Journal of Economics, Finance and Management Studies

ISSN (print): 2644-0490, ISSN (online): 2644-050

Volume 07 Issue 05 May 2024

Article DOI: 10.47191/jefms/v7-i5-52, Impact Factor: 8.044

Page No: 2798-2808

The Moderating Role of Government Effectiveness on the Relationship between Selected Macroeconomic Variables and Horticultural Export Performance in Kenya

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ABSTRACT: The horticultural sector in Kenya plays a crucial role in driving the country's economy, making up approximately 1.6% of the country's GDP in 2019. Despite generating a significant Ksh152.3 billion in 2022, the value of these exports exhibited a decline compared to Ksh157.7 billion in 2021. These decreases in horticultural exports performance warrant further investigation into the underlying factors impacting this important sector. This study examines the role of government effectiveness in the relationship between different macroeconomic factors and Kenya's horticultural exports performance using time series data from 1990 to 2021. The study's key findings highlight the significant influence of government effectiveness on the relationship between exchange rates, inflation rates, interest rates, and horticultural export performance. This implies that well-designed government policies have the potential to enhance the positive impacts of these macroeconomic factors. The findings highlight the crucial role of government effectiveness in shaping the impact of macroeconomic factors on Kenya's horticultural export performance. Considering these findings, the study provides a few policy recommendations. Investments in strengthening government institutions and policies can amplify the benefits of favourable exchange rates, controlled inflation, and stable interest rates on horticultural exports. Additionally, taking steps to enhance market access, decrease trade barriers, and negotiate more favourable trade agreements can amplify the advantages of favourable terms of trade for horticultural exports. Lastly, it is important to consider policies that can help address the negative effects of unfavourable terms of trade. This includes strategies like export diversification and risk management, which can be particularly effective with strong government backing.

KEYWORDS: Government Effectiveness, Horticulture Export, Performance, Kenya

1. INTRODUCTION

Kenya's horticultural sector has emerged as a powerful economic driver, significantly contributing to the gross domestic product (GDP) and employing millions of Kenyans (Nzomoi *et al.,* 2022; Samoei, 2014). This sector not only supplies raw materials to manufacturing but also boasts higher farm profitability due to increased production and foreign exchange earnings (Sindi, 2008). It offers vast opportunities in international, regional, and domestic markets, ranking alongside tea and tourism as a leading foreign exchange earner (KNBS, 2017).

Based on the 2023 Economic survey conducted by KNBS, Kenya's exports of Fresh Horticultural Produce (FHP) shown a varied performance from 2018 to 2022. At first, there was an increase in exports, with the amount growing from 322.6 thousand tonnes in 2018 to 313.6 thousand tonnes in 2020. During this period, Kenya's economic performance, as shown by its GDP, generally exhibited modest growth, except for a decline in 2020. Nevertheless, there was a notable surge in FHP exports in 2021, with a peak of 405.5 thousand tonnes, followed by a steep decrease to 279.0 thousand tonnes in 2022. The causes of these variations remain somewhat uncertain; however, they may be associated with variables such as meteorological conditions or disturbances in international commerce. It is crucial to consider the broader economic situation in Kenya, as the country's trade balance has remained negative. Additional investigation is required to provide a comprehensive understanding of the elements that significantly impact the export of fresh horticultural produce (FHP) in Kenya.

From 2018 to 2022, horticulture regularly ranked first in terms of export volume, surpassing an annual total of 460,000 tonnes. Exports in 2021 reached a pinnacle of 682,279.4 tonnes, indicating a notable rising trajectory. Nevertheless, the journey towards

expansion encountered certain obstacles. Although the general trend is positive, there were some variations. In 2019, there was a decline in exports, with a total of 467,602.7 tonnes. However, in 2021, there was a significant increase in exports. The data for 2022 indicates a further decrease of 603,800.3 tonnes, however it still surpasses the initial value recorded in 2018 (KNBS, 2023).

The sector's roots trace back to the early 20th century, with the cultivation of coffee, tea, and pyrethrum (Dijkstra, 1997). The 1960s witnessed Kenya exploring the export potential of fresh flowers, starting with carnations (Whitaker & Kolavalli, 2006), marking its entry into the global cut flower market. This industry experienced significant growth in the 1970s with the introduction of new flower varieties and improved production techniques (Weiss, 2002). Favorable climate and fertile soils in areas like Naivasha and Thika further fueled the sector's expansion (Chege, 2015). Roses became the dominant flower crop, solidifying Kenya's position as a key player in the global market (Megan, 2019).

