulture is influenced by its favorable climate and soil conditions, allowing for the cultivation of a wide variety of fruits, vegetables, and flowers. This natural endowment positions Kenya as a competitive producer in the global horticultural market. Macroeconomic drivers, such as exchange rates and inflation, play a role in shaping the cost structure for horticultural

production. If Kenya can maintain a relatively stable macroeconomic environment, it enhances its comparative advantage by ensuring that the cost of production remains competitive in the international market.

Government effectiveness is crucial in amplifying Kenya's comparative advantage in horticulture. Effective governance facilitates the implementation of policies that support the horticultural sector, such as investments in infrastructure, research and development, and quality control measures. A government that actively promotes and sustains an environment conducive to horticultural production contributes to the country's competitive edge. Moreover, streamlined regulatory processes and transparent governance reduce transaction costs for businesses, enhancing the overall efficiency of the horticultural value chain (Sila et al., 2016).

Kenya’s success in horticultural export performance, therefore, hinges on leveraging its comparative advantage and aligning macroeconomic drivers and government effectiveness with the unique strengths of the horticultural sector. By optimizing these factors, Kenya can enhance its specialization in horticulture, leading to increased export competitiveness, economic growth, and improved livelihoods within the sector. The Comparative Advantage Theory serves as a framework to understand how these elements interconnect, contributing to Kenya's sustained success in the global horticultural market.

2.2.2 The Purchasing Power Parity Theory

Purchasing Power Parity (PPP) is a theory in international economics that attempts to compare the relative value of different currencies by measuring their ability to buy a basket of identical goods and services in different countries. In simpler terms, PPP suggests that the exchange rate between two currencies should be equal to the price

ratio of a specific basket of goods in each country (Obstfeld & Rogoff, 1996). The Purchasing Power Parity (PPP) theory was not introduced by a single individual but has evolved over time with contributions from various economists. The concept of PPP can be traced back to the early economic thought, but it was formalized and developed more rigorously in the 20th century. The Purchasing Power Parity (PPP) Theory offers insights into how macroeconomic drivers, government effectiveness, and horticultural export performance in Kenya can be understood in terms of exchange rates and their impact on relative prices. According to PPP, in the long run, exchange rates between two countries should equalize the prices of a basket of goods and services, accounting for factors like inflation. When examining macroeconomic drivers such as inflation in Kenya, PPP suggests that sustained inflation could lead to a depreciation of the Kenyan Shilling, affecting the relative prices of horticultural exports. If inflation is higher in Kenya compared to its trading partners, it may erode the purchasing power of the currency, impacting the competitiveness of horticultural products in the international market.

Government effectiveness is crucial in the context of PPP as it influences the implementation of policies that can affect relative prices and exchange rates. For instance, effective governance that ensures transparent and consistent application of trade policies and regulations contributes to stable economic conditions. A government that actively manages inflation, maintains a stable interest rate environment, and implements sound fiscal policies can create an environment conducive to the relative price stability emphasized by PPP. This, in turn, positively affects the competitiveness of horticultural exports by contributing to a more predictable and stable exchange rate environment.

In terms of horticultural export performance, PPP provides a framework to understand how exchange rate movements can impact the real value and relative prices of horticultural products. If exchange rates deviate from their PPP equilibrium, it can lead to misalignments in prices, affecting the cost of production and international competitiveness of horticultural exports. Kenya's ability to optimize its horticultural export performance, therefore, is contingent on effectively managing macroeconomic drivers to maintain relative price stability, aligning with the principles of PPP.

The PPP Theory offers a lens through which the interactions between macroeconomic drivers, government effectiveness, and horticultural export performance in Kenya can be analyzed. By considering the long-term equilibrium of exchange rates and the impact of relative prices on the competitiveness of horticultural products, policymakers and stakeholders can better navigate the complexities of international trade and optimize the sector's performance in the global marketplace.

2.3 Empirical Literature

This section explores studies on horticultural exports performance, exchange rate, terms of trade, interest rate, inflation rate and the moderating effect of government effectiveness on macroeconomic drivers of horticultural export performance.

2.3.1 Exchange rate and Horticulture Performance

Since the breakdown of the Bretton-Woods system of pegged-but-adjustable exchange rates in 1973, there has been significant empirical research examining the impact of exchange-rate volatility on trade. Exchange-rate volatility refers to the unpredictable movement of an exchange rate, which can increase, decrease, or remain unchanged. This research is motivated by the theory that exchange-rate volatility introduces an element of uncertainty into cross-border business, which in turn reduces trade and

thereby diminishes economic welfare. This uncertainty can negatively affect the volume of international trade and, consequently, economic welfare (Sweidan, 2016).

A study by Ahmed Kasim Dube et al. (2018) investigated the factors influencing Ethiopia's horticultural export performance between 1985 and 2016. This research examined the long-term determinants of export growth using an ARDL bound test cointegration analysis. The study found that several factors significantly influenced Ethiopia's horticultural exports in both the short and long run. These included the real exchange rate, Ethiopia's real GDP, foreign direct investment (FDI), and international prices. Foreign GDP and real interest rates were found to be significant only in the long run.

William (2022) analyzed the factors impacting Tanzania's horticultural exports performance between 1988 and 2018. The study revealed that real exchange rate, agricultural GDP, and foreign income significantly influence long-term export performance. The findings suggest that exchange rate flexibility and interest rate stabilization policies are crucial for boosting Tanzanian horticultural exports and potentially other sectors as well.

Manaseh (2014) discovered that investment and a favourable exchange rate increased Kenyan coffee exports more than price. De Grauwe (1988), Chowdhury (1993), De Vita and Abbott (2004), Verheyen (2012), and Grier and Smallwood (2013) discovered that the relationship between exchange rates and export is negative.

Mwongera (2015) investigated factors affecting Kenya's horticultural exports (1984-2014). Despite steady growth in the sub-sector, export rates slowed over the past decade. The study identified real exchange rate, agricultural GDP, and real interest rate

as significant influences on exports. Based on the findings, the study recommends policies that boost agricultural output, maintain competitive exchange rates, and lower interest rates to improve Kenya's horticultural export performance.

Kinuthia (2014) studied the effect of foreign exchange rate fluctuations on horticultural export earnings in Kenya. The purpose of this study was to determine the impact of foreign exchange rate fluctuations on Kenyan horticultural export earnings. To achieve the stated research objective, this study used secondary data. Horticultural export earnings from Horticulture Crops Development Authority (HCDA) were analyzed alongside Central Bureau of Statistics exchange rates (Ksh Vs USD) for the period 2009 to 2013. To gain a comprehensive understanding of how these factors affect or relate to horticultural export earnings in Kenya, the model used for this study included inflation indices and foreign direct investment as a percentage of GDP statistics. For the period 2009-2013, multiple regression was used to determine the relationship between Horticultural export earnings and foreign exchange rates, inflation indices, and foreign direct investment as a percentage of GDP.

The study's findings concluded that the exchange rate is related to horticultural export earnings in Kenya. The Pearson correlation coefficient was 0.689. As a result, it can be concluded that fluctuations in foreign exchange rates have a significant impact on Kenyan horticultural export earnings. Structures to support horticultural export performance in Kenya must be developed by the government. Policymakers should foster an environment conducive to the maintenance and sustainability of a stable exchange rate system that is resilient to external shocks. The government must develop and implement policies that lead to export diversification. There is also a need to

increase supply in the horticultural sector through incentives and subsidies that will result in lower production costs.

The empirical literature centered majorly on industrial countries until the late 1990s, thus reflecting that there was no time-series data relevant to them, particularly data of high-frequency, less developed countries got little attention than their developed counterparts. All in all, it was concluded generally from the empirical literature associated with industrial countries' trade is that the connection between volatility in rate of exchange and trade is still a puzzle, with a number of studies discovering insignificant effect or, if the effect is significant, it is not mainly positive or negative (Bahmani & Hergety, 1999). With availability of data increasing, mainly at frequencies that are high, for less developed countries, many studies of late have investigated the impacts of temporary volatility in rates of exchange on the exports of various groups of less developed countries (De Grauwe, 1988).

Negative impact of volatility in rate of exchange on exports is supported by theories that are of the perception that because volatility in exchange rate presents business uncertainty environment, traders who are rational always try to avoid or decrease their uncertainty exposure and any other type of trade activities adjustment risk. Clark (1973) is among the researchers who postulated that volatility in rate of exchange and exports are negatively related. The study argued that increasing exchange rate would cause producers who are risk averse to reduce their exposure to risk so as to prevent its effect on profitability in the absence of hedging facilities. Producers react by output reduction and therefore export large amounts. This consideration gained also the support of Broda & Romalis (2003), who discovered that, provided the exporter's main objective is to maximize on the profit, then they are likely to decrease their risk exposure to of any

kind of risk, with volatility in rate of exchange included. According to Vergil (2002), volatility results in exports to perform below par due to uncertainty creation thus effecting planning, and also it does not encourage suppliers locally from extending to foreign markets because they fear being exposed to variability of profit which may come up from instability of exchange rates. When the market is free, exporters may choose to move out of the market when they think that the environment to be very risky and to come back when stability resumes. Franke (1991) and Sercu & Vanhulle (1992) demonstrated that exporters would easily reduce on exports and move out of the market when volatility goes high if market entry or exit costs are lower.

Earlier studies by De Grauwe (1988), Chowdhury (1993), De Vita and Abbott (2004), Verheyen (2012), and Grier and Smallwood (2013) discovered that the relationship between exchange rates and export is negative. A number of these studies concentrated on countries that are developed and they discovered that the connection between instability of exchange rate and the performance of exports within this group is negative. Contrast to this, several theories indicated that volatility in rate of exchange could in fact lead to exports underperformance. This happens due to a few exporters subscribing to the low-risk-low-return practice, thus exporting more when volatility in exchange rate is high (Côté, 1994). The motive behind this routine practice is that when the marginal revenue is expected to reduce by exporters as the volatility of exchange rate increases, they tend to increase on the export volumes so as to compensate for the likelihoods of reduced marginal revenue. According to De Grauwe (1988), Kroner & Lastrapes (1993) and Égert and Morales-Zumaquero (2008), due to the continuous volatility in rate of exchange few traders may escalate trade when they expect further future deterioration of the environment. This encourages current trade as traders,

expecting a reduce in profit and activity, and in such a case where volatility of exchange rate stays put for an extended period, rush to finalize transactions to make up for the reduction in profit and activity. Bailey, Tavlas and Ulan (1987) also supported this argument by arguing that, if exporters are well risk-averse, then their expectations for a decrease in marginal utility of revenue of export rises due to an increase in volatility in rate of exchange. This concern encourages exporters, in an attempt to maximize profits and to compensate for the likelihoods of the reduction in future profits, increase their current volumes of export if volatility persists.

Contrasting numerous conventional aspects, various studies and theories failed to determine how exchange rate and exports are related. Chit, Rizov, and Willenbockel (2010) for instance insinuated that volatility of exchange rate has insignificant influence on trade. The not likely effect of volatility in rate of exchange on exports prevails most in countries, where future transactions in trade are finalized at a certain level of rate of exchange because they have better hedging facilities. The already pegged prices and volumes of goods and services that are to be delivered should not be affected by future movements in the rate of exchange. Hooper and Kohlhagen (1978) examined how instability in rate of exchange impacted both multilateral and bilateral trade amongst less developed countries during 1965 to 1975 and found insignificant relationship between the variables. Similarly, Solakoglu, Solakoglu and Demirağ (2008) discovered that in Turkey, some organizations had no positive or negative effects of the fluctuation of rate of exchange on exports. The study by Hall *et al.* (2010) discovered insignificant relationship for emerging markets but a negative connection for countries that are developed. The logic of no impact in this case arose from the impartiality these countries capital markets. Additional researchers who failed to

empirically confirm the effect of volatility in rates of exchange on trade are Gotur (1985) and Klaassen (2004), with no exception of Asseery and Peel (1991). The accessible studies touching on the influence of volatility of exchange rate on exports and tools of analysis used are well noted down in the references.

Yüksel, Kuzey, & Sevinç, (2012), conducted a study on the effect of volatility in rate of exchange, prices of exports and measured GDP of partners of trade in Turkey's exports aggregate. On employing OLS regression method to know the connection between RER volatility and exports, the study applied appropriate tests for consistency and analysis of the data which included; time series data and cross correlation to establish the connection between the variables pairs was exploited. The results showed the presents of a negative connection between exports and volatility; although, this connection was insignificant standing at 5% level.

Gautam *et al.,* (2013) analyzed the impact of volatility in real rates of exchange of Indian rupee with Euro, US Dollar, Japanese Yen and United Kingdom's pound on India's agricultural exports such as, Coffee, Tea, Rice and Cereals to areas trading with Euro, Japan, USA and UK for the duration 2002 to 2009. In the study a panel data fixed effect analysis was used and the results obtained indicated the GDP and Real exchange rate were the significant determinants of exports in cereals while GDP as factor, determined only for exports in Rice in India, where as for tea and coffee the exports determinants were real exchange rate and volatility in real rate of exchange. The study discovered that real rate of exchange was significantly impacting the cereals exports, tea and coffee also, while for coffee and tea volatility in exchange rate was also exhibiting a key role.

According to Fear (2013), regression results of a study on the determinants of the Kenyan exports by Orindi (2010) indicated that explanatory variables namely, the importer's GDP and population provided most of the explanatory power in the regression. The coefficients of these variables had positive signs and hence they were consistent with theoretical expectations. The positive coefficient for the importer's GDP was due to the positive effects of foreign income on the level of Kenya's exports. High transportation costs were found to have a negative effect on the exports. The COMESA dummy used by Orindi (2010) was found to be statistically significant at 1%. This implied that Kenya's exports were likely to be higher to COMESA member states than non-COMESA members. In addition, EU dummy was also found to be positive and statistically significant at 1%. This suggested that Kenya's exports to EU members were likely to be higher than exports to non-EU members. The coefficient for embassy was also positive and significant thereby implying that presence of an embassy/consulate in the importing country promoted Kenyan exports to that country. The significance of these three variables implies that economic partnership agreements are important in promoting exports. However, the study by Fear (2013) focused on all the Kenyan exports (exports from all the sectors) and hence a study specific to horticultural exports is required because different sub-sectors may respond differently to macroeconomic variables. In addition, for a comprehensive and precise analysis, there is a need for disaggregation of the various sub-sectors in the economy.

In their study on factors influencing Egyptian agricultural export earnings, Mengistu (2014) used the gravity model approach to study the pattern of Egyptian agricultural exports from 1994 to 2008. Looking at the fixed effect model, random effects model and the common intercepts model. The authors used the fixed effects model in the

analysis (based on the Hausman test). The study findings showed that the Egyptian GDP was positive and significant, meaning an increase in Egyptian GDP would lead to an increase in the Egypt's agricultural exports. However, the importer's GDP was not significant thereby suggesting that the foreign income had no significant effects in influencing the Egyptian agricultural exports. The coefficient of distance was negative and significant. Distance was used as a proxy for the transportation costs. The negative value of the coefficient of the distance variable implied that the transportation costs increases as the distance between two countries increases thereby negatively affecting the exports. The importer's GDP per capita turned out to be insignificant in determining the exports of agricultural commodities. However, the Egyptian per capita income was negative and significant thereby suggesting that an increase in Egyptian GDP per capita would lead to a reduction in agricultural exports. The authors attributed this to an increase in local consumption as a result of an increase in household income.

Salasya et al. (2006), in a study on analysis of factors that influence export of French beans from Kenya used linear regression of total French beans exports on price and air freight charges. The regression results showed that the co-efficient for price was positive but insignificant at 5% level. The air-freight co-efficient was negative and was significant at 5% significance level. It was argued that price influenced the quantity of French beans exported by a small margin. Mold & Prizzon (2008) found that price impacted on agricultural exports by a small margin. The results of pooled regression estimates of unit price elasticity of African exports for the period 1980-2001 had a negative and significant co-efficient for agricultural exports implying that African countries increased agricultural exports as the international prices decreased.

Abukari and Cunfeng (2021) conducted a study on the competitiveness and determinants of cocoa exports in Nigeria. They used a multiple regression analysis. They fitted the four functional forms of the regression models (linear, double log, exponential and semi log) to the data by the method of the ordinary least squares. They took the exponential function as the lead equation based on the econometric and statistical criteria (Coefficient of multiple determinations). The authors employed export performance ratio (EPR) in the analysis of the export performance in which the trend was estimated inter-temporally. They estimated the export performance ratio to establish the comparative advantage of Nigeria in cocoa export sector.

The regression results for the factors influencing cocoa exports in Nigeria indicated that the coefficients of total world quantity, exchange rate of Nigerian Naira against the dollar and the Nigerian cocoa production (output) were statistically significant. The coefficients explained 70.3 percent of the variability in the export of cocoa from Nigeria. This had an implication that these variables are the major factors influencing the Nigeria's cocoa export. The coefficient value of the world volume, exchange rate and the Nigerian cocoa production were significant at both 5% and 1% level of significance. The coefficients of the world volume of cocoa and Nigeria's cocoa production were positive while the coefficient of the rate of exchange was negative. The positive coefficients of world volume and Nigeria's cocoa production implied that the two variables positively influenced export of cocoa. The authors attributed the negative coefficient of the exchange rate to the declining productivity in the Nigerian economy during the period under study.

(Meme, 2015) in a study on analysis of Kenya's export performance used an error correction model in their estimation. They estimated three models in their analysis; tea

exports model, coffee exports model, and model for other exports from Kenya. In the model for coffee, the error correction results showed that all the variables used in the regression had the expected sign. The coefficient for the real exchange rate and investment as a ratio of GDP were positive and significant. However, the price effect was only significant at the 10 percent significance level. In addition, the authors found that the export supply was responsive to prices in the long run. The income of the trading partners was not significant. Manufactured exports are relatively more sensitive to foreign income than agricultural exports. This was evident from the results of analysis of determinants of other exports (excluding coffee and tea) from Kenya in the same study by Were et al. (2002). Unlike the regression for coffee exports, income of the trading partners was significant in the model for other exports. However private investment as a proportion of GDP was not significant. The study thus partly attributed the significance of foreign income to exports of manufactured and processed goods to Uganda and Tanzania. The exchange rate was not significant in the regression for tea exports.

In a study about the export of gherkin and cucumber in India, Kumar et al. (2008) estimates the factors affecting cucumber and gherkin exports by use of a log linear demand function. The world volume of internationally traded cucumber and gherkin products and the exchange rate were found to be significant. According to that study, the world traded volume of these commodities was used to capture the change in international demand for these products. Therefore, an increase in this variable was expected to lead to an increase in the quantity of exports of cucumber and gherkin products from India. Both coefficients were positive and significant. The regression results indicated that an increase in international trade volume in gherkin and cucumber

products (increase in international demand) would lead to an increase in exports of the same products from India. In addition, the positive coefficient of the real exchange rate had an implication that depreciation of the real exchange would lead to an increase in the exports of these commodities.

2.3.2 Terms of Trade and Horticulture Performance

A widely held belief is that agriculture's terms of trade decline over time, as a result of Engel's Law, which states that as economic growth occurs and incomes rise, demand for agricultural products rises more slowly than demand for manufactured goods and services. As a result, agriculture is viewed as a declining sector that should be given less policy priority than others in efforts to promote growth. That has not always been the case, and many now argue, particularly at this point in global economic change, that agriculture needs to move up the policy agenda (Colman, 2010).

Bekele and Mersha (2019) analyzed the determining factors of Ethiopia's coffee exports (ECE) performance in the dimension of export sales using a more realistic model application called the dynamic panel gravity model. This allowed for a more accurate representation of the data. It begins with the decomposition of the determinant into variables related to both the supply and demand sides of the market. It did this using short panel data, which included 71 nations that have been reliable importers of Ethiopian coffee throughout the course of 11 years, from 2005 to 2015. The Harris–Tzavalis panel unit root test was performed on each variable, and the first difference transformation was utilized for the variables that demonstrated the presence of a unit root. A two-step general method moment estimation strategy was utilized in the process of specifying and estimating the system model of a linear dynamic panel gravity model. The findings of the model indicated that lagged ECE performance, real gross domestic

product (GDP) of importing countries, Ethiopian population, Ethiopian real GDP, openness to trade of importing countries, Ethiopian institutional quality, and weighted distance were found to be the factors that determined the performance of Ethiopia's coffee exports. To improve Ethiopia's coffee exports performance, the report suggested measures that would boost institutional quality or facilitate advantageous market settings, supply capacity, trade liberalization, and destinations with relatively reduced transportation costs.

2.3.3 Interest rate and Horticulture Performance

A study by Meme (2015) on export performance of the horticultural sub-sector in Kenya indicated that the real exchange rate, agricultural GDP, and real interest rate all have a significant impact on horticultural exports. The coefficient of foreign income, on the other hand, was not significant. The primary goal of this study was to identify the factors that influence horticultural exports in Kenya in order to recommend policies that can be implemented to improve the horticultural subsector. Secondary time series data for horticultural exports, real exchange rate, agricultural GDP, real interest rate, and foreign income were used in the analysis, which spanned 30 years (1984-2014). The information was gathered from various issues of the KNBS Economic Survey and Statistical Abstract, as well as various issues of the CBK Statistical Bulletin, HCDA, and World Bank development indicators publications. Five major importers of Kenyan horticultural produce (the United Kingdom, Germany, the Netherlands, France, and Belgium) were chosen. An error correction model was used in the analysis using co-integration analysis. Government policies should be aimed at increasing agricultural GDP, maintaining the exchange rate at a competitive level for horticultural exports, and lowering the economy's interest rate.

To solve the problem of heterogeneity across primary commodities, which may have been a problem in past studies, Kassouri and Alttaş (2020) developed a solution. a nonlinear panel ARDL technique was used to capture both the cross-sectional and temporal fluctuations across basic commodities. Their investigation uncovered three primary discovery patterns. In the first place, they brought to light the fact that the response of the RER to shocks in terms of trade is asymmetric. In the long run, the real appreciation is more evident for positive shocks in terms of trade than for negative shocks in terms of trade; yet, negative shocks in terms of trade cause the RER to devalue in the short run. Second, they discovered that the asymmetric responses of RER are unique to each commodity subgroup and appear to be of greater significance for nations that are major exporters of energy. In conclusion, they demonstrated that countries that export hard commodities such as agricultural and food and beverage commodities are more susceptible to real appreciation over the long term in comparison to nations that export soft commodities such as energy and metal commodities. It is a fundamental policy corollary that there is a need to remediate the loss of the external competitiveness associated with real appreciation. This can be accomplished by coordinating monetary and fiscal policies to effectively absorb the enormous additional foreign reserves and ensure an exchange rate equilibrium level. This will bring about macroeconomic stability in primary commodity-exporting countries.

2.3.4 Inflation and Horticulture Performance

Akpaeti, Agom, and Frank (2019) analyzed the effects of inflation on farmers income in Nigeria 1970 to 2017 to bring about a sustainable growth and financial transformation in the agricultural sector Error Correction Model (ECM) approach was used. The results of the trend analysis showed that the inflation coefficient (4.74)

percent was positive and highly significant at one percent. Findings also showed that there was a positive but low (0.22%) correlation that exists between inflation and farmers' income while there was a strong positive relationship that existed between inflation and agricultural investments.