The 1980s and 1990s saw diversification within the sector with the introduction of French beans, snow peas, mangoes, avocados, and passion fruits (Raikes & Gibbon, 2000). This expansion was driven by market demand, suitable growing conditions, and a strategic move to reduce overreliance on specific crops. During this period and the early 2000s, Kenya focused on improving market access and adhering to international quality standards (Jaffee & Henson, 2004). The country obtained certifications like GlobalGAP (Good Agricultural Practices) and Fairtrade to meet the requirements of importing countries, particularly those in Europe.

In recent years, the focus has shifted towards sustainable practices like organic farming, water conservation, and waste management (WTO, 2020). Efforts have also been made to promote value addition and agro-processing to minimize post-harvest losses, extend product shelf life, and enhance market competitiveness (Ministry of Agriculture Report, 2019). However, maximizing these potential hinges on a complex interplay between various macroeconomic factors including macroeconomic stability and government effectiveness.

While past studies have explored the independent effects of macroeconomic variables on agricultural exports (Clottey et *al.,* 2009; Alagh, 2011), a crucial gap remains. Limited research examines how government effectiveness influences this relationship. Inefficient or corrupt governments can distort markets, hinder infrastructure development, and create uncertainty for investors, potentially weakening the positive effects of favorable macroeconomic conditions on export performance.

Based on the above arguments, the study sought to investigate the moderating effect of government effectiveness on the relationship between the following macroeconomic factors and horticultural export performance in Kenya: Exchange rate, Inflation rate, Interest rate and Terms of trade.

2. EMPIRICAL LITERATURE

Kumar *et al.* (2008) analyzed Indian cucumber and gherkin exports. They discovered that Indian exports increased as global trade volume for these products increased, indicating growing worldwide demand. The weakening of the Indian Rupee also boosted exports of these goods.

Abukari and Cunfeng (2021) examined Nigerian cocoa export determinants. They discovered that worldwide cocoa amount, currency rate, and Nigerian cocoa production explained over 70% of export fluctuation. A weaker currency rate (Naira depreciation) increased exports, presumably due to decreased Nigerian productivity over the study period. Global cocoa demand and domestic production boosted Nigerian cocoa exports.

Abukari and Cunfeng (2021) investigated Ghana's cocoa export competitiveness compared to neighboring West African countries. Their findings reveal Ghana still holds a significant advantage in cocoa bean exports, primarily due to the high quality of their beans. However, fluctuating production volumes limit export potential.

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.

Molonko and Ampah (2018) define a moderator as an extraneous variable that influences the relationship between the dependent and independent variables. The influence of a moderator is assessed based on its capacity to affect the direction and/or intensity of the relationship between the independent and dependent variables in a consistent manner. According to a study conducted by Duho, Amankwa, and Musah-Surugu (2020), government efficacy, which refers to the quality of output and the extent to which policies accomplish desired objectives, is a significant topic in public policy in Africa and Asia.

Research Gap

The reviewed literature extensively examines the relationship between various macroeconomic variables and horticultural export performance. These studies identify factors like exchange rate, agricultural GDP, foreign income, real GDP, and international prices as significant determinants of export success (Kumar et al., 2008; Abukari & Cunfeng, 2021; Dube et al., 2018; William, 2022; Mwongera, 2015). However, a significant gap exists regarding the moderating role of government effectiveness in this relationship. While studies by Manaseh (2014) and Mwongera (2015) acknowledge the importance of government policies, they don't delve into how government effectiveness itself might influence the impact of other variables on export performance.

3.0 METHODOLOGY

3.1 Target Population, Data Types and Sources

The paper targeted data from the period spanning 1990-2021 for all the study variables; dependent and independent. This paper used mainly annual secondary time series data The study employed annual time series data from the period spanning 1990-2021 for all the study variables; dependent and independent which were sourced from Kenya National Bureau of Statistics Economic Surveys, the Central Bank of Kenya, and the World Development governance indicators of the World Bank. The choice of this period was motivated by the availability of data and by the fact that it consists of the period where Kenya had experienced moderate economic growth rate with relatively promising performance of horticultural exports. In this study, the explanatory research method was used because it offers a framework for examining variables in order to either support or refute the claim that they have a cause-and-effect relationship (Salkind, 2010).

3.2 Measurement of Variables

The study utilized various macroeconomic variables as described in table 3.1.

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 Compilation, 2024

3.3 Pre-Estimation and Post-Estimation Tests

Various tests were conducted to analyze the data and summarize the findings in relation to the objectives. The tests included descriptive statistics, which involved calculating means, minimum and maximum values, and standard deviations. Correlation relationships between the study variables were also explored. The study discussed the findings of the univariate properties of each series, using graphical representation. Additionally, stationarity checks were performed using the Augmented Dickey Fuller and Philip-Perron tests. Some structural breaks were identified, and a Vector Error Correction Model (VECM) was used for regression analysis.

***Stationarity Test*:** The Phillips-Perron test and the Augmented Dickey Fuller (ADF) test were employed to assess the stationarity of various variables in the study. The Phillips-Perron test, an improvement over the Dickey Fuller test, found that exchange rate (EXRT), government effectiveness (GE), and horticultural exports (HEP) were not stationary at levels but became stationary after first difference. In contrast, inflation (INF), interest rate (INTR), and terms of trade (TOT) were stationary at levels (Table 3.2). The ADF test results from table 3.3 confirmed these findings, showing that INF, INTR, and TOT were stationary at levels, while HEP, EXRT, and GE achieved stationarity after first difference. These results support the conclusion that the study variables were integrated of order one *(I(1)),* indicating a long-term association among them.

Table 3. 1: Philips Perron Unit Root Test

Variable	ADF test statistic	P	Critical values 1%	5%	10%	Conclusion
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: Research data (2024)

Table 3. 2: Augmented Dickey Fuller Unit Root Test

Variable	**ADF test statistic**	**P**	**Critical values 1%**	**5%**	**10%**	**Conclusion**
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: Research data (2024)

Unit Root Test with Structural Breaks: The analysis proceeded to test for unit roots in the presence of structural breaks, recognizing that traditional unit root tests might be biased due to ignoring structural changes. The Clemente-Montaés-Reyes unit-root test with a single mean shift and additive outlier model was employed, aiming to identify breaks in time series data that could be attributed to events like regime changes or economic crises. The results, presented in Table 3.4 shows Clemente-Montañés-Reyes unit-root test with single mean shift for various variables and their respective breaks. For the exchange rate (EXRT), significant breaks were observed in 1996 and 2012. Inflation (INFL) showed breaks in 1994 and 2007, while interest rate (INTR) exhibited breaks in 2002 and 2008. Government effectiveness (GE) had breaks in 2000 and 2011, and terms of trade (TOT) showed breaks in 2000 and 2015. Horticultural exports (HEP) had breaks in 1997 and 2004. These breaks indicate significant structural shifts in the variables, possibly influenced by various economic, political and policy changes in Kenya during those specific years.

Table 3. 3: 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, 2024

3.4 Model Specification

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 represents horticulture performance, Exr_t is the exchange rate, ToT_t is the terms of trade and Dp_t is inflation Ir_t is the 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.

Testing for Direct Effect

For the direct effect, the Vector Error Correction model (VECM) for estimation of the relationship after confirmation of the existence of long run relationship between the study variables. The Model was customized to analyze the relationship between macroeconomic variables and horticultural export performance 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 is 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;

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

Where α is coefficients of the adjustment's matrix, β is co-integrating equations matrix coefficients, Γ= is short run coefficients and X_t is model endogenous variables.

Testing for Indirect Effect

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. 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).

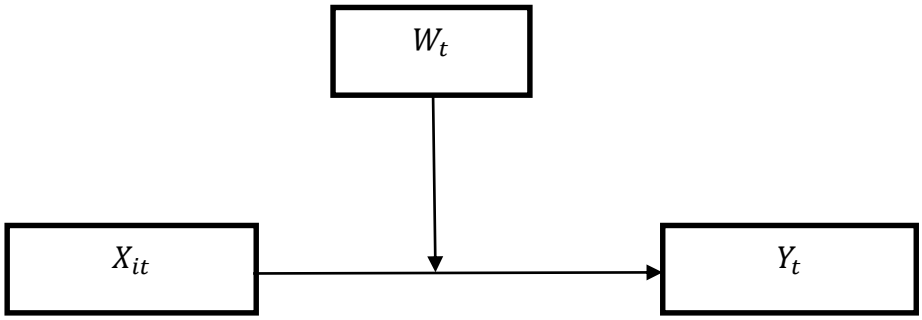

Figure 3. 1: Moderation Analysis
Source: Hayes (2013)

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 3.5, 3.6, 3.7, 3.8 and 3.9 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.