To achieve sustainable growth and financial transformation in the agricultural sector, Akpaeti et al. (2019) used an Error Correction Model (ECM) approach to analyze the effects of inflation on farmers' income in Nigeria from 1970 to 2017. The trend analysis revealed that the inflation coefficient (4.74) was positive and highly significant at one percent. The findings also revealed a positive but low (0.22 percent) correlation between inflation and farmers' income, as well as a strong positive relationship between inflation and agricultural investments. The study recommended that the Federal Government and the Central Bank of Nigeria, along with other economic stakeholders, develop viable and practical monetary policies to reduce inflation and bring it under effective control. In order to sustain growth, inflation must be monitored and limited to a single digit rate. Furthermore, the study recommended prudent economic policies that avoid excessive money printing in order to curb inflation and achieve price stabilization in order to promote Nigeria's investment climate. This is necessary to ensure that the agricultural sector continues to play a significant role in the Nigerian economy, particularly in driving the economy toward national growth.

Samoei and Kipchoge (2021) study on the drivers of horticultural exports in Kenya examined the major drivers of horticultural exports in Kenya from 2005 to 2017. The study uses a co-integration model to discover that horticultural exports, interest rates, exchange rates, and inflation rates are all co-integrated in the long run. At a statistically significant level of 1%, these co-integrated series converge to their long-run

equilibrium at a rate of 8.53 percent on each period. More specifically, the study investigates whether interest rates have a negative impact on Kenyan horticultural exports, while inflation and exchange rates have a positive impact. Thus, the study suggested that the Kenyan government use monetary policies to reduce interest rates and stabilize the macroeconomic environment in order to increase horticultural exports, such as targeted exchange rate adjustments through the use of foreign reserves.

Njoroge (2012) conducted research on the factors influencing the performance of Small Scale Horticulture farmers in Thika District, Kenya. The primary goal of this study was to identify the factors influencing the performance of small-scale horticulture farmers in Kenya's Thika district. Using a descriptive cross-sectional design and a structured questionnaire to collect data. Farm management, market factors, investment climate, government policies, inflation inclusive, and cost factors were identified as the main factors influencing performance in small scale horticulture farming. Some of the key findings are that the market for farm produce is not fully developed and that farm workers' skill levels need to be improved. Finally, the performance of the horticulture sector has been hampered by a lack of a large market for the products and a slow market growth rate. High inflation drives up prices, resulting in a small market for high-priced goods. There is a need to improve performance in areas such as infrastructure, technology, and the hiring of skilled labor to improve sector performance. It is suggested that the Kenyan government expand domestic and regional markets for Kenyan horticultural produce while maintaining a favorable legal and regulatory environment.

Dube, Ozkan, and Govindasamy (2018)Analyzed the Export Performance of the Horticultural Sub-Sector in Ethiopia. The study was proposed to investigate the factors

that influenced Ethiopia's horticultural export performance from 1985 to 2016. This study relied on secondary data gathered from the National Bank of Ethiopia, the Ethiopia Horticulture Producer Exporter Association, the Ministry of Agriculture of Ethiopia, FAOSTAT, UNCTAD, and the World Bank. The autoregressive-distributed lag (ARDL) bound test cointegration approach was used to investigate the series' short-run and long-run relationships. The Error Correction Model (ECM (-1)) model result was revealed to be negative and significant, confirming the existence of cointegration among the series. Its coefficient value was 0.472, indicating that 47 percent of the adjustment would be made in the first year and that it would return to long-run equilibrium after 2.12 years. The model results also revealed that the real effective exchange rate, Ethiopia's real GDP, foreign direct investment (FDI), prices, and the structural break all had a significant impact on horticultural export performance in both the short and long run. Foreign GDP and real interest rates were only found to be significant in the long run. Finally, important policy measures deemed necessary to improve Ethiopia's horticultural export performance were recommended.

2.3.5 Moderating Effect of government Effectiveness on macroeconomic drivers of horticultural export performance in Kenya

A moderator, according to Molonko and Ampah (2018), is a third variable that influences the relationship between the dependent and independent variables. A moderator’s impact is defined statically as an interaction that affects the direction and/or strength of the relationship between the independent and dependent variables.

According to Duho, Amankwa, and Musah-Surugu (2020) in Africa and Asia, the concept of government effectiveness is an important concept in public policy. Governments use public policy to implement their political visions and effect desired

changes. Government effectiveness is a source of concern for both governments and citizens. Effectiveness is a measure of output quality and how well policy achieves desired outcomes. Measuring effectiveness necessitates the use of stakeholder opinions, making it a relative concept to evaluate. Government effectiveness is defined as "perceptions of the quality of public services, the quality of the civil service and its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies." It entails sound policy formulation, proper implementation, and, in general, citizen-centric policies. All else being equal, the more effective a nation's government is, the higher the level of social welfare. Thus, effectiveness is a key performance indicator for African and Asian economies interested in improving the well-being of their citizens through horticultural development and performance.

The research conducted by Ruzekova, Kittova, and Steinhauser in 2020 employed econometric models to quantify and define the impact of the institutional environment, which includes both the quality of governmental and regulatory measures as well as the corruption perception index. The researchers evaluated the impact of the institutional environment based on export performance, considering this metric as one of the most important single-factor indicators of competitiveness. For the study, precise quantification of exogenous variables was not a prerequisite; instead, the focus was on examining the strength and direction of links between endogenous and exogenous factors to determine if there was a correlation between the two sets of variables. The researchers' hypothesis was that a higher quality institutional environment would lead to better competitiveness and lower transaction costs, based on the concept that export performance is a valid measure of competitiveness. However, the results of the study

revealed that export performance is not a reliable predictor of competitiveness. This finding suggests the need for additional indicators, particularly those that encompass multiple elements, to assess competitiveness more accurately.

2.4 Research Gap

Majority of the study that were reviewed concentrated majorly on the effect of fluctuations of foreign exchange rate though there are several factors other than foreign exchange rates fluctuations that affect horticultural export performance, a number of which are not corresponding with either the fixed or floating rate regimes. The factors keep varying in different countries with relative merit in the horticultural export sector. Even though there is a broad range of factors that have been found from studies related horticultural export performance, numerous studies empirically gravitate to break down these factors to variables in price, showing the hardness in quantifying non-price variables or getting a set of data that is complete and reliable.

Several studies have been conducted on the impact of macroeconomic variables and their effect on horticultural export performance. The studies have yielded a mixed bag of results. Existing empirical evidence, on the other hand, is mostly from developed countries, with only a few empirical studies from developing countries like Kenya. It is clear that few comprehensive studies on emerging markets have been conducted. As a result, this study will fill this void by investigating the effects of macroeconomic drivers on Kenya’s horticultural export performance. Further, the study incorporated government effectiveness as one of the variables that moderate the relationship between the variables under the study. This is a variable that has been given less attention in all the reviewed literature.

2.5 Conceptual Framework

Kothari (2004) define conceptual framework as a structure that defines the interrelationship between different variables deemed important in a study. The conceptual framework further expresses the researcher's views about the construct important in a study. This study conceptualizes that export performance is influenced by selected macroeconomic drivers in Kenya.

Independent variables **Moderator**

Dependent

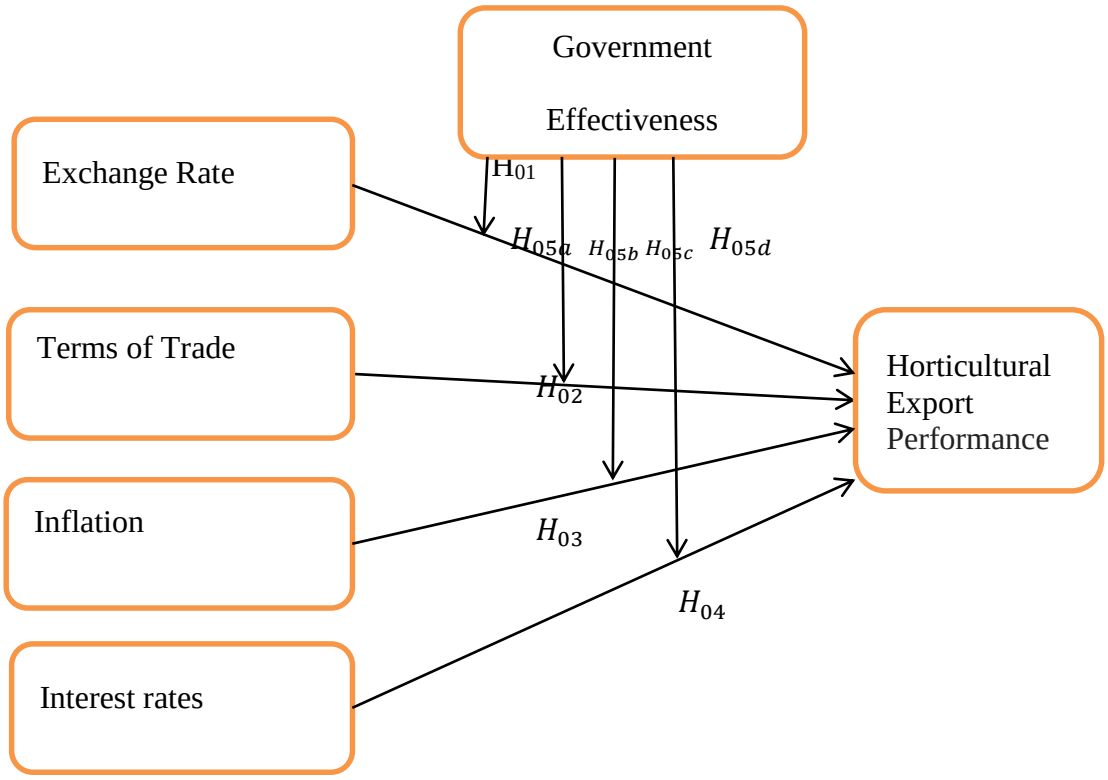


Figure 2.1: Conceptual framework

Source: Author's conceptualization, 2023

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Overview

This chapter highlights the methods and procedures that were used in carrying out the study. It includes the research design that was employed, target population of the study, the sampling frame and the unit of analysis to be used. The section also highlights the type of data that was employed and a brief discussion on the regression model and data analysis that was carried out on the collected data.

3.1 Research Design

A research design is a proof logical model that enables the researcher to deduce presumptions that concerns fresh relations among the variables that are investigated (Soffer, Kahan, & Nachmias, 2019). This is the program that guides an investigator in collecting, analyzing and interpreting observations.

The study employed the use of explanatory research design. According to Gog (2015), studies that set up causal connection between variables may be termed as explanatory studies. This is because the stress is normally on analyzing a situation or a problem in order to explain the connection between the variables under observation (Saunders *et. al,* 2003). As Hair, Babin, Money & Samuel, (2003) observed, explanatory studies are designed to test whether there is any relationship between two mutually exclusive events. In general, an explanatory design is appropriate because the study intends to establish the causal effect among macroeconomic drivers, government effectiveness and horticultural export performance in Kenya.

3.2 Target Population

Piper, Zuilkowski, and Mugenda (2014) define population as an entire individuals set, cases or objects with similar characteristics that are observable. Borg & Gall (1999) define population as the entire membership of a real hypothetical set of people, object or event to which a research desires to establish study's results. The study employed time series data from the period spanning 1990-2021 for all the study variables; dependent and independent. A nexus between the variables was investigated by analyzing the time series data on the study variables within the study period. The choice of this period was motivated by the availability of data and by the fact that it consists the period where Kenya had experienced moderate economic growth rate, poor performance of horticultural exports and rising rate of debt accumulation. Understanding the role of horticultural exports and factors that affects its performance is therefore critical to the government and policy makers.

3.3 Area of Study

The study narrowed to the Kenyan economy as a case study. Selection of Kenya was based on the intended relevance of the policy recommendations of the study. The country provided a good case study owing to its moderate rate of economic growth currently and corresponding increase in public debt and poor performance of horticultural exports. The Kenyan economy has also experienced periods of economic meltdown that provide an opportunity to understand the factors contributing to it and the level of horticultural export earnings to economic growth during this study period. Importantly, Kenya is the largest economy in East Africa with a diverse economy and a liberalised horticultural and financial sector.

Additionally, the study focused on four independent variables namely inflation, exchange rate, interest rate and terms of trade). The study employed a moderator variable which was government effectiveness and the dependent variable was horticultural export performance. Government effectiveness plays a pivotal role in shaping economic policies and their impact on various sectors, including horticulture. A robust and efficient government is more likely to implement and enforce policies that positively influence macroeconomic conditions and support the growth of the horticultural industry. By including government effectiveness as a moderator, researchers can assess how the effectiveness of government interventions moderates the relationship between macroeconomic drivers and horticultural export performance.

3.4 Data Sources and Extraction

This study employed time series data. The annual data for horticultural export performance and other independent study variables; exchange rate, terms of trade, inflation and interest rate were retrieved from the Kenya National of Bureau of Statistics (KNBS), The Central bank of Kenya (CBK) while government effectiveness data was retrieved from the World Development governance indicators of the World Bank.

3.5 Data Analysis

The study employed descriptive and inferential statistics in its analysis. STATA-version 14 software of data analysis was employed to estimate descriptive statistic and all regression analyses. The software was also used to carry out test statistics, determination of the short run and the long run relationship between the variables and diagnostic tests. The study employed the Jacque-Bera test proposed by Lomnicki (1961) and Jacque and Bera (1987). This test was employed to ascertain if there is constant variance. The Dickey & Fuller (1979) and Philips & Perron (1988) tests

enabled determination of stationarity. This tests are required because regressing time series variables that are always trended will give rise to spurious regression results. Two tests of stationarity were required to check for robustness (Enders, 2004). The VEC model was utilized to estimate the long-run and short-run relationships among the variables in the study.

3.6 Empirical Model

The study assumed a linear relationship between HXP and the determinants of HXP as evidenced from the available literature. Therefore from the reviewed theories and empirical findings of past studies, this relationship was expressed as:

$HXP_t = f(Exr_t, ToT_t, Dp_t, Ir_t)$.....3.1

Where;

HXP = Horticulture performance

Exr_t= Exchange rate

ToT_t= Terms of trade

Dp_t= Inflation

Ir_t= Interest rate

The specific long-run equation in this study can then be expressed as:

$lnHXP_t = \beta_0 + \beta_1 lnExr_t + \beta_2 lnToT_{t_t} + \beta_3 lnDp_t + \beta_4 lnIr_t + \varepsilon_1$…….....3.2

Where; $lnHXP$ = is the natural logarithm for horticulture performance, $lnExr_t$= is the natural logarithm for exchange rate, $lnToT_t$= is the natural logarithm for terms of trade, $lnIr_t$= is the natural logarithm for interest rate and ε_1 is the error term

3.7 Vector Error Correction (VEC)

Model was customized to analyze the relationship between macroeconomic variables and horticultural exports in Kenya. The VEC Model's main distinguishing factor requires the series to be co-integrated, whereas the VAR model requires non-cointegration. The presence or absence of co-integration dictates which of the two models between VAR and VECM should be fitted for the study's data set. Vector autoregressive (VAR) is a model in econometrics that captures values and interdependencies between multiple time series and generalizes univariate (ARs) models. It is a system of equations equal to the number of variables within the model (Brooks, 2008). Also, each variable is taken as endogenous, and in the VAR system, each variable is a function of its own lagged values (past values) and lagged values of other variables in the model.

If the series is non-stationary and not co-integrated, the researcher differenced the data to induce stationarity before estimating the VAR model. If the series are co-integrated, then the following model from Brooks (2008) is adopted.

$Y_t = \alpha_0 + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \beta_3 Y_{t-3} + \cdots \beta_p Y_{t-p} + \varepsilon_t$…….…… 3.3

Where;

Y_t = the model variables, four by a 1-dimensional vector of the model's endogenous variables.

α_0 = is the model intercept, i.e., four by a 1-dimensional vector of constant.

$\beta_1, \beta_2, \beta_3$ β_4 and β_5 is a 5 by 5-dimensional autoregressive coefficient matrices of the established parameter that relate to lagged values of the variables to their current values.

ε_t = is a four by a 1-dimensional vector of stochastic error term normally distributed with noise properties $N(0, \sigma^2)$, $t-1, t-2, \ldots, t-p$ is the number of lags.

VAR model is not used to capture the dynamics within if the series are not co-integrated. In such cases, the VEC model is employed to describe the relationships. Therefore, VECM is described as a restricted VAR model used for stationary and co-integrated series. In the long-run, co-integrated series share equilibrium, while in the short term, the series may deviate from the equilibrium as they respond to their own shocks where the VEC model is used to correct the short term deviations. The VECM model takes the following form;

$$\Delta X_t = \alpha\beta X_{t-1} + \Gamma_1 \Delta X_{t-1} + \Gamma_2 \Delta X_{t-2} + \Gamma_3 \Delta X_{t-3} + \cdots \Gamma_p \Delta X_{t-p} + \varepsilon_t \ldots\ldots\ldots\ldots 3.4$$

Where

α= is coefficients of the adjustment's matrix,

β = is co-integrating equations matrix coefficients

Γ= is short run coefficients

X_t = model endogenous variables.

3.7.1 Testing Moderation of Government Effectiveness

The study investigated the moderating role of government effectiveness on the relationship between exchange rate, inflation, interest rates, terms of trade and horticultural performance in Kenya. A moderator, according Molonko and Ampah (2018), is a third variable that influences the relationship between the dependent and independent variables. A moderator's impact is defined statically as an interaction that affects the direction and/or strength of the relationship between the independent and dependent variables.

To test the conceptualized relationships, several models are formulated to facilitate the process in accordance with Andrew Hayes (Hayes, 2013). According to Hayes (2013), if the effect of independent variable (*X*) on dependent (*Y*) varies in relation to variation

in moderating variable (*W*) then moderation is deemed to have occurred. Figure 3.1 conceptualize this relationship in a statistical diagram according to (Karazsia & Berlin, 2018).

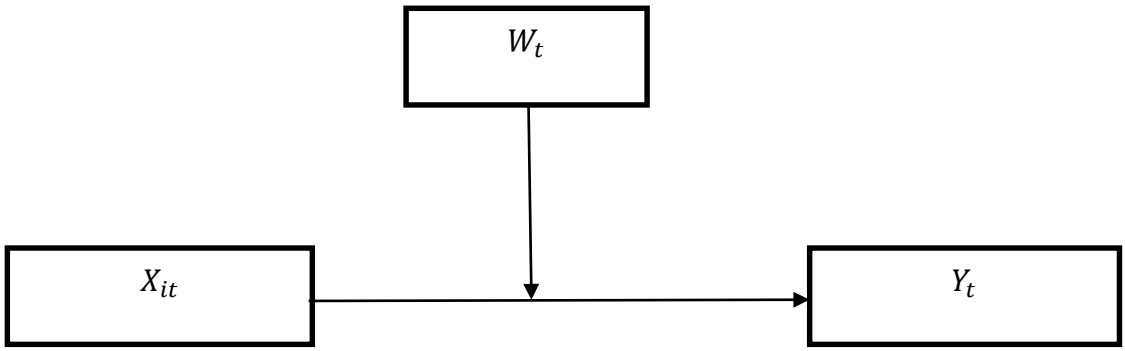


Figure 3. 1: Moderation Analysis
Source: Hayes (2013)

Where, Y_t is the horticultural export performance (HXP), X_{it} stands for the independent variables which can take the form of; exchange rate, terms of trade, inflation and interest rate W_t is the moderating variable (government effectiveness) and *t* is the year.

Precisely, equation 3.3, 3.4, 3.5, 3.6 and 3.7 are models that were be used to measure the effect of moderation of government effectiveness and on each of the independent variables of the study hierarchically.

$$HXP_t = \beta_0 + \beta_1 EXR_t + \beta_2 TOT_t + \beta_3 DP_t + \beta_4 IR_t + \beta_5 GOE_t + e_t \quad \text{.....3.3}$$

$$HXP_t = \beta_0 + \beta_1 EXR_t + \beta_2 TOT_t + \beta_3 DP_t + \beta_4 IR_t + \beta_5 GOE_t + \beta_6 EXR_t GOE_t + e_t \quad \text{.....3.4}$$

$$HXP_t = \beta_0 + \beta_1 EXR_t + \beta_2 TOT_t + \beta_3 DP_t + \beta_4 IR_t + \beta_5 GOE_t + \beta_6 EXR_t GOE_t + \beta_7 TOT_t GOE + e_t \quad \text{.....3.5}$$

$$HXP_t = \beta_0 + \beta_1 EXR_t + \beta_2 TOT_t + \beta_3 DP_t + \beta_4 IR_t + \beta_5 GOE_t + \beta_6 EXR_t GOE_t + \beta_7 TOT_t GOE_t + \beta_8 DP_t GOE_t + e_t \quad \text{.....3.6}$$

$$HXP_t = \beta_0 + \beta_1 EXR_t + \beta_2 TOT_t + \beta_3 DP_t + \beta_4 IR_t + \beta_5 GOE_t + \beta_6 EXR_t GOE_t + \beta_7 TOT_t GOE_t + \beta_8 DP_t GOE_t + \beta_9 IR_t GOE_t + e_t \quad \text{……3.7}$$

3.8 Operationalization of Variables

Table 3.1 presents variable description, its measurement and hypothesized relationship with the dependent variables.

Table 3. 1: Description and Measurement of Variables

Abbreviation	Name of the variable	Description and measurement	Data Source
HXP	Horticulture Export Performance	Total monetary value of goods exported from horticulture measured annually (Kasema, 2023).	KNBS
EXR	Exchange Rate	This is the price of a Kenyan currency (Ksh) against the US dollar (Afuecheta *et al.*, 2024).	CBK
TOT	Terms of Trade	This is the ratio of horticultural export prices to import prices in US dollar (Sundari *et al.*, 2023).	KNBS
INT	Interest Rate	This is the lending interest rate adjusted for inflation as measured by the GDP deflator (Hasran et al.,2023).	CBK
INF	Inflation	This a proxy for consumer prices. General persistent increase in prices of goods and services over a given period (Prati, 2023).	KNBS
GEFF	Government Effectiveness	Government effectiveness assesses the quality of public services, civil service, policy formulation, policy implementation, and the credibility of a government's commitment to improving or maintaining these qualities. This index ranks countries from -2.5 (least effective) to 2.5 (most effective) (more effective). It is one of several government quality indicators (Hang & Lien, 2022).	WORLD BANK

Source: Author's Conceptualization, 2023

3.9 Test for Stationarity

A variable with a unit root is said to be non-stationary. Most macroeconomic variables are unstable at level I(0) (D. Gujarati & D. Porter, 2009). It is critical to test the univariate variables under investigation for the existence of unit roots. A time series

variable's stationarity is an important phenomenon because it can influence its behaviour (Ansari, Park, & Kubo, 2019). If the x_t and y series were non-stationary random processes i.e. integrated processes, modeling the variables and relationship as a simple ordinary least squares relationship would result in a spurious regression (Lütkepohl, Krätzig, & Boreiko, 2006). Augmented Dickey Fuller (ADF), Phillips-Perron (PP), Elliot-Rothenberg-Stock (ERS), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) are used to determine the presence of a unit root.

$$Y_t = \beta Y_{t-1} + \varepsilon_t \quad \text{.....3.8}$$

If β is equal to one, the model has a unit root and the time series has non-stationarity characteristics. In absolute value, β must be less than one i.e. $-1 < \beta > 1$. The variables' stationarity will be tested using the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests.