$HXP_t = \beta_0 + \beta_1 EXR_t + \beta_2 TOT_t + \beta_3 DP_t + \beta_4 IR_t + \beta_5 GOE_t + e_t$……..3.5

$HXP_t = \beta_0 + \beta_1 EXR_t + \beta_2 TOT_t + \beta_3 DP_t + \beta_4 IR_t + \beta_5 GOE_t + \beta_6 EXR_t GOE_t + e_t$……..3.6

$HXP_t = \beta_0 + \beta_1 EXR_t + \beta_2 TOT_t + \beta_3 DP_t + \beta_4 IR_t + \beta_5 GOE_t + \beta_6 EXR_t GOE_t +$
$\beta_7 TOT_t GOE + e_t$……..3.7

$HXP_t = \beta_0 + \beta_1 EXR_t + \beta_2 TOT_t + \beta_3 DP_t + \beta_4 IR_t + \beta_5 GOE_t + \beta_6 EXR_t GOE_t +$
$\beta_7 TOT_t GOE_t + \beta_8 DP_t GOE_t + e_t$……..3.8

$HXP_t = \beta_0 + \beta_1 EXR_t + \beta_2 TOT_t + \beta_3 DP_t + \beta_4 IR_t + \beta_5 GOE_t + \beta_6 EXR_t GOE_t +$
$\beta_7 TOT_t GOE_t + \beta_8 DP_t GOE_t + \beta_9 IR_t GOE_t + e_t$……..3.9

4.0 RESULTS AND DISCUSSIONS

The findings of the correlation analysis are summed up and reported in table 4.1. 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.

The results show a strong positive correlation between horticulture export performance and the exchange rate (0.8668), indicating that as the exchange rate increases, horticulture export performance also tends to increase. There is a moderate positive correlation between horticulture export performance and terms of trade (0.5202), suggesting that an improvement in terms of trade is associated with better horticulture export performance. Conversely, there is a weak negative correlation between horticulture export performance and inflation (-0.2959) and a weak positive correlation with interest rate (0.0505), implying that higher inflation and interest rates may have a slight adverse impact on horticulture export performance. The correlation with government effectiveness is weak and positive (0.0895), indicating a minor positive relationship. Overall, these findings suggest that exchange rate and terms of trade are important factors influencing horticulture export performance in the study.

Table 4. 1: 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, 2024

The results of the Vector Error Correction Model (VECM) revealed significant relationships between horticultural export performance and the selected macroeconomic variables. The coefficient for the exchange rate was -0.4874, with a p-value of 0.000, indicating a strong negative relationship between the exchange rate and horticultural export performance. This suggests that an increase in the exchange rate is associated with a decrease in horticultural export performance. Similarly, inflation has a coefficient of -1.1499 with a p-value of 0.000, indicating a significant negative relationship. A higher inflation rate is associated with lower horticultural export performance. On the other hand, the interest rate has a coefficient of 0.4413 with a p-value of 0.017, indicating a significant positive relationship. This suggests that a higher interest rate is associated with higher horticultural export performance. Government effectiveness also shows a significant negative relationship, with a coefficient of -23.935 and a p-value of 0.003, indicating that higher government effectiveness is associated with lower horticultural export performance. Finally, terms of trade had a coefficient of 1.0241 with a p-value of 0.000, indicating a significant positive relationship. Overall, the study results suggest that the exchange rate, inflation, interest rate, government effectiveness, and terms of trade are all significant determinants of horticultural export performance, with varying degrees of impact.

Table 4. 2: 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	***
Government eff.	-23.935	8.1083	-2.95	.003	-39.8274	-8.0433	***
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, 2024

The R-squared 0.7378 indicates that the model fit the data well, explaining over 73% of the variation in export performance. This means factors like exchange rate, inflation, interest rates, trade conditions, and government effectiveness significantly influence how well Kenya's horticulture sector performs in exports. The model further suggests that horticultural exports tend to return to a balanced state (equilibrium) relatively quickly after any disruptions. Since the 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 4.3: Vector Error Correction Results

Equation	Parms	Chi2	P>Chi2			
_cel	2	19.094	0.001			
Variables	Coefficient	Std. Err	Z	p>|z|	95% confidence interval	
Cointegrating equation	.1713265	.0466888	3.67	0.000	.079818	.2628349
Debt sustainability						
Debt-service-ratio	-0.35102	0.0083	-4.25	0.000	-.05129	-.01890
Exchange rate	-0.0054	0.0016	-3.23	0.000	-.00863	-.00211
Constant	0.5853		-	-	-	-

Source: Data analysis results, 2024

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 4.1 shows that all of the values fall within the unit circle, confirming the stability of the generated coefficient in the VECM model.