3.9.1 Augmented Dickey–Fuller (ADF) Test

This was proposed by Dickey and Fuller proposed this (1981). The Augumented Dickey Fuller test is based on the following model to account for all types of unit roots:

$$\Delta y = \alpha + \beta y_{t-1} + \delta t + \sum_{j=1}^{k} \alpha_j \Delta y_{t-j} + \varepsilon_t \quad \text{.....3.9}$$

The test involves fitting the regression model;

$$\Delta Y_t = \varphi Y_{t-1} + \sum_{j=1}^{p-1} \alpha_j^* \Delta Y_{t-j} + \upsilon_t \quad \text{.....3.10}$$

by ordinary least squares (OLS), but serial correlation will present a problem. To account for this, the Augmented Dickey–Fuller test regression comprises lags of the first differences of ΔY_t. Phillips and Perron (1988) proposed two alternative statistics, Phillips and Perron's test statistics can be viewed as Dickey–Fuller statistics that have

been made robust to serial correlation by using the Newey and West (1987), heteroskedasticity and autocorrelation-consistent covariance matrix estimator.

3.9.2 Phillips-Perron Test

The following model is used in the test;

$$\Delta Y_t = \varphi Y_{t-1} + \sum_{j=1}^{p-1} \alpha_j^* \Delta Y_{t-j} + \upsilon_t \quad \text{.....3.11}$$

Augmented Dickey–Fuller test regression comprises lags of the first differences of ΔY_t to avoid serial correlation. Phillips and Perron (1988) proposed two alternative statistics, Phillips and Perron's test statistics can be viewed as Dickey Fuller tests that have been made robust to serial correlation by using the Newey and West (1987).

3.10 Unit Root Tests with Structural Breaks

This study applied annual time series data spanning the period 1990 to 2021. This time period includes a wide range of macroeconomic events and policy positions. The relative economic tranquility of the 1980s, price controls, and a fixed foreign exchange rate regime prior to 1990 were all important features of this time period. In response to the International Monetary Fund's stringent policy prescriptions, Structural Adjustment Programs were implemented in the 1990s. Government liberalization and monetary restraint marked the decade of the 2000s. Some of these occurrences were natural and may have had a short-term impact on public safety and sustainability.

According to Ouma (2006) the policy positions for the time period under consideration were also distinct. Control of interest rates, or interest rate targeting, control of credit expansion, and domestic credit ceilings were the monetary policy objectives between 1990 and 2020. During this time, the fiscal deficit was low. There was a persistent

balance of payment problem and severe structural macroeconomic constraints and horticultural export fluctuations from 1991 to 2010.

Since 1991/92, the economy has seen the use of indirect monetary policy instruments such as monetary targeting, flexible exchange rates, interest rate liberalization, money market interest rates, and the use of open market operations. Following 2002, the government enacted massive stimulus fiscal policy, necessitating increased fiscal spending and stringent fiscal reforms, which would have had an impact on Kenya's horticultural export performance.

Furthermore, the post-election violence of 2007/2008 slowed economic growth, increased government spending, and decreased horticultural export performance. The government, through its legislative arm, reintroduced a four percent interest rate cap in Kenya, the CBK base rate (Banking Act, 2016). This law went into effect on September 4, 2016, and will remain in effect until November 5, 2019. As a result, policy instruments such as the fiscal deficit, exchange rate, inflation, and interest rate variables were distinct during this period, as was the targeted goal of improving agricultural sector and horticultural export performance. Furthermore, the government's fiscal and monetary policy responses to the COVID-19 pandemic serve as the foundation for an economic structural break test of horticultural export performance.

3.10.1 Zivot Andrews Unit Root Test with Structural Break

As Perron (1990) points out, when the data are trend stationary with a structural break, conventional unit root tests are biased toward a false unit root null. This observation prompted the development of a large body of literature outlining various unit root tests that remain valid in the presence of a break. Because traditional unit root tests can

produce false results when the time series contains shocks. As the Zivot and Andrews (1992) method considers the selection of break points in the results estimation process, it will be used in the analysis of this study. Zivot and Andrews (1992) test will test the unit root's null hypothesis against the alternative of a one-time structural split with three models. The first Model will allow a one-time change in the series point or trend, the second Model will allow for a one-time change in the slope of the series' trend function and the third Model will allow all changes (Lee & Strazicich, 2004). The equations of regression which corresponds to these three scenarios are:

$$\Delta Y = \mu + \beta_t + \alpha Y_{t-p} + \varphi DU_t + \sum_{i=1}^{p} C_i \Delta Y_{t-i} + \varepsilon_i \quad \ldots\ldots 3.12$$

$$\Delta Y = \mu + \beta_t + \alpha Y_{t-p} + \gamma DT_t + \sum_{i=1}^{p} C_i \Delta Y_{t-i} + \varepsilon_i \quad \ldots\ldots 3.13$$

$$\Delta Y = \mu + \beta_t + \alpha Y_{t-p} + \gamma DU_t + \varphi DT_t + \sum_{i=1}^{p} C_i \Delta Y_{t-i} + \varepsilon_i \quad \ldots\ldots 3.14$$

Where DT_t DU_t and will be break point dummy variables for a trend shift a mean shift respectively. The shifts will occur at each possible break point: $T_B(1<T_B<T)$ formally which can be illustrated as:

$$DU_t = \begin{cases} 1\ if, t \geq T_B and \\ 0, Otherwise \end{cases} \quad \ldots\ldots 3.15$$

$$DU_t = \begin{cases} t - T_B\ if, t \geq T_B and \\ 0, Otherwise \end{cases} \quad \ldots\ldots 3.16$$

Whereby T_B is the specified break date p is the number of optimum lags determined for each possible break point by one of the information criteria that is AIC and BIC. The null hypothesis is $\alpha = 0$, which implies that the series exhibits a unit root with a drift

and excluded any structural break points. The alternative hypothesis is $\alpha < 0$, which implies that the series is trend-stationary with an unknown one-time break.

3.10.2 Clemente-Montañés-Reyes Unit Root Test with Two Structural Breaks

In a situation with more than one structural break, the Zivot Andrews test may be inefficient since it incorporates only one structural break in the data even if more than one break could be present. The Clemente-Montañés-Reyes unit root test (1998) was applied in this study to resolve this sort coming. The test statistic for null hypothesis H_0 against alternative hypothesis that is H_1 is given by;

$$H_o: Y_t = Y_{t-p} + \varphi_1 DTB_{1t} + \varphi_2 DTB_{2t} + \varepsilon_t \quad \text{.....3.17}$$

$$H_1: Y_t = \mu + \omega_1 DU_{1t} + \omega_2 DTB_{2t} + \varepsilon_t \quad \text{.....3.18}$$

In the above two equations DTB_{it} was the pulse variable equivalent to 1 if $t = TB_i + 1$ and zero if otherwise. Further, $DU_{1t} = 1$ if $TB_{it} < t(i = 1,2 \ldots)$ and if this assumption is violated then DU_{1t} will be equal to zero. The mean modification will be represented by the time periods TB_1 and TB_2. Further, it will be simplified with the assumption that $TB_i = \varphi_i T(i = 1,2)$ where $> \varphi >$ while $\varphi_1 < \varphi_2$ Clemente-Montañés-Reyes (1998). If we have an innovative outlier containing two structural breaks then the following test for unit root is performed:

$$Y_t = \mu + \tau Y_{t-p} + d_1 DTB_{1t} + d_2 DTB_{2t} + d_3 DU_{1t} + d_4 DU_{2t} + \sum_{i=1}^{p} C_j \Delta Y_{t-p} + \varepsilon_t \quad \text{.....3.19}$$

This equation was used to estimate the minimum value of the t-ratio through simulations and the value of the simulated t-ratio will be utilized to identify all break

points if the value of the autoregressive parameter is constrained to a unit (Shahbaz, Zeshan, & Afza, 2012).

For the derivation of the asymptotic distribution of the said estimate, it will be assumed that $\varphi_1 > \varphi_2 > 0 : 1 > \varphi_2 - 1 > \varphi_0 : \varphi_1 and\ \varphi_2$ obtain the values in the interval that is,$\frac{t+2}{T}, (T-1)/T$ by selecting the largest window size. Further, $\varphi_1 < \varphi_2 + 1$ will be used to show that cases where break points exist in repeated periods will purged as shown by (Baum, 2018).

When shifts are better able to explain additive outliers, a two-step approach is used to test the unit root hypothesis. The deterministic variable is removed from the estimation in the first step, and the minimum t-ratio and hypothesis $\varphi_1 = 1$ is tested in the second.

3.11 Lag Length Selection Criteria

The number of lags to include in the analysis must be determined by balancing the marginal benefits of including more lags with the marginal cost of increased estimation uncertainty. If the estimation order is too low, the research may miss crucial information contained in the omitted lag periods. However, if it is set too high, many unnecessary coefficients will be estimated. In this study, the Akaike Information Criterion (AIC), Hannan and Quinn Information Criteria (HQIC), Sequential modified LR test statistic, Final Prediction Error (FPE), and Schwarz Bayesian Information Criteria (SBIC) will be used to estimate the optimal lag length.

The Schwarz Information Criterion selects the most parsimonious models with the fewest coefficients whereas AIC selects the most lavish models (Luetkepohl, 2009). Generally the decision rule is to pick the model with the lowest value of the information criteria to ensure that the error term is not mispecified (Gordon, 1995).

When the focus is on the within-sample fit or estimation of the dependent variable, model fit measures and testing procedures based on the sum of squared residuals, such as R^2 are useful. Within-sample measures are not always optimal when the model is being built for forecasting. As we have seen, as more variables are added to a model, R^2 cannot fall, so there is an inherent tendency to over fit the model, limiting its potential as the best predictive model, because adding variables to a model increases the variance of the forecast error. Because adding variables to the model may increase the variance of the forecast error, this criterion may lead us away from the best forecasting model. It has been suggested that R squared is a fit metric that penalizes the loss of the degree of freedom resulting from the addition of variables to the model.

$$\acute{R}^2 = \left\{\frac{n-1}{n-k}\frac{\hat{e}'\hat{e}}{(\varepsilon y-\acute{y})^2}\right\} \quad \text{.....3.20}$$

The question arises as to whether the penalty is sufficiently large to ensure that the criterion necessarily leads the analyst to the correct model as the sample size increases. Two alternative fit measures that have been suggested are the Akaike Information Criterion;

$$AIC\ (K) = S_y^2\ (1 - R^2)\ \varepsilon^{\frac{2k}{n}} \quad \text{.....3.21}$$

Normally reported in log form in most econometric soft-wares as;

$$AIC\ (K) = ln\left[\frac{\varepsilon'\varepsilon}{n}\right] + \frac{2k}{n} \quad \text{.....3.22}$$

and the Schwarz or Bayesian Information Criterion,

$$\text{BIK (K)} = S_y^2\ (1\text{-}R^2)\ \varepsilon^{k/n} \quad \text{.....3.23}$$

Reported in log formas;

$$BIC\ (K) = ln\left[\frac{\varepsilon'\varepsilon}{n}\right] + \frac{klnn}{n} \quad \text{.....3.24}$$

The better model has less AIC and BIC because as R^2 increases the values declines but everything else remain constant (Greene, 2003).

3.12 Co-integration Tests

The maximum likelihood method test developed by Johansen and Juselius (1990) was used to investigate the existence of a long-run relationship between a dependent variable and the independent variables. If two or more variables have a long-term or equilibrium relationship, they are said to be co-integrated. As a result, it was critical that variables be tested for co-integration after stationarity tests.

The study employed a co-integration method based on Johansen's maximum likelihood framework that includes a multiple trace test procedure, the maximum eigenvalue test, and a method based on minimizing one of two different information criteria. According to Becketti (2013), standard regression techniques such as Ordinary Least Square (OLS) require variables to be covariance-stationary, i.e., have a finite mean and variance process at the level, so co-integration is important because it allows inference and interpretation of variables that are not covariance-stationary.

3.13 Model Diagnostic Tests

3.13.1 Normality Test

The Jack Bera (JB) test is an asymptotic test that uses the following statistic to determine the skewness and kurtosis of OLS residuals.

$$JB = n\left[\frac{s^2}{6} + \frac{(K-3)^2}{24}\right] \quad \text{.....3.25}$$

Where n is the sample size, s = skewness and K the kurtosis coefficient.

The null hypothesis of normality is compared to alternative hypothesis of non-normal distribution. The JB statistic should be statistically indifferent from zero for a normal

distribution. If the null hypothesis is rejected for any of the variables, it means the variables are not normally distributed, and a Logarithmic transformation is required.

3.13.2 Autocorrelation

Watson and Durbin created the Durbin Watson Test (1951). Error terms are assumed to be distinct from one another. Autocorrelation, also known as serial correlation, is useful when there is a linear correlation between the error term for one observation and the error term for the next. This is more applicable to time series data, which is organized by time. The Durbin Watson Test makes use of the following statistic.

$$d = \frac{\sum_{i=z}^{n}(\varepsilon_i - \varepsilon_{i-1})^2}{\sum_{i=1}^{n}\varepsilon_i{}^2} \quad \text{.....3.26}$$

Where $\varepsilon_i = y_i - y$ (are the residuals), n is the number of elements in the sample and z the number of independent variables. d takes on values between 0 and 4. If $d = 2$, no autocorrelation, d is less than 2, positively auto correlated, small values of d indicate successive error terms are positively correlated and d is greater than 2, negatively auto correlated.

3.13.3 Multicollinearity

Multicollinearity refers to a condition in which two or more explanatory variables in a multi-regression model are strongly linearly related. If the association between two independent variables is equal to 1 or −1, we have perfect multicollinearity. Virtually, we rarely face total multicollinearity in a data set. More generally, the problem of multicollinearity occurs when there is an apparent linear relationship between two or more independent variables. A set of variables is perfect multicollinear if there is one or more exact linear relationship between some of the variables the following condition is satisfied (Gujarati, 2009);

$s\lambda_1 x_1 + \lambda_2 x_2 + \cdots \lambda_k x_k = 0$ …….....3.27

Where $= 1$, $\lambda_{i's}$ are constants and that not all of them are zero simultaneously. However, in a situation where we have both perfect collinearity as well as the case where the X variables are interrelated though not perfectly, the following equation follows;

$\lambda_1 x_1 + \lambda_2 x_2 + \cdots \lambda_k x_k + v_i = 0$……..……..…3.28

v_i is the error term. In ordinary least squares method we seek to establish;

$\beta = (X^{\intercal}X)^{-1}X^{\intercal}Y$ Where;

$$X = \begin{bmatrix} 1 & X_{11} \dots X_{11} \\ & \vdots \quad \vdots \\ 1 & X_{1N} \dots X_{KN} \end{bmatrix}$$……..……..3.29

If there is a perfect relationship between the independent variables, at least one of the columns of X is a linear combination of the others, and so the rank of X and $(X^{\intercal}X)$ is less than k, and the matrix$(X^{\intercal}X)$ will not be invertible, i.e. singular matrix.

If there is a perfect relationship between the independent variables, at least one of the columns of X is a linear combination of the others, and the rank of X and the rank of (X) is less than k, and the matrix of (X) is not invertible, i.e. the matrix of singular matrix. The study used Variance Inflation vector.

3.13.3.1 The Variance Inflation Factor

The variance inflation factor, (VIF) is the quotient of the variance of the multiple-term model by the variance of the single-term model. It quantifies the magnitude of the multi-collinearity in the ordinary least square regression analysis. This sets out an index that

determines how much the variance (the square of the standard deviation of the estimate) of the estimated regression coefficient is increased due to collinearity.

$$VIF = \frac{1}{1-R^2} \quad \text{.....3.30}$$

The higher the value of VIF, the more collinear the element. As a rule of thumb, if the VIF of a variable exceeds 10, which occurs when R^2 exceeds 0.9, that variable is said to be highly collinear and therefore calls for remedial measures Sheather (2009).

3.13.4 Heteroscedasticity

If the variance of the random disturbance is different across elements of the vector or the variance-covariance matrix of disturbance ε_i across the diagonal is non-constant, then heteroscedasticity exist i.e.

$$\left[Y = \delta^2 \begin{Bmatrix} x_1 & 0 & 0 \\ 0 & x_2 & 0 \\ 0 & 0 & x_3 \end{Bmatrix}\right] \quad \text{.....3.31}$$

Breusch-Godfrey and white test were used to test for the presence of heteroscedasticity .If detected it is fixed by Heteroscedasticity consistent standard errors (HCSE) (D. N. Gujarati & D. C. Porter, 2009).

3.14 Ethical Considerations

The researcher considered the fundamentals of ethical analysis, and how it will impact the report, according to (Polonsky & Waller, 2018). In accordance with this, the researcher obtained an introductory letter as part of the requirements of Moi University which was to maintain confidentiality and assurance that the thesis will be for academic purposes only. The researcher adhered to the standards on intellectual property by

properly acknowledging the sources of information, and all references were properly cited and referenced in the APA format.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Overview

This section summarizes the findings in relation to the objectives, beginning with descriptive statistics and progressing to inferential statistics. Means, minimum and maximum values, and standard deviations are all descriptive terms. The correlation relationships between the variables are also described. The chapter also discusses the findings of the univariate properties of each series (graphical representation), as well as the Augmented Dickey Fuller and Philip-Perron for stationarity checks. Some structural breaks, vector error correction model Regression analysis results, and hypothesis testing are presented. The results are presented using charts, tables, and figures.

4.2 Summary of Descriptive Statistics

The research variables under study for the years 1990 to 2021 are shown in Table 4.1 raw summary descriptive statistics. From the table above, the mean of horticulture exports performance was Kshs.62.3 billion (standard deviation = Kshs. 64.1billion; Minimum= Kshs. 16.0 billion; Maximum= Kshs.170 billion. The gap between the minimum value and the maximum value of horticulture exports performance was big as indicated by the difference between the minimum and the maximum values. This was also supported by higher value of standard deviation.

Table 4.1: Summary of Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Horticulture exports performance	32	6.23E+10	6.41E+10	1.60E+7	1.70E+11
Exchange rate	32	74.80784	22.15893	22.91477	109.6377
Inflation	32	10.59902	8.811721	0.9332055	41.98877
Interest rate	32	7.926303	7.415741	-10.096	21.09633
Government effectiveness	32	-0.491476	0.1047609	-0.702119	-0.301507
Terms of trade	32	99.75453	9.964702	70.14925	114.61

Source: Author (2023)

The mean of exchange rate was 74.80784(standard deviation =22.15893; Minimum =22.91477; Maximum = 109.6377. The gap between the minimum value and the maximum value of exchange rate was relatively bigger as indicated by the difference between the minimum and the maximum values. This was also supported by a relatively higher value of standard deviation of 22.15893.

Inflation averaged 10.59902 (standard deviation: 8.811721; minimum:.9332055; maximum: 41.98877). The difference between the minimum and maximum values of inflation was significant, as indicated by the difference between the minimum and maximum values. This was supported by a higher standard deviation of 8.811721. The average interest rate was 7.926303 (standard deviation: 7.415741; minimum: -10.096; maximum: 21.09633). The difference between the minimum and maximum interest rates was significant, as indicated by the difference between the minimum and maximum values. This was supported by a higher standard deviation of 7.415741.

The average level of government effectiveness was -.4914755 (standard deviation =.1047609; Minimum=.-.7021186; Maximum=.3015067). As indicated by the difference between the minimum and maximum values, the gap between the minimum and maximum values of government effectiveness was small. This was supported by a lower standard deviation of.1047609. The mean of trade terms was 99.75453 (standard deviation =9.964702; Minimum=.70.14925; Maximum=114.61). The difference between the minimum and maximum terms of trade values was small, as indicated by the difference between the minimum and maximum values. This was supported by a lower standard deviation of 9.964702.

4.3 Stationarity Checks

Unit root testing was performed on the six variables that would be assessed for Kenya's horticultural export: exchange rate (EXRT), government effectiveness (GE), Inflation (INF), interest rate (INTR) and terms of trade (TOT) and horticultural exports performance (HEP). The test for the null hypothesis was that the variable had no stationary (presence of unit root), against an alternative hypothesis that there was no unit root. When the test statistic exceeds the 5-percentage critical value, the null hypothesis is rejected and the absence of a unit root is inferred; in other words, when, we accept stationarity and reject the null hypothesis. The first difference is taken when a unit root is present in order to eliminate it.

4.3.1 Phillips-Perron Test

The Philips Perron tests were developed collaboratively by Phillips and Perron (Cheung & Lai 1997). Philips Perron has improved the Dickey Fuller test by taking serial correlation into consideration. It corrects for serial correlation by using the heteroscedasticity-autocorrelation consistent covariance matrix from Newey (1987). It

contrasts the null hypothesis—that the series has a unit root—with the alternative, according to which the series was produced by a stationary process. Table 4.2 provides the results of the Philips Peron test for unit roots. The Table further shows that exchange rate (EXRT), government effectiveness (GE), and horticultural exports (HEP), were not stationary at levels. Inflation (INF), interest rate (INTR) and terms of trade (TOT) were all stationary at levels. This failed to reject the null hypothesis of presence of unit root at all levels of significance. However, it is observed that on first difference, exchange rate (EXRT), government effectiveness (GE), and horticultural exports (HEP), were all stationary p- < 0.05.

Table 4.2: Philips Perron Unit Root Test

	ADF test statistic		Critical values			Conclusion
Variable		P	1%	5%	10%	
EXRT	-1.877	0.2967	-3.709	-2.983	-2.623	Nonstationary
INF	-4.407	0.0003	-3.709	-2.983	-2.623	stationary
INTR	-5.156	0.0008	-3.709	-2.983	-2.623	stationary
GE	-1.244	0.6544	-3.709	-2.983	-2.623	Nonstationary
TOT	3.382	0.0116	-3.709	-2.983	-2.623	stationary
HEP	-1.901	0.3318	-3.709	-2.983	-2.623	Nonstationary
			First Difference			
EXRT	-5.886	0.0000	-3.716	-2.986	-2.624	Stationary stationary
GE	-5.707	0.0000	-3.716	-2.986	-2.624	Stationary
HEP	-5.715	0.0000	-3.716	-2.986	-2.624	Stationary

Source: Author (2023)

4.3.2 Augmented Dickey Fuller Test for Unit Root

The second technique unit test employed in this study was the Augmented Dickey Fuller test (ADF), which was developed by Dickey and Fuller in 1979. This test, (ADF) test has the null hypothesis that the series contains unit root against alternative hypothesis that the series is stationary. If variables are found to be non-stationary, it is corrected by differencing the variable. The results of Augmented Dickey Fuller test is

presented in Table 4.3. The results showed that Inflation (INF), interest rate (INTR) and terms of trade (TOT) were all stationary at levels. However, it was observed that on first difference; horticultural exports (HEP), exchange rate (EXRT) and government effectiveness variables achieved stationarity. This is indicated by its critical values which were less than 5 percent, this rejected the null hypothesis of unit root and hence, *I (1).*

Table 4. 3: Augmented Dickey Fuller Unit Root Test

	ADF test statistic		**Critical values**			**Conclusion**
Variable		**P**	**1%**	**5%**	**10%**	
EXRT	-1.919	0.3231	-3.709	-2.983	-2.623	Non-stationary
INF	-4.278	0.0005	-3.709	-2.983	-2.623	Non-stationary
INTR	-4.067	0.0011	-3.709	-2.983	-2.623	Non-stationary
GE	-1.190	0.6780	-3.709	-2.983	-2.623	Non-stationary
TOT	-1.413	0.0105	-3.709	-2.983	-2.623	Stationary
HEP	-1.778	0.3912	-3.709	-2.983	-2.623	Non-stationary
			First difference			
EXRT	-5.198	0.0000	-3.716	-.2.986	-2.624	Stationary
GE	-5.205	0.0000	-3.716	-.2.986	-2.624	Stationary
HEP	-5.702	0.0000	-3.716	-.2.986	-2.624	Stationary

Source: Author (2023)

It is indicated by $(\text{p value} < 0.05)$ which rejects the null hypothesis in favor of the alternative hypothesis. The existence of stationarity in first difference implies that there is long term association among variables in the study. Therefore, it was concluded that the study variables were integrated of order one, denoted by *I (1).* This supports the earlier findings of (Lutkepohl, 2005; Hamilton, 1994) that macroeconomic variables are not stationary at levels but becomes stationary after first difference (Greene, 2012) The critical reference value for this was 5 percent. All absolute Mackinnon $Z\ (t)$ values less than absolute critical values of 5 percent.

4.3.3 Unit Root Test with Structural Breaks

Checking for unit tests in the presence of structural breaks was the next step in the data analysis process. (Baum, 2005) argued that the Philips-Perron and Dickey Fuller test, which employs the DF-GLS unit root test, may be biased because it ignores the effect of structural change in a time series data. As a result, the author suggested a different approach to account for structural breaks in a particular series: the Clemente-Montaés-Reyes unit-root test with single mean shift, Additive Outlier model. Additive outlier (AO) is applicable when the change is assumed to affect instantaneously.

4.3.4 Clemente-Montañés-Reyes Unit-root Test with Single Mean shift, Additive Outlier Model

The Clemente-Montaés-Reyes unit-root test with a single mean shift and additive outlier model was used to achieve this. With the null hypothesis that rho - 1 is different from zero, Clemente, Montanes, and Reyes (1998) examine the unit root test in the presence of a double structural break in each time series.

The results of the Clemente-Montaés-Reyes unit-root test with a single mean shift are graphically represented to help identify notable events like regime changes, changes in governmental policies, economic crises, and other significant features that occurred and caused a macroeconomic series to break (Jha, 2011). The results of the subsequent data analysis stage, which tested for a unit root with two structural breaks, are shown in Table 4.4. While there may be multiple structural breaks in the system, the Zivot-Andrews test for unit root only considers one structural break in time series data (Samoei & Kipchoge 2021). Therefore, Clemente-Montaés-Reyes tests had to be run to determine whether there were two structural breaks in each of the univariate time series. Figure 4.1 presents Clemente-Montañés-Reyes unit-root test with double mean shifts,

AO model suggested two major optimal break breaks for Kenya's exchange rate at 1996 and 2012. The first gap in 1996 was related to the uncertainties brought on by the 1997 general election and the potential for regime changes. The other notable split occurred in 2012 and was brought on by balance of payment factors that weakened and prolonged Kenyan currency rate instability.

Table 4.4: Clemente-Montañés-Reyes Unit-root Test with Single Mean Shift Results

Variable	Breaks	Coefficient	t - statistic	Rho-1	p – value	Year
EXRT	DU1	30.9008	6.858	-3.826	0.0000	1996
	DU2	25.10728	6.060	-5.490	0.0000	2012
INFL	DU1	-6.63010	-1.464	-6.006	0.005	1994
	DU2	-1.74420	-0.526	-5.490	0.003	2007
INTR	DU1	-12.04912	-3.948	-5.630	0.0000	2002
	DU2	8.12498	2.663	-5.490	0.0013	2008
GE	DU1	-1.11064	-4.928	-4.258	0.0000	2000
	DU2	0.22264	9.672	-5.490	0.0000	2011
TOT	DU1	1.38497	0.376	-3.750	0.706	2000
	DU2	10.27525	2.295	-5.490	0.029	2015
HEP	DU1	3.46486	7.006	-2.026	0.000	1997
	DU2	3.83211	8.930	-0.561	0.0000	2004

Note: DU and rho – 1 represent time structural break and unit
Source: Research Analysis, 2023

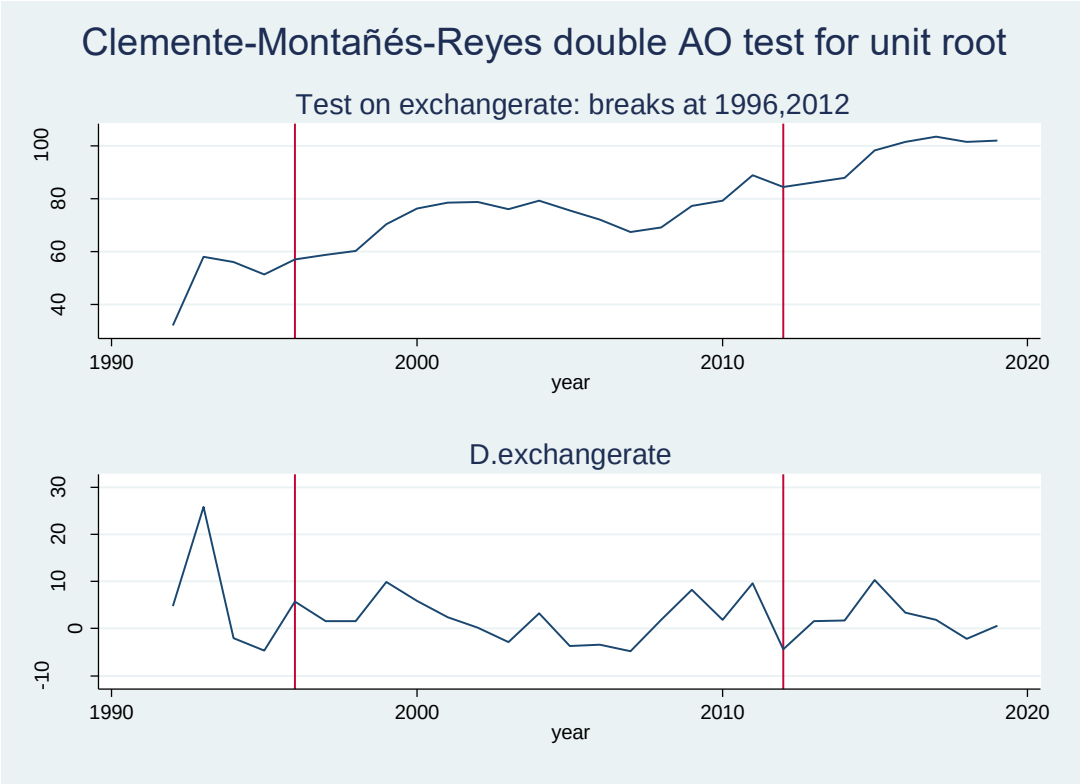


Figure 4. 1: Structural Breaks for exchange rate in Kenya

Source: Research Analysis, 2023

Interest rate exhibited two major structural breaks in 1994 and 2009, (p-value 0.0000). This fundamental flaw resulted from commercial banks' expectation that their lending interest rate will be increased.

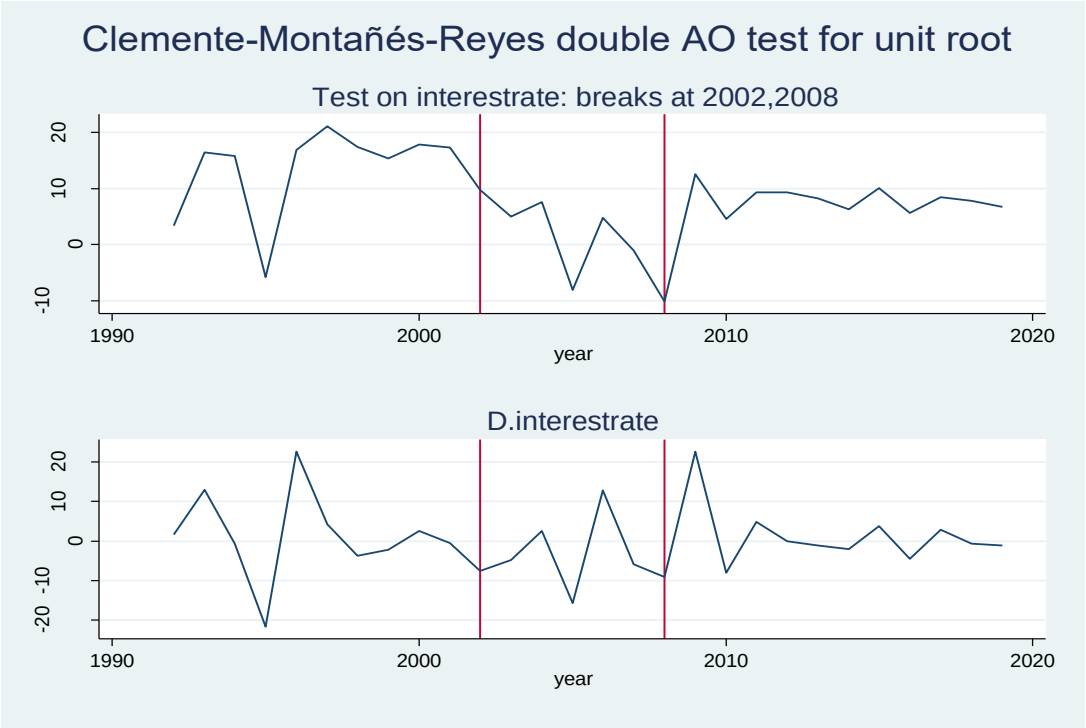


Figure 4. 2: Structural Breaks for interest rate in Kenya

Source: Research Analysis, 2023

Inflation had two significant structural breaks in 1996 and in 2012. The study associated the two breaks with political shocks. According to Yaya, et al. (2019), Political shocks, such as the 1990s political transition and the 2008 post-election violence have also had an impact on Kenya's inflation rate. Over the past 50 years, Kenya's inflation rates have also been highly erratic, triggered by both supply-side and demand-side shocks.

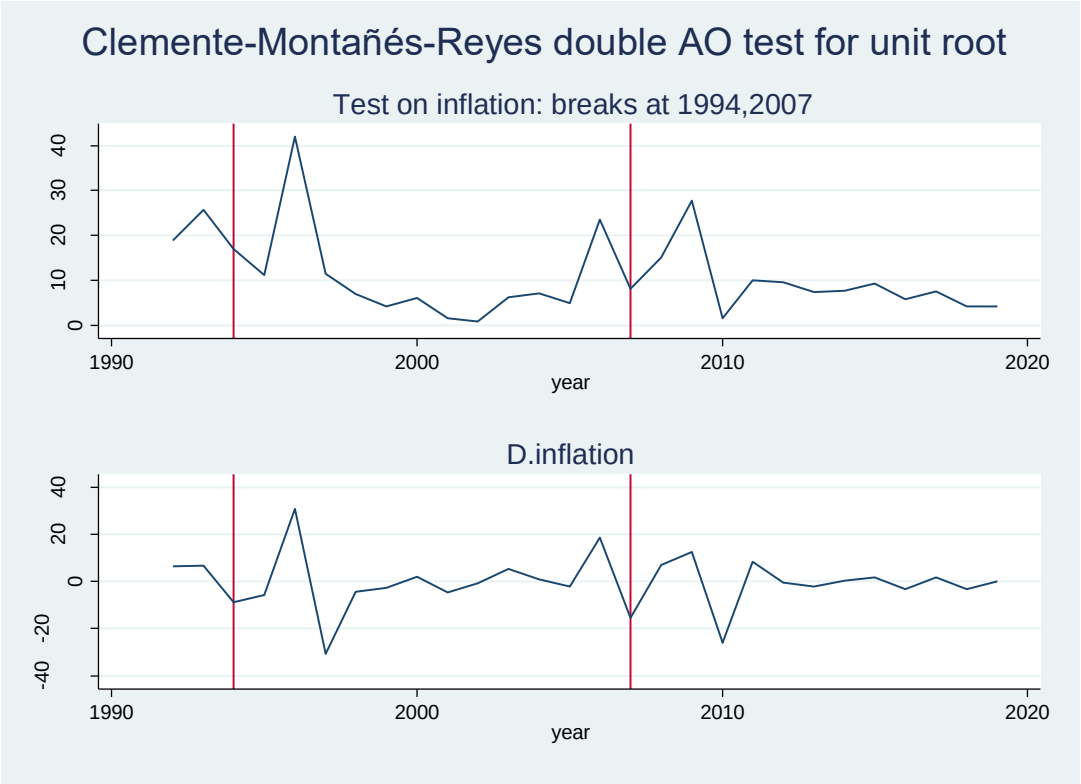


Figure 4. 3: Structural Breaks for inflation in Kenya

Source: Research Analysis, 2023

Government effectiveness exhibited two significant structural breaks, one in the year 2000 and another one in 2011. The global crisis, falling commodity prices, deferred structural adjustment measures, the country's leadership turnover, as well as slow prospects like institutional quality and distributional politics are all strongly related to the both structural breaks. Government effectiveness, according to Kimenyi et al. (2015), is a measure of the caliber of the civil service and its resistance to political influence, the caliber of the formulation and implementation of policies, and the legitimacy of the government's adherence to its stated policies.

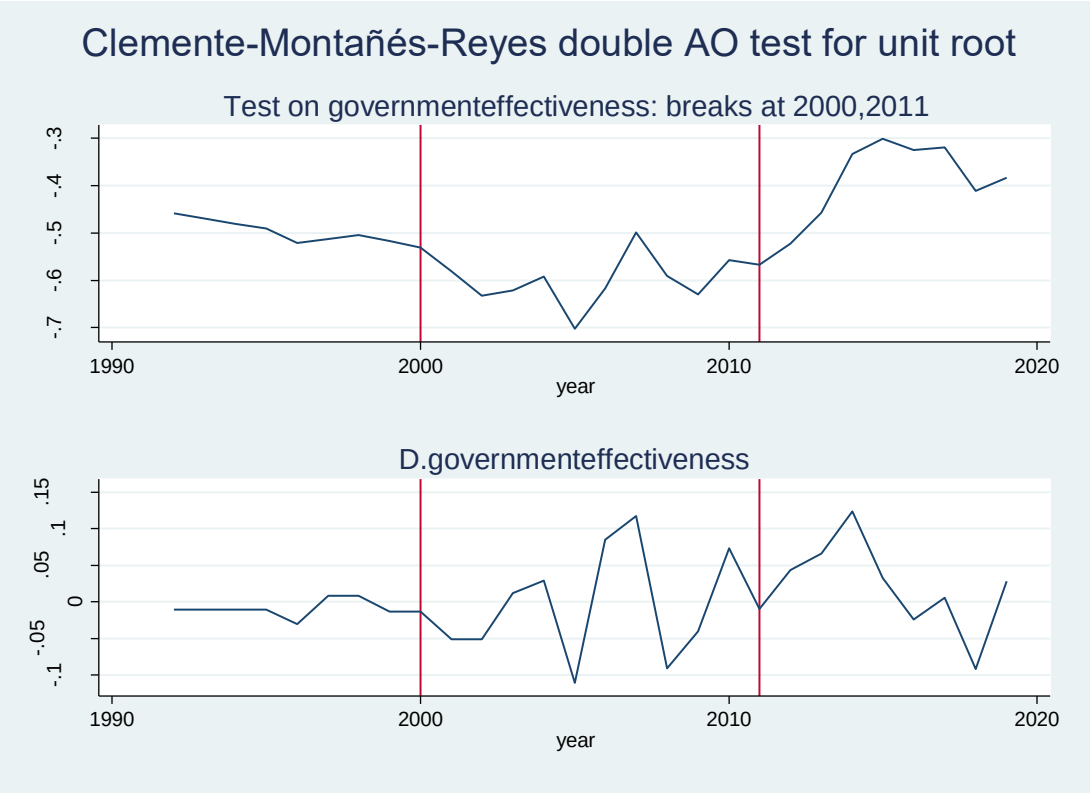


Figure 4. 4: Structural Breaks for government effectiveness in Kenya

Source: Research Analysis, 2023

The figures below illustrate that exports of horticulture revealed two significant structural discontinuities in 1997 and 2004 (p-value 0.0000). Slowed economic growth of 1.7% in 1997 and the first multiparty election in Kenya and 2.60% in 2004 and anxiety of the new referendum campaigns helps to explain the two structural collapses.

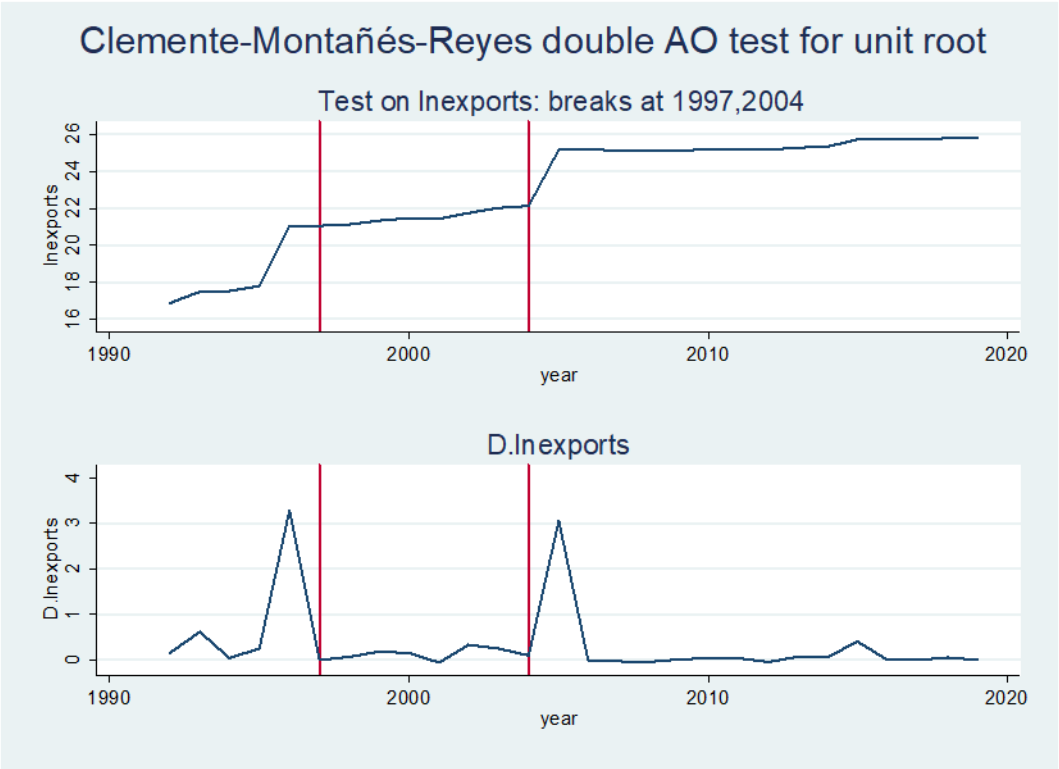


Figure 4. 5: Structural Breaks for horticultural exports in Kenya

Source: Research Analysis, 2023

4.4 Diagnostic Tests

4.4.1 Normality test

For the purpose of determining whether or not the data are normally distributed, the Jarque-Bera Test was carried out; the conclusion reached by this test is that the null hypothesis cannot be rejected if the p-value is smaller than the Chi (2) value. It was determined that the residuals followed a normal distribution. The results presented in table 4.6 indicate that the p value of chi (2) is 0.5098, which is higher than 0.05, which indicates that the null hypothesis cannot be rejected. The consequence is that the premise of normal distribution has not been violated in any way. In the Jarque-Bera test, the null hypothesis (Ho) states that "residuals of variables are normally distributed." The Jarque-Bera test revealed a p-value of .5098, which is a result that is

significantly higher than 0.05. The null hypothesis was not rejected, and therefore the residuals are distributed normally.

Table 4. 5: Jar-Bera Test for Normality

Source	chi2	Df	Prob>chi2
Jarque-Bera normality test	01.347	1	0.5098

Source: Research Analysis, 2023

4.4.2 Autocorrelation Test

The Breusch-Godfrey Lm test was utilized in order to perform an autocorrelation analysis on the residuals. At a threshold of significance equal to five percent, a comparison was made between the null hypothesis—that there is no serial correlation—and the alternative hypothesis—that there is a serial correlation. According to Breusch (1978) and Godfrey (1978), the decision criteria is that the null hypothesis of no serial correlation should be rejected if the p values that correspond to the chi-square test statistics are less than the 5 percent level of significance. On the other hand, the null hypothesis of no autocorrelation should be accepted if the p value that corresponds to chi-square is greater than the 5 percent level of significance. The findings of this research were substantiated once again when the Durbin-Watson test of serial correlation was applied.

The results of the Breusch Godfrey Lm test and the DW test for serial correlation are displayed in table 4.7. The p value that corresponds to chi-square in the preceding table is 0.060, which is higher than the level of significance of 5% (0.05). As a result, the null hypothesis that there is no serial correlation is accepted. The result of the Durbin

Watson test, which was 1.6786, lends further credence to the null hypothesis that there is no serial correlation. When the values of the test statistic range from 1.5 to 2.5, the rule of thumb states that there is no serial correlation.

Table 4.6: Breusch-Pagan-Godfrey LM Test for Serial Correlation

Source	Chi2	Df	Prob>chi2
Breusch Godfrey LM test for Autocorrelation(lags(1))	2.557	1	0.060
Durbin Watsin Test d statistic			1.6786

Source: Research Analysis, 2023

4.4.3 Heteroscedasticity Test

The Breusch-Pagan test was utilized in order to examine the heteroscedasticity test for residuals. The alternative hypothesis of heteroscedasticity was compared against the null hypothesis of homoscedasticity in order to determine which one was accurate. According to Breusch and Pagan (1979), the null hypothesis of homoscedasticity is accepted if the p values that correspond to the chi-square test statistics are greater than the 5 percent level of significance. On the other hand, the null hypothesis of homoscedasticity is rejected if the p values that correspond to the chi-square test statistics are less than the 5 percent level of significance.

According to the findings of this test, which are presented in the table 4.8 located above, the residuals of the model are of a homoscedastic distribution. This is substantiated by the p values that correspond to the chi-square test statistics of 0.0913, which is greater than the significance limit of 5 percent (0.05). Because of this, we can deduce that the model's residuals have a constant variance.

Table 4. 7: Breusch-Pagan test for Heteroscedasticity

Source	chi2	Df	Prob>chi2
Heteroscedasticity	2.85	13	0.0913

Source: Research Analysis, 2023

4.5.4 Multicollinearity Test

When many explanatory variables that are utilized in a regression model have a strong correlation with one another, this phenomenon is referred to as multicollinearity. It is a phenomenon in which there is a high correlation between a number of independent variables. It happens in a model with multiple regression when there is a high correlation between the predictor variables, which leads to doubtful evaluations of the regression coefficients. When attempting to determine the degree to which independent factors explain changes in the outcome variable, this leads to unexpected results (Creswell, 2014). According to Brooks (2008), in any practical setting, the correlation between explanatory variables will be non-zero, but it would generally be relatively benign. This is because a small degree of association between explanatory variables will almost always occur, but it will not cause too much loss of precision in the analysis. Nevertheless, there is an issue when the explanatory factors have a strong correlation with one another. The term for this kind of issue is multicollinearity. As a result, performing a multicollinearity test is an absolute necessity.