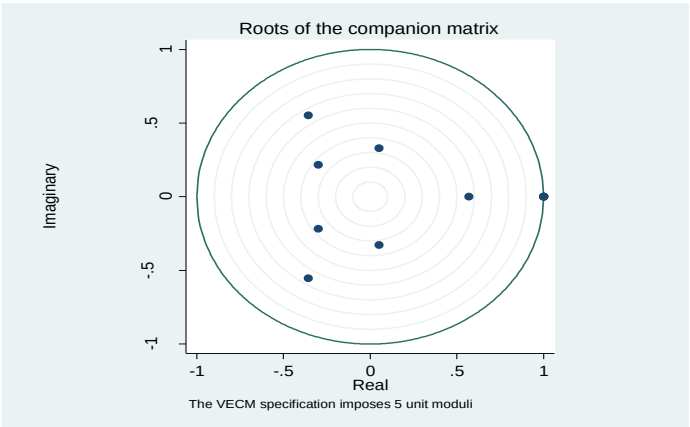

Figure 4. 1: Model Reliability of Coefficients

Source: Data Analysis Results, 2024

The Moderating Role of Government Effectiveness on the Relationship between Selected Macroeconomic Variables and Horticultural Export Performance in Kenya

The study further 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. The hierarchical regression results are presented in table 4.4. 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 variables 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 significant moderating role on the relationship between exchange rate, inflation, interest rate and terms of trade and horticultural export performance. This is evident by the significant interaction terms: EXR*GEFF ($\beta = .630, p < 0.05$), INF*GEFF ($\beta = 1.131, p < 0.05$), INT*GEFF ($\beta = .112, p < 0.05$) and TOT*GEFF($\beta = -.719, p < 0.05$).

Table 4.4: Hierarchical Multiple Regression Moderation Results

	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

In all cases, government effectiveness played a moderating role, but the type of moderation differed. For the relationship between exchange rate, inflation rate, interest rate and export performance, government effectiveness had an enhancing effect. This means that strong effective government strengthens the positive relationship between these factors and horticultural exports performance. For instance, a stable exchange rate due to effective government policies can significantly benefit exports performance.

However, for the relationship between terms of trade and export performance, the effect og government effectiveness was buffering. In this case, a strong effective government weakens the negative impact of unfavorable terms of trade on exports. In essence, good governance can help mitigate the challenges posed by a less favorable trading environment.

5.0 CONCLUSION AND RECOMMENDATIONS

The study highlights key findings regarding the relationship between selected macroeconomic variables and horticultural export performance in Kenya. Firstly, changes in the real exchange rate significantly affect horticulture exports, with an undervalued

currency being preferable for export performance. Secondly, inflationary pressure can lead to higher horticultural prices, affecting demand and borrowing costs, potentially harming export competitiveness. Thirdly, interest rate stabilization measures should be implemented to lower inflation rates and boost export performance. Fourthly, terms of trade significantly influence horticultural export performance, emphasizing the importance of favorable trade conditions. Lastly, government effectiveness plays a significant role in moderating the relationship between macroeconomic drivers and horticultural export performance. Based on these findings, the study recommends several policy measures to enhance macroeconomic stability and boost horticultural export performance. Firstly, policymakers should ensure sound macroeconomic policies, including fiscal and monetary policies, to maintain stability. This includes reducing taxes on horticultural products and providing subsidies to producers. Secondly, policies should aim to improve terms of trade by promoting export promotion measures and discouraging imports of locally produced horticultural exports through tariffs and quotas. Import substitution policies should also be encouraged. Lastly, promoting effective governance, including the rule of law and inclusive institutions, can moderate the impact of macroeconomic drivers on export performance. These recommendations aim to create a conducive environment for the horticultural sector to thrive and contribute more significantly to Kenya's horticultural export subsector.

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