Table 4. 8: VIF test Multicollinearity

Variable	VIF	1/VIF
Exchange rate	2.50	0.400673
Terms of trade	2.19	0.456019
Inflation	1.42	0.705550
Interest rate	1.16	0.860446
Government effectiveness	1.12	0.896598
Mean VIF	**1.68**	

Source: Research Analysis, 2023

Multicollinearity test was carried out in order to determine whether or not a significant correlation exists between any one or more of the variables investigated in the study and any one or more of the remaining independent variables. The variance inflation factor, also known as VIF, was used to quantify the level of correlation that existed between the predictor variables and to estimate the inflated variances that were the result of linear dependence with other explanatory factors. As a general guideline, VIFs of 10 or greater (or, to err on the side of caution, over 5) indicate significant multicollinearity (Newbert, 2008). The values that were obtained from the VIF test ranged anywhere from 1.12 to 2.50. If the value of the VIF is larger than 10, and the tolerance is greater than.20, then there is cause for concern over multicollinearity (Dielman 2001; Gujarati 2003). Consequently, there is not a possibility of an issue with this study from the point of view of the VIF. Accordingly, there does not appear to be a problem with multicollinearity, as indicated by the findings of the diagnostic tests.

4.4.5 Structural Test of Reliability of Coefficients

Misspecification of the model analysis methods may lead to erroneous results, so testing for model is considered necessary. It is additionally essential to check for the reliability

of the generated coefficients in the model. This is accomplished by examining the VECM model's eigen stability condition. Figure 4.6 shows that all of the values fall within the unit circle, confirming the stability of the generated coefficient in the VECM model.

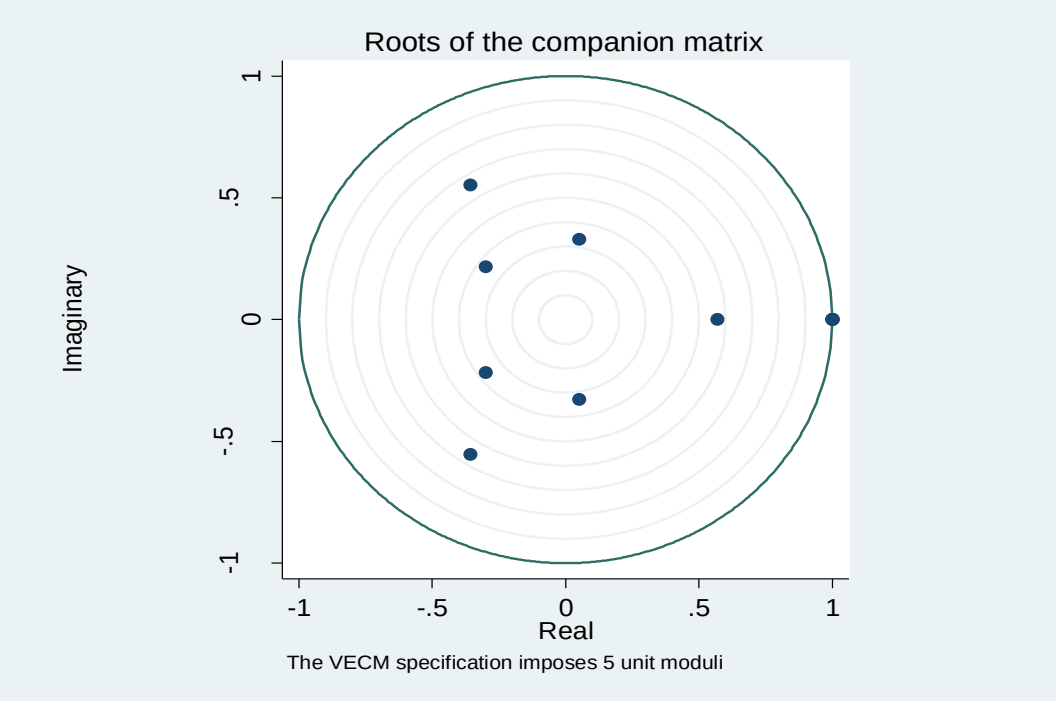


Figure 4. 6: Model Reliability of Coefficients
Source: Research Analysis, 2023

4.5 Correlation Analysis

The findings of the correlation analysis are summed up and reported in table 4.5. It is important to investigate the degree to which the values of the various independent variables are correlated with one another since this might lead to unanticipated shifts in the signs or magnitudes of the coefficients, even when the R-squared statistic is quite high. Even though STATA automatically drops perfectly collinear independent variables during regression, it may still be necessary to examine multicollinearity by using pair-wise correlation and the Tolerance and Variance Inflation Factor (VIF)

methods. This is because multicollinearity can lead to inaccurate results. There is not a single variable pair that exhibits extremely high collinearity, as seen by the pair-wise correlation matrix of the independent variables (more than 0.86 in Table 4.5). The empirical model is constructed in such a way that the pairs are not employed in the same equation for each version of the model; hence, multicollinearity is not a problem that needs to be addressed.

Results in table below indicate that Exchange rate is positively related with Horticulture export performance($r = 0.8668$, $p < 0.05$). This therefore suggests that the higher the Exchange rate the higher the Horticulture export performance in Kenya. The relationship is not perfectly correlated and therefore multicollinearity is not a problem. Results in the table also indicate that Inflation is negatively related with Horticulture export performance($r = -0.2959$, $p < 0.05$). This therefore suggests that the higher the Inflation rate the lower the Horticulture export performance in Kenya. The relationship is not perfectly correlated and therefore multicollinearity is not a problem. Additionally, Government effectiveness is positive and insignificantly related with Horticulture export performance($r = 0.0895$, $p > 0.05$). This therefore suggests that the higher the government effectiveness the higher the Horticulture export performance in Kenya. The relationship is not perfectly correlated and therefore multicollinearity is not a problem. It was also found out that Terms of trade is positively related with Horticulture export performance($r = 0.5202$, $p < 0.05$). This therefore suggests that the higher the terms of trade the higher the Horticulture export performance in Kenya. The relationship is not perfectly correlated and therefore multicollinearity is not a problem.

Table 4. 9: Pearson's Correlation Coefficients

	Horticulture export performance	Exchange rate	Inflation	Interest rate	Government effectiveness	Terms of trade
Horticulture export performance	1					
Exchange rate	0.8668*	1				
Inflation	-0.2959*	-0.4159*	1			
Interest rate	-0.1885	0.0505	0.1587	1		
Government effectiveness	0.0895	0.2559	-0.1211	0.1030	1	
Terms of trade	0.5202*	0.6354*	0.0107	0.3081	0.2175	1

Key: *indicates significance at 5%
Source: Research Analysis, 2023

Table 4.5 indicates that inflation rate is negatively and significantly related with Exchange rate (r = -0.4159). This therefore suggests that the higher the inflation rate the higher the Exchange rate in Kenya. The relationship is not perfectly correlated and therefore multicollinearity problem does not exist. Finally, Terms of trade is positively related with Exchange rate($r = 0.6354$, $p < 0.05$). This therefore suggests that the higher the Inflation rate the higher the Exchange rate in Kenya. The relationship is not perfectly correlated and therefore multicollinearity is not a problem.

4.6 Estimation of Vector Error Correction Model (VECM)

The vector error correction model (VECM) is a vector auto regression (VAR) in which variables are co-integrated using the maximum likelihood method proposed by Johansen (1995). In a VECM, the cointegrating equations or adjustment terms parameters can be restricted. In this model, the number of lags must be greater than 0, but small enough that the model's degrees of freedom are less than the number of observations. Table 4.10 presents results for VECM. The header includes sample

detail, the fit of each equation, and statistics of the overall model fit. Estimates of the long-run parameters along with their standard errors, z statistics, and confidence intervals are included in the first section of the estimated results as shown in the table.

Overall, the output shows that the root mean square error (RMSE) is small (0.0278) and R-square, which measures the percentage of time that the independent variables explain the dependent, was 73.78 percent. This means that the exchange rate, inflation, interest rate, terms of trade and government effectiveness accounted for approximately 73.78 percent of the total variation in horticultural exports performance in Kenya during the study period. The chi square value of 61.89 and significant probability of 0.000 implying VEC model was fit. The coefficient of co-integration or co-integrating equation (ce1) was 0.0129. Since this coefficient of ce1 was positive 0.0129 and the probability value is statistically insignificant, the estimates suggest swift adjustment to equilibrium. It indicates that horticultural performance is above its equilibrium value. The reciprocal of co-integrating equation shows how many years this partial adjustments or deviations comes back to equilibrium. For instance, it takes approximately 78 years (1/0.0129) for these partial adjustments to fully come to equilibrium.

Table 4. 10: Results for Vector Error Correction Model

Lnhexports	Coef.	St.Err.	z	p	[95% Conf	Interval]	Sig
Exchange rate	-.4874	.0943	-5.17	.000	-.6722	-.3025	***
Inflation	-1.1499	.2849	-4.04	.000	-1.708	-.5915	***
Interest rate	.4413	.1843	2.39	.017	.0801	.8024	***
Terms of trade	1.0241	.1657	6.18	.000	.6994	1.3488	***
Constant	-92.361	-	-	-	-	-	-
R-squared		0.7378	Number of obs			32	
RMSE		0.0278	Prob > Chi2			0.000	
Co-integrating Eq. (ce1)		0.0129	Bayesian crit. (BIC)			19.3911	
Chi2		61.8973					
Akaike crit. (AIC)		16.9157					

**** p<.01, ** p<.05, * p<.1*

Source: Research Analysis, 2023

As previously discussed, Johansen's co-integration test confirmed the presence of long run relationships. When Johansen normalization was imposed, the exchange rate, inflation and government effectiveness all had a negative long-run relationship with horticultural performance in Kenya. Interest rate, terms of trade, on the other hand, had a positive and significant impact. The behavioural trend of the co-integration experience among the variables is depicted in Figure 4.11 below. Because parameter inference is typically heavily reliant on the stationarity of the co-integrating equations, the analysis tested the model specification as well as estimated and graphed the co-integrating equations over time.

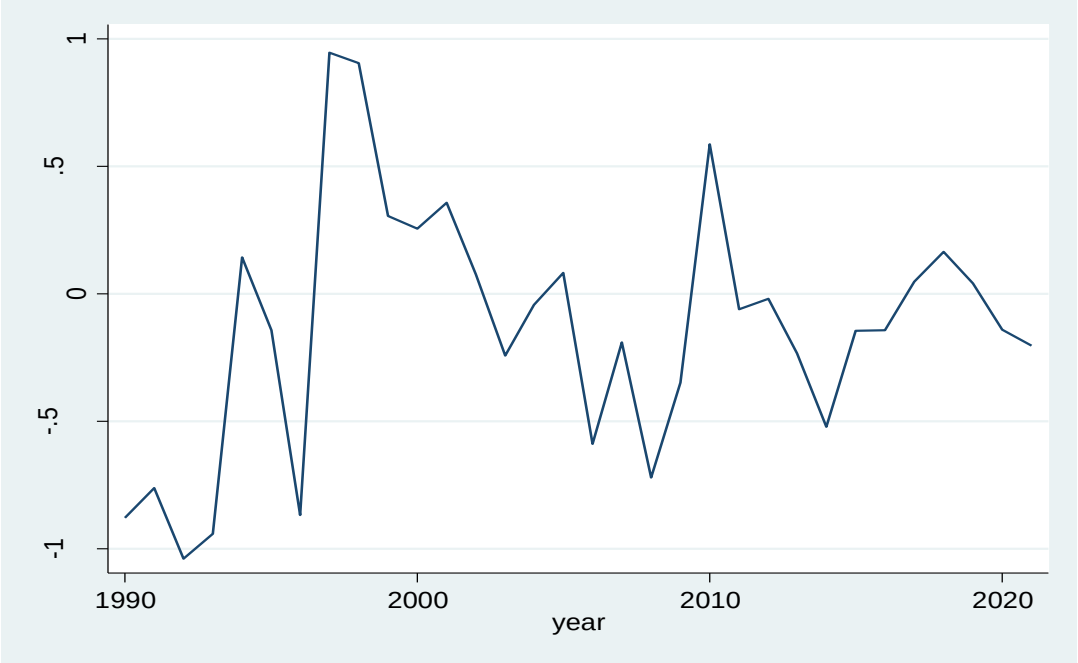


Figure 4.7: Graphical Representation of Cointegrating Equation
Source: Research Analysis, 2023

Despite the fact that the large shocks visible in the level graph have significant implications for co-integrating equation forecasts, the only point of interest is the negative pattern in the first co-integrating equation around the 1990s and, more recently, around 2010. The level graph shows that something caused a significant upward development of the economy around 2000, followed by a rapid downturn, causing co-integration to become negative, but later in 2010, the positive sign of co-integration can be associated with economic growth recovery.

4.7 Moderation of Government Effectiveness

The study tested for moderating effect of government effectiveness on the linkage between exchange rate, inflation, interest rate and terms of trade on horticultural performance in Kenya. It adopted the Hayes model. A hierarchical multiple regression was used in testing moderation as suggested by Hayes, (2017). Moderation analysis

was done on each of the explanatory variables on their effects on horticultural export performance. Results were presented using a table.

Table 4.11 shows hierarchical regression results. It is easier to note that two models used in testing moderation have difference results with difference significance. The first moderation was on the link between none moderated regression of independent variables on horticultural performance. The second explains moderation of government effectiveness on the relationship between explanatory variables and the dependent variable. The significance of F-statistic at 5 percent level across the models explains the model fitness. R-square is high on both models. For instance, in the first model, it explains that the 83.10 percent variation of horticultural export performance is explained by exchange rate, inflation, interest rate, terms of trade and government effectiveness on horticultural performance in Kenya.

The results indicate that government effectiveness has a moderating role on the relationship between exchange rate, inflation and terms of trade and horticultural performance. This is evident by the significant interaction terms: EXR*GEFF ($\beta = .630, p = .017$), INF*GEFF ($\beta = 1.131, p = .001$), TOT*GEFF($\beta = -.719, p = .015$). Government effectiveness has shown a insignificant moderating role the relationship between interest rate and horticultural export performance.

4.8 Test of Hypothesis and Discussion

4.8.1 Effects of Exchange Rate on Horticultural Performance in Kenya

H_{01} stated that exchange rate does not significantly affect horticultural export performance in Kenya. The regression results from the VEC model showed that exchange rate is vital determinant of horticultural export performance in Kenya (coefficient of -0.487, p – value 0.000 < 0.05). The coefficient showed that a unit change

in exchange rate results to a decrease in horticultural export performance in Kenya by 0.487 units. Therefore, the hypothesis that exchange rate does not affect horticultural performance in Kenya was rejected. The study interpreted that an increase in exchange rate oscillation would lead to a reduction in foreign trade because there are costs which are associated with variability in the exchange rate, and these lowers the incentives to trade. In addition, the negative exchange rate coefficient implies that depreciating the value of exchange rate will cause a reduction of international trade because the cost of imports will rise. This result conforms to the findings by Ferto and Fogarasi (2014), Hooy, C. W., Siong-Hook, L., & Tze-Haw, C. (2015), and also it opines with theoretical viewpoint, which held the view that exchange rate fluctuations are a significant cause of macroeconomic uncertainty.

Mwangi, Mbatia, & Nzuma, (2014) carried out a study on the Effects of exchange rate on French beans exports in Kenya. The findings showed that exchange rate fluctuation has a negative and considerable short- and long-term impact on exports of French beans. The empirical findings specifically demonstrated that exports of French beans to the European Union decline by more than a proportionate amount for every unit rise in exchange rate in Kenya. Since exchange rate has a significant impact on the global flow of capital, products, and services, i.e., commodities in general, it has been a source of concern for the majority of the world since the 1970s. The enterprises are susceptible to medium and long-term exchange rate even if they can hedge against short-term foreign exchange risk. The firm's investment decision may be impacted by this exposure to foreign exchange risk, which would skew the best use of resources (Lyimo & Kimaro 2021).

While conducting research on the Effect of Real Exchange rate and Selected Macroeconomic Variables on Trade Exports Performance in Kenya, Kiptarus, et al., (2022) discovered that Kenya's trade export performance declines by 0.1234 percent as a result of exchange rate. According to economic theory, exporters are naturally risk averse. According to Rehman, Ahmad, & Arif, (2022) a rise in the exchange rate reduces export volume since it raises costs that may be irreversible to prepare for increased future uncertainty. The market participants' reallocation of resources may be the cause of the negative association between exchange and trade export performance. In spite of the presence of hedging tools, Duru, *et al.,* (2022) demonstrated that short-run exchange rate nevertheless disrupts trading because it raises the risk premium in the future exchange rate.

The findings positively agreed with Otieno and Mudaki (2011), who postulate in their study that the real exchange rate has positive effects in the short-run but that these effects are found to be statistically insignificant. Otieno and Mudaki (2011) found that the real exchange rate has positive effects in the long-run but that these effects are statistically insignificant. Despite this, the elasticity of demand in the short run is large and positive, just like it is for primary items, which are quite near to unity. As a result, it is more likely that the consequences of the real exchange rate will be long term in nature rather than short term in form. Therefore, worries regarding the consequences that a real exchange rate rise will have in the short run are unjustified. They also draw the conclusion, based on their data, that fluctuations in exchange rate have not been at levels that hurt export growth and, as a result, earnings. In other words, there may be a threshold level at which changes in exchange rate begin to have an adverse effect on exports. Because of the positive association that exists between export performance and

the depreciation of the shilling in real terms in Kenya, there have been doubts raised regarding the underlying factors of demand for the nation's exports. Others think that excellent economic growth prospects in export destination countries are a more significant impact, despite the fact that some people have stated that the exchange rate is a factor. They also come to the conclusion in their studies that the exchange rate is an important factor of a country's export revenues, which is congruent with the conclusions reached in this study.

Exports of horticulture are sensitive to shifts in the real exchange rate. The performance of exports is adversely affected by exchange rate appreciation or overvaluation. It is important to keep the Real exchange rate at its equilibrium, but from the perspective of horticultural export performance, it is also preferable to have the currency undervalued. Real exchange rate policies differ between Kenya and other nations, which is a significant factor in the disparities in export performance between them. In order to improve the performance of her horticulture exports, Kenya should purposefully maintain a real exchange rate that is undervalued for an extended period of time.

4.8.2 Effects of Inflation on Horticultural Export Performance in Kenya

H_{02} stated that inflation rate does not significantly affect horticultural export performance in Kenya. Table 4.10 below shows the findings of relationship between inflation and Horticultural export performance in Kenya. The results indicate that inflation has a significant negative relationship with Horticulture export performance (β_1 = -1.150, ρ<0.05). These results show that a 1 unit increase in inflation has 1.150 unit decrease effect in Horticulture export performance. The second hypothesis was rejected. The results of this study were in a disagreement with the study done by Samoei & Kipchoge (2022) that established that inflation could positively affect

horticultural export performance in Kenya in the long run. Lovasy, (1962) outlines that the first effect of inflation is a rise in prices on the home market, which, as a result, makes profiting from sales on the domestic market more attractive than sales on international markets. This has an effect of reducing export performance of horticultural commodities.

Returns from the latter will not vary in step with inflation; export prices are basically a "given" for the majority of countries that produce primary commodities and cannot be altered appreciably in reaction to growing production costs. In cases where a nation's share in the global exports of a particular commodity is large enough to enable it, by a change in volume, to influence international prices, inflationary cost increases will tend to encourage such a change with the goal of raising the price of the commodity and keeping it at a high level. This is because a country's ability to influence international prices is contingent on its ability to change its volume of exports. However, sooner or later this will encourage a growth of production in nations that are already in competition with the nation or the introduction of alternatives, both of which would have a negative impact on the country's exports. A decline in the performance of horticulture exports is likely to occur in the event that horticultural exports continue to deteriorate. If inflation remains high for an extended period of time over a number of years, the structure of the economy will shift in a way that is detrimental to horticultural exports. Even though inflation is frequently the result of efforts to speed up economic development, sometimes with a special emphasis on particular sectors and targets, it is likely to cause investment to be redirected toward processes that yield quick returns at the expense of projects with a longer-term outlook. When it comes to Kenya's quest to grow its economy, the development and diversification of the country's horticultural

exports are of the utmost significance. Horticultural exports are typically one of the primary sources of revenue, and as such, their performance needs to be improved. This is true even though receiving loans and grants from other countries can be useful in increasing the amount of foreign exchange received.

The study therefore concludes that inflationary pressure in the economy can put upward pressure on the pricing of horticulture commodities; however, higher horticultural prices raise the demand for farm inputs, including the cost of borrowed funds. This can cause the cost of borrowing money to increase. Because of this, the costs of horticultural items grown in Kenya would wind up being higher in comparison to those grown in other nations. The horticultural industry's ability to perform well in export markets would suffer as a direct consequence. There is need for policy makers to keep inflation level at a sustainable level that is neither too low nor too high to dislodge horticultural export performance in Kenya. This can be done through the use of macroeconomic policies such as fiscal policies, monetary policies and inflation targeting.

4.8.3 Effect of Interest Rate on Horticultural Performance in Kenya

H_{03} stated that interest rate does not significantly affect horticultural export performance in Kenya. The hypothesis that interest rate does not significantly affect horticultural export performance in Kenya was rejected by the study. The results showed that since real interest rates were positively (0.441, p=0.017) correlated with horticultural exports, an increase in real interest rates would result in a rise in horticulture exports from Kenya by raising the cost of borrowing. It was also underlined that the horticulture sub-sector is significantly more capital intensive than other agricultural sub-sectors, which explains the significance of borrowing costs in affecting horticultural exports. Setting up greenhouses, cooling facilities, packing houses,

irrigation systems, and purchasing fertilizer, agrochemicals, and other inputs all demand a sizeable amount of capital. The results of the study opines with the findings of Mabeta, (2015). The investment in growing horticulture crops will be smaller and the amount exported will be lower the higher the interest rate. Consequently, it was anticipated that the real interest rate would be negatively correlated with horticulture exports (George 2022). In his study on Export performance of the horticultural sub-sector in Kenya, Meme, (2015) found that real interest rates, agricultural GDP, and real exchange rates all had a considerable impact on horticulture exports

Effective interest rate stabilization measures should be implemented such as ceiling on lending rates and putting up policy measures that can lower inflation rate. These are thought to be crucial policy changes that could also be applicable to other industries to boost Kenya's horticultural export performance.

4.8.4 Effects of Terms of Trade on Horticultural Export Performance in Kenya

H_{04} stated that terms of trade does not significantly affect horticultural export performance in Kenya. The study had hypothesized that terms of trade does not have a significant effect on horticultural export performance in Kenya. The study results rejected the hypothesis. This is indicated by a positive and statistically significant coefficient of (1.024, p=0.000). This shows that a one percent increase in terms of trade causes a 1.024 percent increase in horticultural export performance in Kenya. The results are consistent with the economic theory that was projected. This suggests that a combination of advantageous trade terms and the high price stability of Kenyan horticultural products results in an increase in export revenues. These results confirmed previous research by Mutebi et al. (2018) that terms of trade are a reliable predictor of export performance. But then again, a study by Morrison et al. (2016) discovered that

exports in Eastern and Southern Africa, which are occupied by primary agricultural exports, struggle from deteriorating terms of trade, particularly exports of tea, coffee, and horticulture, as well as from high price volatility on the global market. According to a study by Subramanian et al. (2007), the absence of advantageous trade conditions and the ensuing existence of trade barriers is a significant obstacle to international trade. The results, however, are at odds with those of a prior study by Otieno & Mudaki (2011), who discovered that the performance of trade exports is negatively impacted by terms of trade. The employment of alternative proxies for terms of trade, techniques, and sample periods makes the presence of a conflicting link between trade export performance and terms of trade plausible. The conclusions may vary depending on the countries involved because different countries may have different trading terms.

4.8.5 Effects of Government Effectiveness on Horticultural Export Performance

Table 4.10 shows the findings of relationship between government effectiveness and Horticultural export performance in Kenya. The results indicate that the government effectiveness has a significant positive relationship with Horticultural export performance (β =0.252, ρ<0.05). The hypothesis that government effectiveness has no significant effect on horticultural export performance in Kenya was rejected. The results agrees with a study by Acemoglu, Johnson & Robinson (2002) contend that inclusive political and economic institutions are necessary for economic development in an economy. Horticultural export performance is a major contributor of economic development especially in Kenya. A greater standard of life, stable macroeconomic indices, and debt sustainability are all necessary for economic development. According to the study's findings, Kenya's political and economic institutions have been exclusive

which is indicated by ineffective governance, which explains why there is a negative correlation between government effectiveness and horticultural export performance.

When social and economic policies are implemented more quickly, more productive investments are made, and good governance is supported, the economy grows more quickly, which benefits industries like horticultural production. Institutions and governmental policies shape the economic environment in which people acquire skills, businesses acquire money, and individuals produce output. While effective social infrastructure that guards against diversion can be efficiently provided by good governments to promote economic progress, expropriation, confiscatory taxation, and unfavorable rules and laws can be implemented by bad governments to foster public diversion in an economy.

4.8.6 Role of Government Effectiveness as Moderator

Since government effectiveness has shown a significant indirect influence of inflation on the horticultural export performance. According to Duho, Amankwa, and Musah-Surugu (2020), the concept of government effectiveness is important in public policy in Africa and Asia. Governments utilize public policy to put their political visions into action and bring about desired changes. Both governments and citizens are concerned about government effectiveness. Effectiveness is a measure of the quality of output and how well policy achieves the desired results. Measuring effectiveness necessitates the use of stakeholder perspectives, making it a subjective concept to assess. Perceptions of the quality of public services, the quality of the civil service and its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies are all defined as measures of government effectiveness.

Government effectiveness in productivity is critical to lowering inflation. High government effectiveness in productivity is dependent on innovation and efficiency, both of which should be promoted. It takes time to increase productivity. You must redesign factories, irrigate new land, experiment with new crops or animal breeds, invest in research and development, and change national culture to emphasize efficiency while reducing red tape and bureaucracy. To create competition, new and enforceable laws must be enacted.

It entails sound policy formulation, proper implementation, and, in general, policies that are centered on the citizen. All else being equal, the higher the level of social welfare, the more effective a nation's government is. Thus, effectiveness is a critical performance indicator for African and Asian economies interested in improving their citizens' well-being through horticultural development and performance.

Hypothesis ($H5_a$) stated that; Government effectiveness has no significant effect on the relationship between exchange rate and horticultural export performance in Kenya. The regression results show that government effectiveness had an enhancing effect on the relationship between exchange rate and horticultural export performance in Kenya ($\beta = .630$ *and* $\rho<0.05$); hence hypothesis $H05_a$ was rejected. The enhancing moderation effect of government effectiveness on the relationship between the exchange rate and the horticultural export performance in Kenya can be attributed to several reasons.

A government's ability to implement effective policies, provide infrastructure support, and create a conducive business environment directly influences the competitiveness of the horticultural sector (Booth & Golooba- Mutebi, 2014). When the government is effective in managing economic policies, such as maintaining a stable exchange rate, it contributes to a more favorable environment for exporters (Morina et al., 2020). A

stable exchange rate reduces uncertainties for horticultural exporters, making it easier for them to plan and execute their operations. Additionally, an effective government can invest in the development of agricultural infrastructure, facilitate access to markets, and ensure compliance with international quality standards. These factors collectively enhance the overall performance of horticultural exports, making them more resilient to fluctuations in exchange rates and positioning Kenya as a reliable player in the global market.

Hypothesis ($H5_b$) stated that; Government effectiveness has no significant effect on the relationship between inflation rate and horticultural export performance in Kenya. The regression results show that government effectiveness had an enhancing effect on the relationship between inflation rate and horticultural export performance in Kenya ($\beta = 1.131$ *and* $\rho < 0.05$); hence hypothesis $H05_b$ was rejected. The enhancing moderation effect of government effectiveness on the relationship between the inflation rate and the horticultural export performance in Kenya can be attributed to several reasons.

Government effectiveness is instrumental in shaping the dynamic between inflation rates and horticultural export performance in Kenya (Mwatu, 2022). A government's ability to implement sound economic policies, particularly in managing inflation, has a direct impact on the competitiveness of the horticultural sector. Effective governance can help maintain price stability, which is crucial for the cost structure of horticultural production and export activities. When the government successfully manages inflation, it creates a more predictable and conducive environment for horticultural exporters, enabling them to plan their operations with greater confidence. Moreover, an effective government can implement policies that address the specific needs of the horticultural

sector, such as providing financial support, infrastructure development, and quality assurance measures (Appiah, Osei, Selassie & Osabutey, 2019). These efforts collectively contribute to a more resilient and competitive horticultural export industry in Kenya, mitigating the adverse effects of inflation on the sector's performance.

Hypothesis ($H5_c$) stated that; Government effectiveness has no significant effect on the relationship between interest rate and horticultural export performance in Kenya. The regression results show that government effectiveness had an enhancing effect on the relationship between interest rate and horticultural export performance in Kenya ($\beta = .112$ *and* $\rho<0.05$); hence hypothesis $H05_c$ was rejected. The enhancing moderation effect of government effectiveness on the relationship between the interest rate and the horticultural export performance in Kenya can be attributed to several reasons.

A government's capacity to implement effective economic policies, particularly in managing interest rates, is critical for the competitiveness of the horticultural sector (Ahmad, 2020). When a government successfully maintains a stable and conducive interest rate environment, it positively impacts the cost of capital for horticultural exporters. Lower and stable interest rates reduce the financial burden on businesses, fostering investment, innovation, and expansion within the horticultural industry. Additionally, an effective government can facilitate access to credit, offer financial support, and implement policies that promote the growth of the export sector (Ahmed & Brennan, 2019). This supportive environment enhances the overall performance of horticultural exports in Kenya, making them more resilient to fluctuations in interest rates and positioning the country as a reliable player in the global market.

Hypothesis ($H5_d$) stated that; Government effectiveness has no significant effect on the relationship between terms of trade and horticultural export performance in Kenya.

The regression results show that government effectiveness had a buffering effect on the relationship between term of trade and horticultural export performance in Kenya (β= -.*719 and* $\rho<0.05$); hence hypothesis $H04_a$ was rejected. The buffering moderation effect of government effectiveness on the relationship between the exchange rate and the horticultural export performance in Kenya can be attributed to several reasons.

A government's efficacy in formulating and implementing strategic economic policies directly influences how the horticultural sector responds to changes in terms of trade (Carrière- Swallow, Magud & Yépez, 2021). When a government is effective, it can devise policies that help mitigate the negative impacts of unfavorable terms of trade on the horticultural export industry. This may include implementing trade diversification strategies, negotiating favorable trade agreements, and providing support mechanisms to offset potential losses. Additionally, an effective government can invest in research and development, promote innovation, and enhance the competitiveness of the horticultural sector, allowing it to adapt more effectively to shifts in terms of trade. By acting as a buffer, government effectiveness contributes to the resilience of the horticultural export performance in Kenya, ensuring that the sector remains robust even in the face of challenging international trade conditions.

Table 4. 11: Hierarchical regression models

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	10.045***	1.48	-1.49	4.484	1.90	2.186
Exchange rate (EXR)	.143***	.007***	.008**	.008**	.008**	.316**
Inflation (INF)	.045**	.015**	.009**	.0156**	.0015**	.645**
Interest rate (INR)	-.108***	-2.43	-2.90**	-2.55**	3.44**	.046**
Terms of trade (TOT)	.007	4.22	0.006	4.46**	1.02**	-.353**
GEFF		.252**	.250**	.243**	.231**	.212**
EXR*GEFF	-	-	-2.97**	2.28**	2.75**	.630**
INF*GEFF	-	-		6.60**	6.46**	1.131**
INT*GEFF	-	-		-	1.09**	.112**
TOT*GEFF	-	-		-	-	-.719**
R-square	.8310	.9916	.9898	.9915	.9916	.7296
P>F	.000	.000	.000	.000	.000	.000

Source: Research Analysis, 2023

Table 4. 12: Summary of hypothesis

Hypotheses	B	P<5%	Decision
$H_{01:}$ Exchange rate does not significantly affect horticultural export performance in Kenya	-0.4874	0.000	Rejected
$H_{02:}$ Inflation in Kenya do not significantly affect horticultural export performance in Kenya	-1.1499	0.000	Rejected
$H_{03:}$ Interest rate does not significantly affect horticultural export performance in Kenya	0.4413	0.017	Rejected
$H_{04:}$ Terms of trade does not have a significant effect on horticultural export performance in Kenya	1.0241	0.000	Rejected
$H_{05a:}$ Government effectiveness has no significant effect on the relationship between exchange rate and horticultural export performance in Kenya	0.630	0.000	Rejected
$H_{05b:}$ Government effectiveness has no significant effect on the relationship between inflation rate and horticultural export performance in Kenya	1.131	0.000	Rejected
$H_{05c:}$ Government effectiveness has no significant effect on the relationship between interest rate and horticultural export performance in Kenya	0.112	0.000	Rejected
$H_{05d:}$ Government effectiveness has no significant effect on the relationship between terms of trade and horticultural export performance in Kenya	-0.719	0.001	Rejected

Source: Research Analysis, 2023

CHAPTER FIVE

SUMMARY OF THE RESEARCH FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Overview

This chapter provides a summary of the findings from the previous chapter as well as conclusion, recommendations, and suggestions for further study.

5.2 Summary of Findings

Being the first specific objective of the study, exchange rate was measured by taking the weighted average annual exchange rate for data analysis purposes. The results of the study indicated that exchange rate does significantly influence horticultural performance in Kenya. According to the coefficient, a change of one unit in the exchange rate causes a drop of 0.0216 units in Kenya's export performance for horticulture. As a result, the claim that Kenya's horticultural performance is unaffected by exchange rate was refuted. Given the costs associated with exchange rate variability and the consequent reduction in trade incentives, the study concluded that an increase in exchange rate oscillation would result in a decrease in foreign trade. Additionally, the negative exchange rate coefficient implies that a decline in the value of the exchange rate will result in a decline in international trade because the price of imports will rise. This finding is consistent with that of Ferto and Fogarasi (2014), Hooy, Siong-Hook, and Tze-Haw (2015), and it also supports the theoretical position that exchange rate fluctuations are a significant source of macroeconomic uncertainty.

On the second objective of the study, inflation was measured using the consumer price index. Data was generated from KNBS annual reports. The results of the study indicated inflation has a significant negative relationship with horticultural export performance

in Kenya. The second hypothesis was therefore rejected. The findings of this study conflicted with a study by Samoei & Kipchoge (2022), which found that inflation could, over time, have a positive impact on Kenya's horticultural export performance. According to Lovasy (1962), the first effect of inflation is a rise in domestic market prices, which makes profiting from domestic sales more desirable than sales on foreign markets. Horticultural commodities' export performance is impacted by this.

On the third objective the study, interest rate was measured by taking real interest rate. The results of the study indicated that interest rate has a significant positive relationship with horticultural export performance in Kenya. The results of the study were in contradiction with those done by Mabeta (2015).

On the fourth objective, terms of trade was measured by taking the ratio of horticultural export prices to horticultural import prices. The null hypothesis of study that terms of trade does not significantly affect horticultural export performance in Kenya was rejected. This was supported by a p value that was less than 5 percent level of significance. The study indicated that terms of trade has a positive significant relationship with horticultural export performance in Kenya. The results of the study however were in contradiction with that done by Otieno & Mudaki (2011).

On the fifth objective, government effectiveness was measured by taking the index provided to rank countries in accordance with quality of public service, civil service, policy implementation and credibility of the government commitment to improving and maintaining quality. The results of the study indicated that government effectiveness has a negative significant relationship with horticultural export performance. These results were in contradiction with that done by Acemoglu, Johnson & Robinson (2002)

that concluded that inclusive political and economic institution are necessary for economic development of any economy.

Finally, the sixth objective of moderating effect of the relationship between the various macroeconomic variables and horticultural export performance was analyzed and the relationship between exchange rate, inflation and terms of trade and horticultural export performance had a significant effect. Government effectiveness did not moderate the relationship between Interest rate and horticultural export performance.

5.3 Conclusion

The findings of the study conclude that changes in the real exchange rate have an impact on horticulture exports. Exchange rate appreciation or overvaluation is detrimental to the performance of exports. It is crucial to maintain the equilibrium of the real exchange rate, but from the standpoint of horticultural export performance, it is also preferable to have the currency undervalued. Kenya's real exchange rate policies are different from those of other countries, and this is a big reason why their export performances differ from one another. Kenya should deliberately maintain an undervalued real exchange rate for a protracted period of time in order to improve the performance of her horticulture exports.

Secondly, study comes to the conclusion that economic inflationary pressure can influence the price of horticulture commodities upward; however, higher horticultural prices increase the demand for farm inputs, including the price of borrowed money. As a result, borrowing money might become more expensive. As a result, the price of horticultural products produced in Kenya would end up being higher than those produced in other countries. As a direct result, the horticultural industry's capacity to perform well in export markets would suffer. Policymakers must maintain inflation at

a manageable level that is neither too low nor too high to negatively affect Kenya's horticultural export performance.

Third, the study concluded that Effective interest rate stabilization measures should be implemented such as ceiling on lending rates that may result to lowering inflation rate. These are thought to be crucial policy changes that could also be applicable to other industries in order to boost Kenya's horticultural export performance.

Fourth, the study concludes a term of trade is an important macroeconomic variable in determining horticultural export performance in Kenya. The results of the study were also consistent with the economic theories employed in the study.

The study also concluded that government effectiveness did have a significant role in determining horticultural export performance in Kenya. Further, government effectiveness as a moderator variable had a significant effect on the relationship between inflation exchange rate and terms of trade and horticultural export performance. Government effectiveness had no significant effect on the relationship between interest rate and horticultural export performance.

5.4 Recommendations

5.4.1 Policy Recommendations

The study recommends that policy makers should devise appropriate measures of enhancing macroeconomic drivers' stability in the economy to boost export performance of horticulture products in Kenya. This is because the study results have showed that macroeconomic drivers influence horticultural export performance in Kenya. There are a number of key policies that the government can put in place to enhance stability of macroeconomic drivers. First, policy makers should ensure that there are sound and solid macroeconomic policies in place that do not dislodge

macroeconomic variables. These policies include effective fiscal policies and monetary policies. Fiscal policies entail use of taxes and government expenditure. The government should reduce taxes on horticultural products to encourage more producers to engage in this sector and therefore increase the number of exports. Furthermore, expansionary government expenditure that entails allocation of funds in terms of subsidies to producers in this sector would drive export performance upwards. Use of monetary policies can also be an effective tool of stabilizing macroeconomic variables such as interest rate, inflation and exchange rate. This is usually implemented by the Central Bank of Kenya (CBK) through the Monetary Policy Committee (MPC) that meets every monthly to review macroeconomic drivers. Since inflation is a monetary phenomenon which has a direct effect on exchange rate, the CBK can manage money supply levels in the economy such that the amounts of money in circulations is neither too high nor too low to dislodge macroeconomic drivers and thereby having detrimental effect on horticultural export performance.

Secondly, policy makers should devise appropriate sound polices towards favorable terms of trade. In order to enhance export performance, the prices of exports should be enhanced as compared to those of imports. These can be achieved by coming up with export promotion policies that would see more producers producing horticultural products for exports. Additionally, policy makers should encourage producers by coming up with measures such as provision of international markets for local horticultural products, elimination of tariffs and quotas for producers taking part in exportation of horticultural products. Horticultural products being produced should be categorized as a zero rated so that producers can claim input tax and are not charged output tax.

Additionally, import substitution policies should be promoted to discourage Kenyan citizens from consuming foreign products in place of locally manufactured products. Import substitution policies would enhance the terms of trade macroeconomic driver that has a significant influence on horticultural export performance in Kenya. This can be achieved by imposition of taxes on goods imported by importers such that the prices of imports are higher than the prices of locally available horticultural products. Policy makers could come up with policies that would provide goods and services that would substitute those imported from foreign countries in order to enhance the terms of trade of the external sector.

Finally, the government should promote effective governance by promoting the rule of law through the laws of Kenya as provided by the constitution. Effective governance has a moderating effect on the relationship between macroeconomic drivers and horticultural export performance in Kenya. Promotion of effective governance would enhance institutional quality in Kenya and thereby curbing vices such as corruption, poor macroeconomic management, violence, intolerance and political instability. Policy makers should advocate for inclusive political and economic institutions that incorporate public views and provide opportunities to citizens who include producers. Inclusive political and economic institutions are crucial in moderating the relationship between macroeconomic drivers and horticultural export performance.

5.4.2 Theoretical Implications

Drawing on the Comparative Advantage Theory, several theoretical recommendations and implications can be highlighted for addressing the interplay between macroeconomic drivers, government effectiveness, and horticultural export performance in Kenya. Firstly, recognizing and leveraging Kenya's inherent

comparative advantage in horticulture, including favorable climate and soil conditions, implies that policymakers should prioritize investments in infrastructure, research and development, and technology that enhance the productivity and quality of horticultural production. By aligning government efforts with the country's natural strengths, Kenya can boost its competitiveness in the global horticultural market, mitigating the impact of macroeconomic drivers on export performance.

Secondly, the Comparative Advantage Theory underscores the importance of strategic trade policies that align with Kenya's specialization in horticulture. Policymakers should focus on creating an enabling environment that promotes stability in macroeconomic drivers, including managing inflation, interest rates, and exchange rates. A stable economic environment, coupled with effective governance, can foster a conducive climate for horticultural businesses. This may involve implementing transparent and consistent trade regulations, streamlining bureaucratic processes, and enhancing government effectiveness in supporting the horticultural sector. By aligning policy decisions with the principles of comparative advantage, Kenya can position itself to capitalize on its strengths, navigate macroeconomic challenges, and optimize horticultural export performance.

From the perspective of the Purchasing Power Parity (PPP) theory, theoretical recommendations and implications can be drawn to enhance the understanding of the relationship between macroeconomic drivers, government effectiveness, and horticultural export performance in Kenya. Firstly, policymakers should consider the long-term equilibrium in exchange rates proposed by PPP when formulating strategies related to macroeconomic drivers. To maintain stable and predictable exchange rates, efforts to control inflation, interest rates, and other macroeconomic variables become

crucial. A focus on fostering macroeconomic stability aligns with the PPP theory's premise that exchange rates should reflect relative price levels, ultimately contributing to a more favorable environment for horticultural exports.

Secondly, the PPP theory emphasizes the role of government effectiveness in influencing exchange rates and relative prices. Policymakers should prioritize effective governance in the implementation of trade policies, ensuring transparent and consistent regulatory frameworks. This includes addressing bureaucratic hurdles and reducing transaction costs for businesses involved in the horticultural sector. Government effectiveness becomes a key factor in facilitating the adjustment of relative prices and maintaining the competitiveness of horticultural exports. By aligning policy decisions with the principles of PPP, Kenya can work towards creating an environment that supports stable exchange rates and enhances the performance of its horticultural industry in the global market.

5.5 Recommendations for Further Research

The study focus was macroeconomic drivers and the moderating role of government effectiveness on horticultural export performance in Kenya. The macroeconomic drivers of this study were interest rate, exchange rate, inflation, and terms of trade. Future research studies should encompass the other macroeconomic drivers that may have significant influence on horticultural export performance in Kenya. These macroeconomic indicators include balance of payment, unemployment, government expenditure and money supply. A study that encompasses all these macroeconomic indicators would provide comprehensible findings that would inform policy in Kenya.

Additionally, future studies could use other moderator variables that influence the relationship between macroeconomic indicators and horticultural export performance

in Kenya other than government effectiveness. These include regulatory quality, rule of law, and level of corruption in the economy which are all indicators of government effectiveness. Use of the named moderator variables would provide a detailed outline of the relationship between the macroeconomic drivers and horticultural export performance in Kenya.

A comprehensive analysis could also be carried out in other countries in East Africa or Sub-Saharan Africa other than solely Kenya. This would entail a panel analysis of the macroeconomic indicators, government effectiveness and horticultural export performance. The usefulness of such a study would assess the extent to which macroeconomic drivers influence horticultural export performance in this region. Other than using horticultural export performance, future study could employ other dependent variables such as agricultural export performance, or export performance in general.

Finally, future studies could apply other methods of analysis other than those employed in this study. There are numerous different methods of analysis such as autoregressive distributed lag (ARDL), Hierarchical regression model in case of panel data with a moderator variable, and Arch Model. These tools of analysis could be employed and results compared with the one employed in this study. Threshold variables could also be employed to analyze how macroeconomic indicators affect horticultural export performance in different region shifts. That is, during the period of economic stability and period of economic instability.

5.6 Limitation of the Study

Macroeconomic conditions, such as inflation, interest rates, exchange rates, and terms of trade, are influenced by a myriad of global and domestic factors, making it

challenging to isolate the specific impact on the horticultural sector in Kenya. Variations in international market dynamics, geopolitical events, and global economic trends may introduce externalities that are difficult to control or account for, potentially limiting the generalizability of the study's findings. Additionally, the dynamic nature of macroeconomic variables over time may necessitate a longitudinal approach, which could pose logistical challenges and require sophisticated analytical techniques to capture the evolving relationships.

Another limitation involves the subjective nature of assessing government effectiveness. While government effectiveness is a crucial factor in shaping economic outcomes, its measurement can be subjective and context dependent. Different stakeholders may have varied perceptions of government effectiveness, and indices used to quantify this variable might not capture the nuances of policy implementation and enforcement at the sectoral level. The study employed the universally accepted measure of government effectiveness, potentially impacting the robustness and generalizability of the findings.

REFERENCES

Abraham, M., & Pingali, P. (2021). Shortage of pulses in India: Understanding how markets incentivize supply response. *Journal of Agribusiness in Developing and Emerging Economies*.

Abukari, A., & Cunfeng, T. (2021). The Export Competitiveness of Ghana's Cocoa Industry in West Africa. *Journal of Agricultural Science*, *13*(3), 80.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2002). Reversal of fortune: Geography and institutions in the making of the modern world income distribution. *The Quarterly journal of economics*, *117*(4), 1231-1294.

Adeola, O., Meru, A. K., & Kinoti, M. W. (2018). Kenya's blooming flower industry: Enhancing global competitiveness. *Africa's Competitiveness in the Global Economy*, 331-349.

Afuecheta, E., Okorie, I. E., Nadarajah, S., & Nzeribe, G. E. (2024). Forecasting Value at Risk and Expected Shortfall of Foreign Exchange Rate Volatility of Major African Currencies via GARCH and Dynamic Conditional Correlation Analysis. *Computational Economics*, *63*(1), 271-304.

Agriculture Food Authority. (2021). *The Agriculture Food Authority annual report 2021*.

Ahmad, M. (2020). Developing a Competitive Agriculture and Agro-based Industry under CPEC. *China's Belt and Road Initiative in a Global Context: Volume II: The China Pakistan Economic Corridor and its Implications for Business*, 227-269.

Ahmed, F. U., & Brennan, L. (2019). An institution-based view of firms' early internationalization: Effectiveness of national export promotion policies. *International Marketing Review*, *36*(6), 911-954.

Akpaeti, A. J., Agom, D. I., & Frank, N. N. (2019). Analysis Of The Effects Of Inflation On Farmers Income In Nigeria:(1970 to 2017).

Alagh, M. (2011). *Agricultural economy of India and macro-economic effects: Some empirical results and a research agenda based on the literature*. Indian Institute of Management.

Alila, P. O., & Atieno, R. (2006). Agricultural policy in Kenya: Issues and processes. *Nairobi: Institute of Development Studies*.

Altman, M. (2003). Staple theory and export-led growth: constructing differential growth. *Australian Economic History Review*, *43*(3), 230-255.

Aly, H., & Hosni, R. (2018). Examining the nexus between exchange rate volatility and export performance: Empirical evidence from the Egyptian experience. *Business and Economic Horizons*, *14*(3), 542-560.

Amutabi, C. (2024). The impact of COVID-19 pandemic on trade balance in the East Africa Community region: evidence from a Pooled Mean Group model. *Cogent Social Sciences*, *10*(1), 2312653.

Ansari, K., Park, K.-D., & Kubo, N. (2019). Linear time-series modeling of the GNSS based TEC variations over Southwest Japan during 2011–2018 and comparison against ARMA and GIM models. *Acta astronautica*, *165*, 248-258.

Appiah, K., Osei, C., Selassie, H., & Osabutey, E. (2019). The role of government and the international competitiveness of SMEs: Evidence from Ghanaian non-traditional exports. *Critical perspectives on international business*, *15*(4), 296-322.

Aseto, J. O., Anggraeni, K., Melgar, M. I. M., Ballón-Ossio, A., Sander, L. E., Grossi, F., . . . Orwa, N. (2022). Promotion and Uptake of Sustainable Consumption and Production (SCP) Practices among Kenyan MSMEs: Key Learnings. *Sustainability*, *14*(6), 3207.

Asongu, S. A., Folarin, O. E., & Biekpe, N. (2020). The long-run stability of money in the proposed East African monetary union. *Journal of Economic Integration*, *35*(3), 457-478.

Awokuse, T. O. (2009). Does agriculture really matter for economic growth in developing countries? : Citeseer.

Aye, G. C., & Odhiambo, N. M. (2021). Threshold effect of inflation on agricultural growth: Evidence from developing countries. *Advances in Decision Sciences*, *25*(2), 1-22.

Balcilar, M., & Bekun, F. V. (2020). Spillover dynamics across price inflation and selected agricultural commodity prices. *Journal of Economic Structures*, *9*(1), 1-17.

Becketti, S. (2013). *Introduction to time series using Stata* (Vol. 4905): Stata Press College Station, TX.

Bekele, W. T., & Mersha, F. G. (2019). A dynamic panel gravity model application on the determinant factors of Ethiopia's coffee export performance. *Annals of Data Science*, *6*, 787-806.

Bijaoui, I. (2017). *Multinational interest & development in Africa: establishing a people's economy*: Springer.

Booth, D., & Golooba-Mutebi, F. (2014). Policy for agriculture and horticulture in Rwanda: A different political economy?. *Development Policy Review*, *32*(s2), s173-s196.

Boulanger, P., Dudu, H., Ferrari, E., Mainar-Causapé, A., Balié, J., & Battaglia, L. (2018). Policy options to support the agriculture sector growth and transformation strategy in Kenya. *A CGE Analysis, EUR, 29231*.

Brondino, G. (2023). Fragmentation of production, comparative advantage, and the Heckscher-Ohlin theory. *Review of Political Economy*, *35*(3), 803-822.

Carrière-Swallow, Y., Magud, N. E., & Yépez, J. F. (2021). Exchange rate flexibility, the real exchange rate, and adjustment to terms-of-trade shocks. *Review of International Economics*, *29*(2), 439-483.

Chege, R. W. (2015). *Origin and Development of Naivasha town, 1895-2013* (Doctoral dissertation, Egerton University).

Chit, M. M., Rizov, M., & Willenbockel, D. (2010). Exchange rate and exports: New empirical evidence from the emerging East Asian economies. *World Economy, 33*(2), 239-263.

Chowdhury, A. R. (1993). Does exchange rate volatility depress trade flows? Evidence from error-correction models. *The review of economics and statistics*, 700-706.

Clarke, M. (2023). Economic impact assessment for Hort Frontiers: An evaluation of Masterclass in Horticultural Business (LP15001).

Clottey, V. A., Karbo, N., & Gyasi, K. O. (2009). The tomato industry in northern Ghana: Production constraints and strategies to improve competitiveness. *African Journal of Food, Agriculture, Nutrition and Development*, *9*(6).

Colman, D. (2010). Agriculture's terms of trade: issues and implications. *Agricultural Economics, 41*, 1-15.

De Grauwe, P. (1988). Exchange rate variability and the slowdown in growth of international trade. *Staff Papers*, *35*(1), 63-84.

De Vita, G., & Abbott, A. (2004). The impact of exchange rate volatility on UK exports to EU countries. *Scottish Journal of Political Economy*, *51*(1), 62-81.

Dijkstra, T. (1997). *Horticultural marketing channels in Kenya: structure and development*. Wageningen University and Research.

Dornbusch, R. (1985). Purchasing power parity.

Dua, P., & Goel, D. (2021). Determinants of inflation in India. *The Journal of Developing Areas*, *55*(2).

Dube, A. K., Ozkan, B., & Govindasamy, R. (2018). Analyzing the export performance of the horticultural sub-sector in Ethiopia: ARDL bound test cointegration analysis. *Horticulturae, 4*(4), 34.

Duho, K. C., Amankwa, M. O., & Musah-Surugu, J. I. (2020). Determinants and convergence of government effectiveness in Africa and Asia. *Public Administration and Policy, 23*(2), 199-215.

Duho, K. C., Amankwa, M. O., & Musah-Surugu, J. I. (2020). Determinants and convergence of government effectiveness in Africa and Asia. *Public Administration and Policy*.

Eisenshmidt, J., & Smets, F. (2019). Negative interest rates: Lessons from the euro area. *Series on Central Banking Analysis and Economic Policies no. 26*.

Enders, W. (2004). Applied Econometrics Time Series. New York: John Wiley.

Fear, J. (2013). Hartmut Berghoff is Director of the German Historical Institute in Wash-ington, DC, and Professor of Economic History at the University of Göttingen in Germany. His fields of expertise are the history of con-sumption, business history, and immigration history. Most recently, he has coedited Decoding Modern Consumer Societies (Palgrave Macmil. *Family Multinationals: Entrepreneurship, Governance, and Pathways to Internationalization*, 241.

Gachukia, M. K. E. W., & Muturi, W. M. (2017). Identifying global value chain governance determinants in Kenya's horticultural oriented export sector by nonlinear principal component analysis. *International Journal on Food System Dynamics*, *8*(4), 317-335.

Gakuru, P. W. (2017). *An empirical analysis of the effect of budget deficits on the current account deficits in Kenya* (Doctoral dissertation, University of Nairobi).

Garcia-Sanchez, I. M., Cuadrado-Ballesteros, B., & Frias-Aceituno, J. (2013). Determinants of government effectiveness. *International Journal of Public Administration*, *36*(8), 567-577.

Gathii, J. T. (2013). The Cotonou Agreement and economic partnership agreements. *UNOHCHR, Realizing the Right to Development*, 259-273.

George, W. (2022). Export performance of the horticultural sub-sector in Tanzania. In *Trade and Investment in East Africa: Prospects, Challenges and Pathways to Sustainability* (pp. 293-313). Singapore: Springer Nature Singapore.

Gog, M. (2015). Case study research. *International Journal of Sales, Retailing & Marketing*, *4*(9), 33-41.

Grier, K. B., & Smallwood, A. D. (2013). Exchange rate shocks and trade: A multivariate GARCH-M approach. *Journal of International Money and Finance*, *37*, 282-305.

Gruss, B., & Kebhaj, S. (2019). *Commodity terms of trade: A new database*. International Monetary Fund.

Gujarati, D. N. (2009). *Basic econometrics*: Tata McGraw-Hill Education.

Gujarati, D. N., & Porter, D. C. (2009). Causality in economics: The Granger causality test. *Basic Econometrics*, 652-658.

Gujarati, D., & Porter, D. (2009). *Essentials of Econometrics 4e*: McGraw Hill.

Hang, D. T. T., & Lien, N.-P. (2022). Effects of Monetary Policy and Government Effectiveness on Economic Growth: Evidence from 49 Countries Worldwide. *Journal of Hunan University Natural Sciences*, *49*(8), 44–54.

Hasran, N. I. L. B., Saputra, J., & Haque, A. U. (2023). Is Interest Rate an Effective Instrument for Controlling Inflation and Its Effect on Investment Activities in Developing Countries?. In *Corporate Management Ecosystem in Emerging Economies: Global Perspectives* (pp. 367-401). Cham: Springer International Publishing.

Hayes, A. F. (2013). Mediation, moderation, and conditional process analysis. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach edn. New York: Guilford Publications*, *120*.

Hayes, A. F., & Rockwood, N. J. (2017). Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations, and implementation. *Behaviour research and therapy*, *98*, 39-57.

Hayes, J. R. (2013). *The complete problem solver*. Routledge.

Henderson, J., Dicken, P., Hess, M., Coe, N., & Yeung, H. W. C. (2002). Global production networks and the analysis of economic development. *Review of international political economy*, *9*(3), 436-464.

Horticultural Crops Directorate. (2021). Annual Report 2020. Retrieved from http://www.hcd.co.ke/index.php/publications

Ikechi, K. S., & Nwadiubu, A. (2020). Exchange rate volatility and international trade in Nigeria. *International Journal of Management Science and Business Administration*, *6*(5), 56-72.

Ikiara, M. M. (1992). *The determinants of export performance of the Kenyan horticultural industry* (Doctoral dissertation).

Jaffee, S., & Henson, S. (2004). *Standards and agro-food exports from developing countries: rebalancing the debate* (Vol. 3348). World Bank Publications.

Johansen, S., & Juselius, K. (1990). Some structural hypotheses in a multivariate cointegration analysis of the purchasing power parity and the uncovered interest parity for UK.

Kabiru, J. N., Ochieng, D. E., & Kinyua, H. W. (2015). The effect of general elections on stock returns at the nairobi securities exchange. *European scientific journal*, *11*(28), 435-460.

Karazsia, B. T., & Berlin, K. S. (2018). Can a mediator moderate? Considering the role of time and change in the mediator-moderator distinction. *Behavior Therapy*, *49*(1), 12-20.

Kasema, R. (2023). Key factors influencing the export performance of SMEs in Rwanda: evidence from the non-traditional export sector. *Asia Pacific Journal of Innovation and Entrepreneurship*, (ahead-of-print).

Kassouri, Y., & Altıntaş, H. (2020). Commodity terms of trade shocks and real effective exchange rate dynamics in Africa's commodity-exporting countries. *Resources Policy*, *68*, 101801.

Kenya Economic Survey. (2020). *The Kenya Economic Survey annual report 2020*.

Kenya Export Promotion and Branding Agency. (2020). Horticulture. Retrieved from https://brand.kephis.org/index.php/commodity/horticulture

Kenya Flower Council. (2021). Impact of COVID-19 on Kenya's Horticulture Sector. Retrieved from https://kenyaflowercouncil.org/2021/05/31/impact-of-covid-19-on-kenyas-horticulture-sector/

Kenya Institute for Public Policy Research and Analysis (2023), Kenya Economic Report 2023. Nairobi: KIPPRA.

Kenya Ministry of Foreign Affairs (2021). *The Kenya Ministry of Foreign Affairs annual report 2021*.

Kenya Ministry of Foreign Affairs. (2021). Trade Diplomacy. Retrieved from https://www.foreignaffairs.go.ke/trade-diplomacy/

Kenya National Bureau of Statistics (KNBS). (2019). Economic Survey 2019. Retrieved from https://www.knbs.or.ke/download/economic-survey-2019/

Kenya National Bureau of Statistics. (2015). *The Kenya National Bureau of Statistics annual report 2015*.

Kenya National Bureau of Statistics. (2016). *The Kenya National Bureau of Statistics annual report 2016*.

Kenya National Bureau of Statistics. (2017). *The Kenya National Bureau of Statistics annual report 2017*

Kenya National Bureau of Statistics. (2020). *The Kenya National Bureau of Statistics annual report 2020*.

Kenya National Bureau of Statistics. (2021). Economic Survey 2021. Retrieved from https://www.knbs.or.ke/download/economic-survey-2021/

Kenya National Bureau of Statistics. (2021). *The Kenya National Bureau of Statistics annual report 2021*.

Kenya National Bureau of Statistics. (2022). *The Kenya National Bureau of Statistics annual report 2022*.

Kenyan Ministry of Agriculture, Livestock, Fisheries, and Cooperatives. (2020). Kenya Horticulture Competitiveness Project.

Kim, M., & Voorhees, M. (2011). Government effectiveness and institutional trust in Japan, South Korea, and China. *Asian Politics & Policy*, *3*(3), 413-432.

Kimenyi, M., Mwega, F. M., & Ndung'u, N. (2015). *The African lions: Kenya country case study* (No. 2015/134). WIDER Working Paper.

Kinuthia, N. M. (2014). *The effect of foreign exchange rate fluctuations on horticultural export earnings in Kenya.* University of Nairobi.

Kumar, N. R., Rai, A. B., & Rai, M. (2008). Export of cucumber and gherkin from India: performance, destinations, competitiveness and determinants. *Agricultural Economics Researh Review*, *21*(1), 130-138.

Lee, S. Y., & Whitford, A. B. (2009). Government effectiveness in comparative perspective. *Journal of Comparative Policy Analysis*, *11*(2), 249-281.

Lovasy, G. (1962). Inflation and exports in primary producing countries. *Staff Papers*, *9*(1), 37-69.

Lütkepohl, H., Krätzig, M., & Boreiko, D. (2006). VAR analysis in JMulTi. *Handbook of Economic Forecasting*.

Mabeta, J. (2015). *Determinants of non-traditional agricultural exports growth in Zambia. A case of cotton and tobacco* (Doctoral dissertation, Egerton University).

Maqbool, M. S., Ahmad, M., Mobeen, M., & Nasim, I. (2021). Competitiveness and Export Performance of Pakistan's Horticultural Sector. *Pakistan Journal of Social Sciences*, *41*(3), 549-560.

Marks-Bielska, R., Wojarska, M., Lizińska, W., & Babuchowska, K. (2020). Local economic development in the context of the institutional efficiency of local governments. *Engineering Economics*, *31*(3), 323-333.

Martin, J. P. (1976). Variable factor supplies and the Heckscher-Ohlin-Samuelson model. *The Economic Journal*, *86*(344), 820-831.

Matui, M. S., Gonzalez, Y. S., Gema, J., & Koomen, I. (2016). *From aid to sustainable trade: driving competitive horticulture sector development: A quick scan of the horticulture sector* (No. 16-03/CDI-16-045). Wageningen Centre for Development Innovation.

Meme, S. M. (2015). *Export performance of the horticultural sub-sector in Kenya: an empirical analysis* (Doctoral dissertation, University of Nairobi).

Mengistu, A. A. (2014). Ethiopia's export performance with major trade partners: A gravity model approach. *Journal of Natural Sciences Research*, *4*(20), 21-28.

Michler, J. D., & Josephson, A. L. (2017). To specialize or diversify: Agricultural diversity and poverty dynamics in Ethiopia. *World Development, 89*, 214-226.

Ministry of Agriculture, Livestock, Fisheries and Cooperatives. (2020). Agriculture Sector Transformation and Growth Strategy 2019-2029. Retrieved from https://www.kilimo.go.ke/wp-content/uploads/2020/05/ASTGS-Public-Domain-9th-May-2020.pdf

Ministry of Agriculture, Livestock, Fisheries and Cooperatives. (2020). National Horticulture Strategy 2021-2026. Retrieved from https://www.kilimo.go.ke/wp-content/uploads/2021/03/NAFSII-Strategic-Plan-2021-2026-Final-Draft.pdf

Moiseev, V. V., Nitsevich, V. F., Sudorgin, O. A., & Galkina, E. V. (2017). To the question of effectiveness of government management.

Mold, A., & Mveyange, A. (2020). The impact of the COVID-19 crisis on trade: Recent evidence from East Africa.

Molonko, B., & Ampah, S. N. (2018). Moderating effect of political risk on the relationship between capital expenditure and sectoral economic growth in Kenya. *International journal of economics and finance*, *10*(1), 129-139.

Morina, F., Hysa, E., Ergün, U., Panait, M., & Voica, M. C. (2020). The effect of exchange rate volatility on economic growth: Case of the CEE countries. *Journal of Risk and Financial Management*, *13*(8), 177.

Mung'atu, J. K., & Nzuma, J. M. (2018). Effect of Credit Access on the Performance of Horticultural Enterprises in Kenya. International Journal of Business and Management Invention, 7(3), 50-57.

Musa, N. (2021). Impact of exchange rate volatility on inflation in Nigeria. *Journal of Contemporary Research in Business, Economics and Finance*, *3*(1), 26-38.

Mwatu, S. M. (2022). Institutions and export performance: firm level evidence from Kenya. *International Review of Economics*, *69*(4), 487-506.

Mwega, F. M. (2009). Global financial crisis discussion series. *Overseas Development Institute*, *111*.

Mwenda, A. K. (2010). Economic and administrative implications of the devolution framework established by the constitution of Kenya.

Nandelenga, M. W. (2021). Fiscal Rules, Fiscal Space and Debt Sustainability for Macroeconomic Stability in Sub-Saharan Africa.

Ndunda, E. N., & Maranga, E. K. (2020). Effects of Climate Variability on Horticultural Farming Systems in Kenya. Climate, 8(6), 72.

Ndungwa, M. F. (2013). Kenya's Manufactured Export Performance And Competitiveness: An Empirical Investigation.

Newey, W. K., & West, K. D. (1987). Hypothesis testing with efficient method of moments estimation. *International Economic Review*, 777-787.

Ng'ethe, A. I. (2022). Factors affecting value addition in the floriculture industry in Kenya.

Ngutu, M. P. (2018). *An Analysis of the Actors, Perceptions and Institutions of Largescale Export-oriented Horticulture in Laikipia County, Kenya* (Doctoral dissertation, University of Nairobi).

Njoroge, E. (2012). *Factors influencing performance of small scale horticulture farmers in Thika district, Kenya.* University of Nairobi.

Njoya, E. T., Efthymiou, M., Nikitas, A., & O'Connell, J. F. (2022). The Effects of Diminished Tourism Arrivals and Expenditures Caused by Terrorism and Political Unrest on the Kenyan Economy. *Economies*, *10*(8), 191.

Nyachae, S. M., & Warue, B. (2020). Horticultural financing lending policies on performance of financing institutions in Kenya. *The University Journal*, *2*(1), XX-XX.

Nyairo, N., & Bäckman, S. (2009). Analysis factors affecting supply of agricultural products: Market liberalization, agricultural policies, bioenergy policies, population growth, input price development, trade policies and other relevant factors.

Nyangweso, P. M., & Odhiambo, M. O. (2004). Exporting Kenya's horticultural products: Challenges and opportunities in the 21st century.

Nyoro, J. K. (2019). *Agriculture and rural growth in Kenya*. Tegemeo Institute.

Nzomoi, J., Mutua, J., Kiprop, H., & Kathambi, A. (2022). An economic analysis of kenya's horticulture export performance 2010–2021. *International Journal of Economics*, *7*(1), 63-75.

Obstfeld, M., & Rogoff, K. (1996). *Foundations of international macroeconomics*. MIT press.

Odhiambo, S. O., Momanyi, G., Othuon, L., & Aila, F. O. (2013). The relationship between fiscal deficits and economic growth in Kenya: An empirical investigation. *Greener Journal of Social Sciences*, *3*(6), 306-323.

Ongore, V. O., & Kusa, G. B. (2013). Determinants of financial performance of commercial banks in Kenya. *International journal of economics and financial issues*, *3*(1), 237-252.

Oranga, K. A. (2022). *The Determinants of the Kenya Shilling-united States Dollar Exchange Rate* (Doctoral dissertation, University of Nairobi).

Otieno, B., & Mudaki, K. (2011). Factors influencing real exchange rate and export sector performance in Kenya. *School of business and economics. Department of economics, Moi University*.

Otieno, M. (2014). *Real Exchange Rate Volatility and Exports in Kenya, 2005-2012* (No. 170). Kenya Institute for Public Policy Research and Analysis.

Peersman, G. (2022). International food commodity prices and missing (dis) inflation in the euro area. *Review of Economics and Statistics*, *104*(1), 85-100.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*(2), 335-346.

Piper, B., Zuilkowski, S. S., & Mugenda, A. (2014). Improving reading outcomes in Kenya: First-year effects of the PRIMR Initiative. *International Journal of Educational Development*, *37*, 11-21.

Polonsky, M. J., & Waller, D. S. (2018). *Designing and managing a research project: A business student's guide*: Sage publications.

Prati, A. (2024). The Well-Being Cost of Inflation Inequalities. *Review of Income and Wealth*, *70*(1), 213-238.

Raikes, P., & Gibbon, P. (2000). 'Globalisation'and African export crop agriculture. *The Journal of Peasant Studies*, *27*(2), 50-93.

Ridolfi, C., Hoffman, V., & Baral, S. (2018). *Post-harvest losses: Global scale, solutions, and relevance to Ghana*: Intl Food Policy Res Inst.

Rikken, M. (2011). *The global competitiveness of the Kenyan flower industry*. Paper presented at the Fifth Video Conference on the Global Competitiveness of the Flower Industry in Eastern Africa.

Rusali, M. A. (2012). Evaluation of Agricultural Products' Quality and Terms of Trade–Empiric Evidences within the Single Market. *Bulletin UASVM Horticulture*, *69*, 2.

Ruzekova, V., Kittova, Z., & Steinhauser, D. (2020). Export performance as a measurement of competitiveness. *Journal of Competitiveness*, *12*(1), 145.

Salami, A., & Arawomo, D. F. (2013). Empirical analysis of agricultural credit in Africa: Any role for institutional factors. *African Development Bank Group*, *192*, 1-28.

Salasya, B., Rich, K., Baltenweck, I., Kaitibie, S., Omore, A., Murithi, F., . . . Staal, S. (2006). Quantifying the economic impacts of a policy shift towards legalizing informal milk trade in Kenya. *Nairobi, Kenya, ILRI.(Markets theme discussion No 1)*.

Salkind, N. J. (Ed.). (2010). *Encyclopedia of research design* (Vol. 1). sage.

Samoei, S. K., & Kipchoge, E. K. (2021). Drivers of horticultural exports in Kenya. *Journal of Economics and Financial Analysis*, *4*(2), 27-44.

Sharma, C. (2020). Exchange rate volatility and exports from India: a commodity-level panel data analysis. *Journal of Financial Economic Policy*, *12*(1), 23-44.

Sheather, S. (2009). *A modern approach to regression with R*: Springer Science & Business Media.

Shitanda, D., & Owino, W. (2020). Enhancing Kenya's Competitiveness in the Global Horticultural Market. International Journal of Agricultural Policy and Research, 8(9), 248-262.

Shittu, O. I., Yemitan, R. A., & Yaya, O. S. (2012). On Autoregressive Distributed Lag, Cointegration And Error Correction Model [An Application to Some Nigeria Macroeconomic Variables]. *Australian Journal of Business and Management Research*, *2*(8), 56.

Sindi, J. K. (2008). *Kenya's Domestic Horticulture Subsector: What Drives Commercialization Decisions by Rural Households?*. Michigan State University. Department of Agricultural Economics.

Soffer, T., Kahan, T., & Nachmias, R. (2019). Patterns of students' utilization of flexibility in online academic courses and their relation to course achievement. *International Review of Research in Open and Distributed Learning*, *20*(3).

Styles, M.A., 2019. *Roses from Kenya: labor, environment, and the global trade in cut flowers*. University of Washington Press.

Sundari, M. T., Darsono, D., Sutrisno, J., & Antriyandarti, E. (2023). Analysis of trade potential and factors influencing chili export in Indonesia. *Open Agriculture*, *8*(1), 20220205.

Sweidan, O. D. (2016). Political instability and economic growth: evidence from Jordan. *Review of Middle East Economics and Finance*, *12*(3), 279-300.

Tarawalie, A. B., Sissoho, M., Conte, M., & Ahortor, C. R. (2013). *Export performance and exchange rate volatility: Evidence from the WAMZ* (No. 5). WAMI Occasional Paper Series.

Tessema, Z., & Alemayehu, M. (2010). Management of napier grass (Pennisetum Purpureum (L.) Schumach) for high yield and nutritional quality in Ethiopia: A Review. *Ethiopian Journal of Animal Production, 10*(1), 73-94.

Tschirley, D. L., Muendo, K. M., & Weber, M. T. (2004). *Improving Kenya's Domestic Horticultural Production and Marketing System: Current Competitiveness, Forces of Change, and Challenges for the Future Volume II: Horticultural Marketing* (No. 680-2016-46707).

Tyce, M. (2020). A 'private-sector success story'? Uncovering the role of politics and the state in Kenya's horticultural export sector. *The Journal of development studies*, *56*(10), 1877-1893.

Umaru, A., Sa'idu, B. M., & Musa, S. (2013). An empirical analysis of exchange rate volatility on export trade in a developing economy. *Journal of emerging trends in economics and management sciences*, *4*(1), 42-53.

UNIDO. (2015). Export Competitiveness of Kenya's Flower Industry. Retrieved from https://www.unido.org/sites/default/files/2015-03/Export-Competitiveness-Kenya-Flower-Industry.pdf

United Nations Industrial Development Organization. (2015). *The United Nations Industrial Development Organization 2015*.

Vergil, H. (2002). Exchange rate in Turkey and Its Effect on Trade Flows. *Journal of Economic & Social Research*, *4*(1).

Verheyen, F. (2012). Bilateral exports from euro zone countries to the US—Does exchange rate variability play a role? *International Review of Economics & Finance*, *24*, 97-108.

Weiss, D. (2002). Introduction of new cut flowers: domestication of new species and introduction of new traits not found in commercial varieties. In *Breeding for Ornamentals: classical and molecular approaches* (pp. 129-137). Dordrecht: Springer Netherlands.

Whitaker, M., & Kolavalli, S. (2006). Floriculture in Kenya. *Technology, Adaptation, And Exports*, 335.

White (2009). The impact of exchange rate volatility on emerging market exports. *Acta Commercii*, *15*(1), 1-11.

World Bank. (2016). Kenya: Horticulture Development Project. Retrieved from https://projects.worldbank.org/en/projects-operations/project-detail/P119783

World Bank. (2021). *The world bank annual report 2021*. The World Bank.

World Trade Organization. (2020). *The World Trade Organization annual report 2020*.

Yaya, O. S., Akintande, O. J., Ogbonna, A. E., & Adegoke, H. M. (2019). CPI inflation in Africa: fractional persistence, mean reversion and nonlinearity. *STATISTICS*, *119*.

Yüksel, H., Kuzey, C., & Sevinç, E. (2012). The impact of exchange rate on exports in Turkey. *European Journal of Economic and Political Studies*.

APPENDICES

Appendix I: University Authorization Letter

MOI UNIVERSITY
POSTGRADUATE OFFICE
SCHOOL OF BUSINESS AND ECONOMICS

Tel: 0790940508
0771336914
0736138770
Fax No: (053) 43047
Telex No. MOIVARSITY 35047

P.O. Box 3900
Eldoret.
Kenya

RE: MU/SBE/PGR/ACD/21B **DATE:** 27th October, 2022

TO WHOM IT MAY CONCERN:

RE: LEMURT JONATHAN - SBE/PGE/16/12

The above named is a bonafide student of Moi University School of Business and Economics, undertaking **Master of Arts in Economics** degree.

He has successfully completed the coursework, defended his proposal, and is proceeding to the field to collect data for her research titled: ***"Macroeconomic Drivers, Government Effectiveness and Horticultural Export Performance in Kenya."***

Any assistance accorded to him will be highly appreciated.

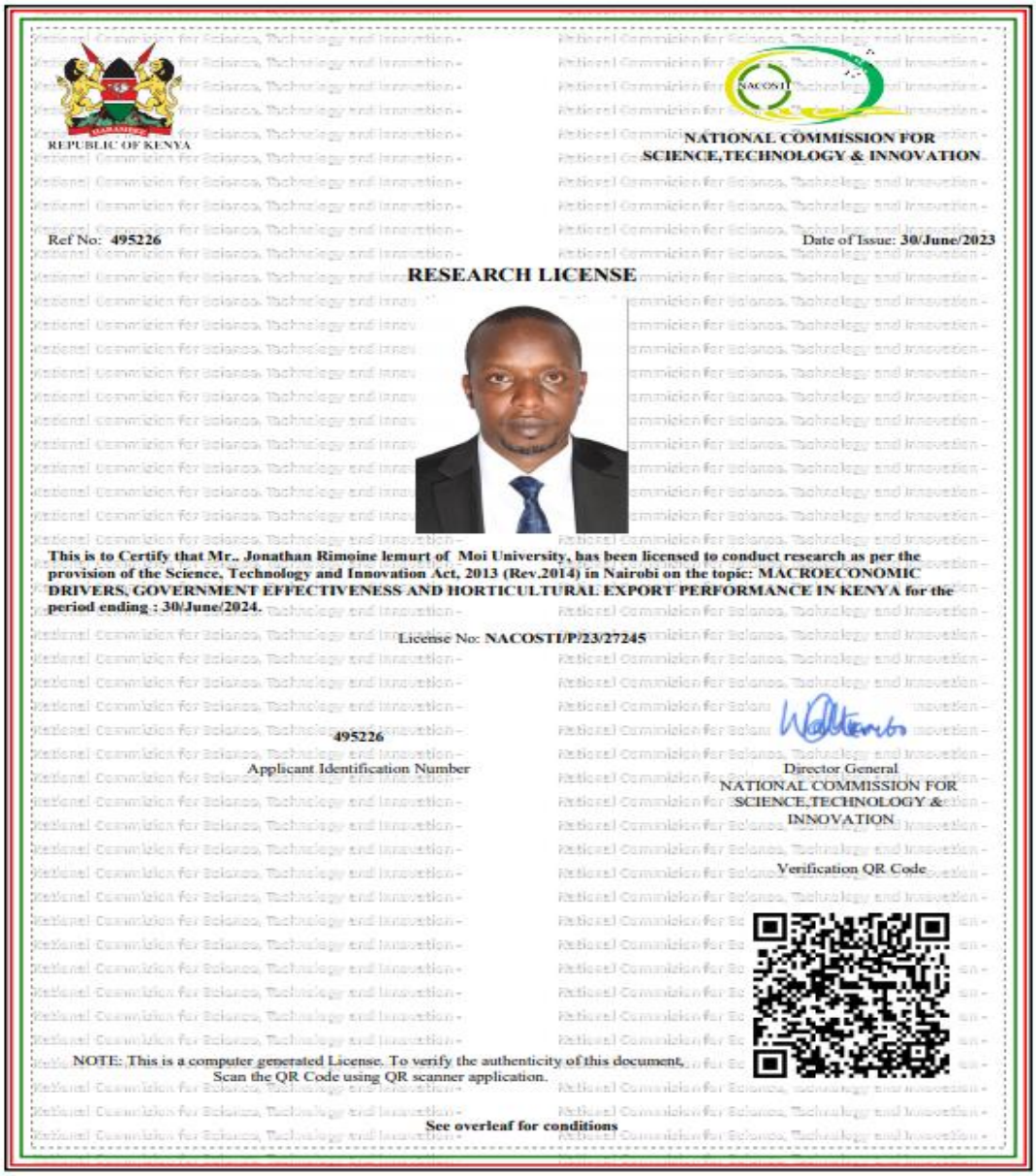
Yours faithfully,

SCHOOL OF BUSINESS & ECONOMICS
MOI UNIVERSITY
P O Box 3900 ELDORET 30100

DR. RONALD BONUKE
POSTGRADUATE CHAIR, SB&E

/kc

Appendix II: National Commission for Science, Technology and Innovation



REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **495226**

Date of Issue: **30/June/2023**

RESEARCH LICENSE

This is to Certify that Mr.. Jonathan Rimoine lemurt of Moi University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: MACROECONOMIC DRIVERS, GOVERNMENT EFFECTIVENESS AND HORTICULTURAL EXPORT PERFORMANCE IN KENYA for the period ending : 30/June/2024.

License No: **NACOSTI/P/23/27245**

495226

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)

Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was the established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
    i. Endanger national security
    ii. Adversely affect the lives of Kenyans
    iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
    iv. Result in exploitation of intellectual property rights of communities in Kenya
    v. Adversely affect the environment
    vi. Adversely affect the rights of communities
    vii. Endanger public safety and national cohesion
    viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
8. The License does not give authority to transfer research materials.
9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and Innovation(NACOSTI),
Off Waiyaki Way, Upper Kabete,
P. O. Box 30623 - 00100 Nairobi, KENYA
Telephone: 020 4007000, 0713788787, 0735404245
E-mail: dg@nacosti.go.ke
Website: www.nacosti.go.ke

Appendix III: Raw Data Results

```
vec  lnexports exchangerate inflation interestrate governmenteffectiveness termsoftrade

Vector error-correction model

Sample:  1992 - 2020                            No. of obs      =        29
                                                AIC             =  23.60336
Log likelihood = -289.2487                      HQIC            =  24.38597
Det(Sigma_ml)  =  18.55838                      SBIC            =  26.10221

Equation           Parms      RMSE     R-sq      chi2     P>chi2
------------------------------------------------------------------
D_hep                  8     .027789   0.7378   61.89732   0.0000
D_exchangerate         8      6.5782   0.2953   8.801835   0.3593
D_inflation            8     2.98234   0.9500   399.0934   0.0000
D_interestrate         8     7.52607   0.5151   22.30783   0.0044
D_governmentef~s       8     .059024   0.1842   4.743067   0.7847
D_termsoftrade         8     3.47044   0.7590   66.15482   0.0000
------------------------------------------------------------------

------------------------------------------------------------------------------
                             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-----------------------------+------------------------------------------------------------------
D_lnexports                  |
                      _ce1   |
                        L1.  |   .0128534   .0263438     0.49   0.626    -.0387794    .0644863
                             |
                  lnexports  |
                        LD.  |  -.1221555   .2325579    -0.53   0.599    -.5779606    .3336496
                             |
              exchangerate   |
                        LD.  |  -.0008504   .0320425    -0.03   0.979    -.0636526    .0619519
                             |
                 inflation   |
                        LD.  |   .0288972    .029049     0.99   0.320    -.0280379    .0858323
                             |
              interestrate   |
                        LD.  |  -.0495751   .0269344    -1.84   0.066    -.1023656    .0032155
                             |
  governmenteffectiveness    |
                        LD.  |   1.842059   3.363354     0.55   0.584    -4.749994    8.434112
                             |
              termsoftrade   |
                        LD.  |   .0324525   .0322494     1.01   0.314    -.0307551    .0956601
                             |
                      _cons  |   .3212128   .1969587     1.63   0.103    -.0648191    .7072447
-----------------------------+------------------------------------------------------------------
D_exchangerate               |
                      _ce1   |
                        L1.  |  -.2276763   .2050867    -1.11   0.267    -.6296389    .1742862
                             |
                  lnexports  |
                        LD.  |  -.4823414   1.810467    -0.27   0.790    -4.030792    3.066109
                             |
              exchangerate   |
                        LD.  |   .1645806   .2494517     0.66   0.509    -.3243358     .653497
                             |
                 inflation   |
                        LD.  |  -.1365505   .2261473    -0.60   0.546    -.5797911    .3066902
                             |
              interestrate   |
                        LD.  |  -.1199451    .209685    -0.57   0.567    -.5309202      .29103
                             |
  governmenteffectiveness    |
                        LD.  |   9.108345   26.18377     0.35   0.728     -42.2109    60.42759
                             |
              termsoftrade   |
                        LD.  |  -.2116259    .251062    -0.84   0.399    -.7036984    .2804467
                             |
                      _cons  |   2.631526   1.533327     1.72   0.086    -.3737391    5.636791
-----------------------------+------------------------------------------------------------------
D_inflation                  |
                      _ce1   |
                        L1.  |  -.2668678   .0929795    -2.87   0.004    -.4491043   -.0846313
                             |
                  lnexports  |
                        LD.  |  -.2715094   .8208057    -0.33   0.741    -1.880259     1.33724
                             |
              exchangerate   |
                        LD.  |   .2436672   .1130931     2.15   0.031     .0220087    .4653256
                             |
                 inflation   |
```

LD.	-.1614845	.1025277	-1.58	0.115	-.3624351	.039466
interestrate						
LD.	-1.231352	.0950642	-12.95	0.000	-1.417674	-1.045029
governmenteffectiveness						
LD.	-7.734015	11.87085	-0.65	0.515	-31.00046	15.53243
termsoftrade						
LD.	-.0617364	.1138232	-0.54	0.588	-.2848258	.1613529
_cons	-.7658938	.6951593	-1.10	0.271	-2.128381	.5965935
D_interestrate						
_ce1						
L1.	-.3447478	.2346383	-1.47	0.142	-.8046303	.1151347
lnexports						
LD.	2.58336	2.071343	1.25	0.212	-1.476397	6.643117
exchangerate						
LD.	.3255591	.285396	1.14	0.254	-.2338067	.884925
inflation						
LD.	.0220932	.2587336	0.09	0.932	-.4850153	.5292017
interestrate						
LD.	-.6139278	.2398992	-2.56	0.010	-1.084122	-.1437341
governmenteffectiveness						
LD.	-22.48387	29.95667	-0.75	0.453	-81.19786	36.23011
termsoftrade						
LD.	-.3811279	.2872383	-1.33	0.185	-.9441046	.1818489
_cons	-1.018316	1.754268	-0.58	0.562	-4.456618	2.419986
D_governmenteffectiveness						
_ce1						
L1.	-.0012591	.0018402	-0.68	0.494	-.0048658	.0023476
lnexports						
LD.	.0124278	.0162448	0.77	0.444	-.0194115	.0442671
exchangerate						
LD.	-.0023636	.0022383	-1.06	0.291	-.0067505	.0020233
inflation						
LD.	-.0004463	.0020292	-0.22	0.826	-.0044234	.0035308
interestrate						
LD.	.0021654	.0018814	1.15	0.250	-.0015222	.005853
governmenteffectiveness						
LD.	.00081	.2349399	0.00	0.997	-.4596639	.4612838
termsoftrade						
LD.	-.0023366	.0022527	-1.04	0.300	-.0067518	.0020786
_cons	.0084233	.0137581	0.61	0.540	-.0185421	.0353888
D_termsoftrade						
_ce1						
L1.	-.6376326	.1081969	-5.89	0.000	-.8496946	-.4255706
lnexports						
LD.	.9528108	.955142	1.00	0.318	-.9192332	2.824855
exchangerate						
LD.	.2952512	.1316024	2.24	0.025	.0373152	.5531872
inflation						
LD.	-.2524328	.1193078	-2.12	0.034	-.4862718	-.0185939
interestrate						
LD.	-.155345	.1106228	-1.40	0.160	-.3721618	.0614717
governmenteffectiveness						
LD.	-5.93126	13.81368	-0.43	0.668	-33.00558	21.14306
termsoftrade						
LD.	-.1565691	.1324519	-1.18	0.237	-.4161701	.1030319
_cons	-.0620475	.8089319	-0.08	0.939	-1.647525	1.52343

```
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2
-------------------------------------------
_ce1                   5   106.1985   0.0000
-------------------------------------------

Identification:  beta is exactly identified

                Johansen normalization restriction imposed
------------------------------------------------------------------------------
                beta |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
---------------------+--------------------------------------------------------
_ce1                 |
          lnexports |          1          .       .       .            .           .
       exchangerate |  -.4873801   .0943141    -5.17   0.000    -.6722324   -.3025278
          inflation |  -1.149905   .2848992    -4.04   0.000    -1.708297   -.5915129
       interestrate |   .4412561   .1842697     2.39   0.017     .0800941     .802418
governmenteffectiveness |  -23.93534   8.108344    -2.95   0.003    -39.8274   -8.043273
       termsoftrade |   1.024116   .1656626     6.18   0.000     .6994229    1.348808
              _cons |  -92.36135          .       .       .            .           .
------------------------------------------------------------------------------
. reg hortperf exch inf interestrate termsoftrade excgov infgov intgov totgov

      Source |       SS       df       MS              Number of obs =      32
-------------+------------------------------           F(  8,    23) =  340.85
       Model |  6.9447e+22     8  8.6809e+21           Prob > F      =  0.0000
    Residual |  5.8577e+20    23  2.5468e+19           R-squared     =  0.9916
-------------+------------------------------           Adj R-squared =  0.9887
       Total |  7.0033e+22    31  2.2591e+21           Root MSE      =  5.0e+09

------------------------------------------------------------------------------
    hortperf |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        exch |   .0079081   .0005787    13.67   0.000      .006711    .0091052
         inf |   .0157287   .0040528     3.88   0.001     .0073448    .0241125
interestrate |   2.43e+08   1.05e+09     0.23   0.819    -1.92e+09    2.41e+09
termsoftrade |   4.22e+07   1.78e+08     0.24   0.814    -3.25e+08    4.10e+08
         gov |   .2524328   .1193078     2.12   0.034      .4862718    .0185939
       _cons |   1.48e+09   1.08e+10     0.14   0.892    -2.09e+10    2.38e+10
------------------------------------------------------------------------------


------------------------------------------------------------------------------
    hortperf |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        exch |   .0086521   .0002457    35.21   0.000      .008147    .0091571
         inf |   .0092695   .0027038     3.43   0.002     .0037118    .0148271
interestrate |  -2.90e+08   1.43e+08    -2.03   0.053    -5.84e+08     4138697
termsoftrade |    8281766   1.21e+08     0.07   0.946    -2.41e+08    2.58e+08
      excgov |  -2.97e+08   9.64e+07    -3.08   0.005    -4.95e+08   -9.91e+07
       _cons |  -1.49e+09   1.08e+10    -0.14   0.891    -2.37e+10    2.07e+10
------------------------------------------------------------------------------

. reg hortperf exch inf interestrate termsoftrade excgov infgov

      Source |       SS       df       MS              Number of obs =      32
-------------+------------------------------           F(  6,    25) =  484.32
       Model |  6.9436e+22     6  1.1573e+22           Prob > F      =  0.0000
```

```
    Residual |  5.9736e+20    25  2.3894e+19           R-squared     =  0.9915
-------------+----------------------------           Adj R-squared =  0.9894
       Total |  7.0033e+22    31  2.2591e+21           Root MSE      =  4.9e+09

------------------------------------------------------------------------------
    hortperf |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        exch |    .008116   .0003333    24.35   0.000     .0074296    .0088024
         inf |    .015677   .0038374     4.09   0.000     .0077737    .0235803
interestrate |  -2.55e+08   1.34e+08    -1.90   0.069    -5.32e+08    2.14e+07
termsoftrade |   4.46e+07   1.14e+08     0.39   0.700    -1.91e+08    2.80e+08
      excgov |  -2.28e+08   9.52e+07    -2.39   0.024    -4.24e+08   -3.19e+07
      infgov |   6.60e+08   2.98e+08     2.21   0.036     4.62e+07    1.27e+09
       _cons |   4.84e+08   1.01e+10     0.05   0.962    -2.03e+10    2.13e+10
------------------------------------------------------------------------------

. reg hortperf exch inf interestrate termsoftrade excgov infgov intgov

      Source |       SS       df       MS              Number of obs =      32
-------------+------------------------------           F(  7,    24) =  405.23
       Model |  6.9445e+22     7  9.9208e+21           Prob > F      =  0.0000
    Residual |  5.8756e+20    24  2.4482e+19           R-squared     =  0.9916
-------------+------------------------------           Adj R-squared =  0.9892
       Total |  7.0033e+22    31  2.2591e+21           Root MSE      =  4.9e+09

------------------------------------------------------------------------------
    hortperf |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        exch |   .0080252   .0003666    21.89   0.000     .0072687    .0087818
         inf |   .0159282   .0039045     4.08   0.000     .0078697    .0239867
interestrate |   3.44e+08   9.56e+08     0.36   0.722    -1.63e+09    2.32e+09
termsoftrade |   1.02e+07   1.28e+08     0.08   0.937    -2.54e+08    2.74e+08
      excgov |  -2.75e+08   1.22e+08    -2.26   0.033    -5.27e+08   -2.34e+07
      infgov |   6.46e+08   3.02e+08     2.14   0.043     2.21e+07    1.27e+09
      intgov |   1.09e+09   1.72e+09     0.63   0.533    -2.46e+09    4.64e+09
       _cons |   1.90e+09   1.05e+10     0.18   0.858    -1.97e+10    2.35e+10
------------------------------------------------------------------------------
------------------------------------------------------------------------------
             dlnexp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------------+---------------------------------------------------------
       exchangerate |   .3156734   .1147062     2.75   0.012     .0764005    .5549463
          inflation |   .6451898   .1509059     4.28   0.000     .3304055    .9599741
       interestrate |   .0457037     .13174     0.35   0.732    -.2291011    .3205085
governmenteffectiveness |   .0495751   .0269344     1.84   0.066     .1023656    .0032155
       termsoftrade |   -.353455   .1380589    -2.56   0.019    -.6414408   -.0654691
             ex_eff |   .6302851   .2412354     2.61   0.017      .127077    1.133493
          inf_eff |   1.130688   .2777808     4.07   0.001     .5512474    1.710129
          int_eff |   .1115194   .2358727     0.47   0.641    -.3805025    .6035412
          tot_eff |  -.7186997   .2706428    -2.66   0.015    -1.283251   -.1541486
            _cons |   2.186205   8.185358     0.27   0.792    -14.88815    19.26056
------------------------------------------------------------------------------
```