Determinant of Coffee Export Performance in Tanzania From 1991-2024

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KEYWORDS	ABSTRACT
Coffee exports volume, ARDL model, exchange rate, and Producer price	*This study examines the determinants of coffee export performance in Tanzania using secondary annual time series data collected from NBS spanning the years 1991 to 2024. Specifically, the analysis employed an Autoregressive Distributed Lag (ARDL) model to investigate the long run effects of four key variables: real producer price, relative export price to producer price, inflation, and the exchange rate on the volume of coffee exports. Furthermore, an ARIMA (1,1,3) model was utilized to forecast export trends up to the year 2030. The results indicated the existence of a long-run cointegration relationship between coffee export volume and the selected variables. The study findings shows that, the exchange rate had a positive and statistically significant impact on coffee exports, implying that depreciation of the Tanzanian shilling enhances competitiveness in international markets. Conversely, the relative export price to producer price exhibited a negative and significant effect, suggesting weak price transmission and limited benefits to farmers from export gains. Meanwhile, real producer price and inflation showed no significant long-run effects. The error correction term was correctly signed and highly significant, confirming a strong tendency toward long-run equilibrium after short-run deviations. The study concludes that exchange rate management and improving producer price incentives are critical to enhancing coffee export performance. Structural interventions to ensure better price transmission and institutional support for smallholder farmers are also essential. These findings support Tanzania's policy ambitions under Vision 2025, FYDP III, ASDP II, and global targets such as SDGs 2, 8, and 9.*

1. INTRODUCTION

Many developing countries have been constrained by an export structure that is heavily dependent on one or a few agricultural exports. Although there have been efforts towards diversification of the export sector, just like many Sub-Saharan African countries, Tanzania's exports are still dominated by primary agricultural products.

Agriculture accounts for nearly 26.5% of GDP at current price, provides 24% of total exports and employs 61.3% of the workforce in Tanzania. Cash crops, including coffee, tea, cotton, cashews, sisal, cloves, and pyrethrum account for the vast majority of export earnings. The volume of major crops both cash and foods, which have been marketed through official channels, have increased over the past few years. , This situation contrasts to the faltering trend they had faced since the 1970's, but still large amounts of produce never reaches the market as poor pricing and unreliable cash flow to farmers continue to frustrate the agricultural sector (Amani, 2005).

For many African countries, including Tanzania, coffee remain one on the strategic commodities that contribute to export earnings, in case of tradition export commodity, coffee accounting for 23.9% of the country's total foreign exchange earnings. Over 15 past years, coffee exports has generated about USD 100 million per year. Overall, the coffee industry in Tanzania directly employs some 450,000 families of which some 120,000 are in the Robusta growing areas of Kagera region. Additionally estimated 2.4 million people are indirectly engaged in the industry locally (TCB,2017).

In terms of agricultural exports, coffee constitutes one of the most important cash crops in Tanzania. Recent reports have indicated that coffee accounted for 23.9 percent of Tanzania's total traditional exports in 2023. This was just behind tobacco and cashew nuts, and followed by cotton and tea as shown in Figure below (URT, 2023)
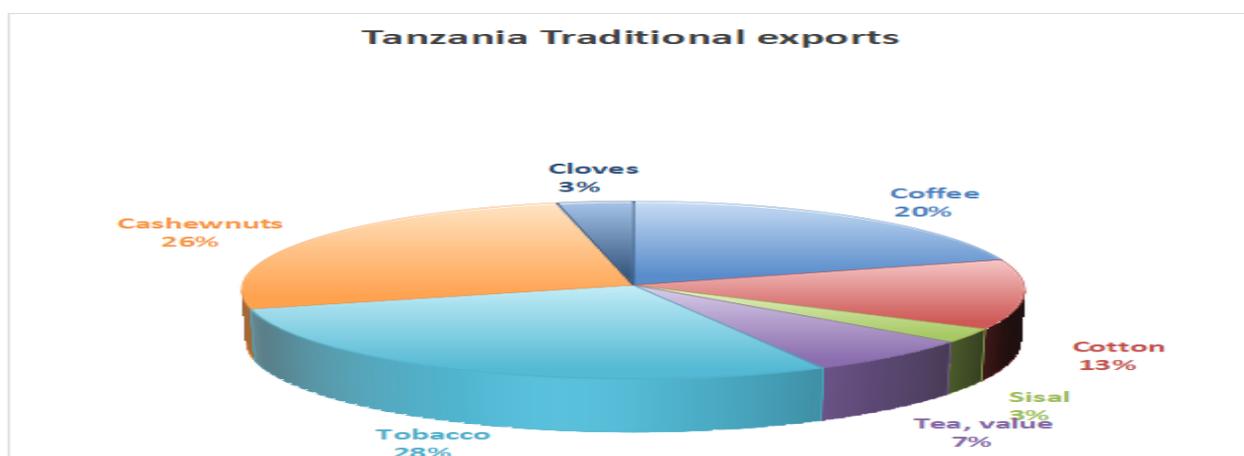

Figure 1: Tanzania tradition export of Goods

Source: Monthly Economic review, BOT, 2024

Coffee is the third most important traditional export crops in Tanzania, drawing significant interest due to its market characteristics, particularly the unstable nature of its prices. While globally Tanzania coffee exports ranks 25th position Understanding the relationship between producer prices, domestic indices, and export prices is crucial for addressing fluctuation of export performance. Exploring the driver of the coffee sector could provide insight to increase both the quantity and value of coffee exports. Notably, the frequent decline in coffee price has often been accompanied by reduction in the quantity and value of coffee exports raising the critical question of whether the price offered to farmers is the sole determinant of export performance.

The determinants of export performance have been extensively studied using various theoretical frameworks. This study will integrate three key theories to analyse Tanzania Coffee export; Traditional Export Demand Theory and Domestic market Structure and Trade Theory.

The traditional Export Demand Theory provides the main theoretical framework, positing that export performance is influenced by relative export prices and the real income of importing countries. This theory is particularly relevant to the first two objectives, which assess the effects of producer prices, domestic price indices and export prices on coffee exports. The theory's strength lies in its quantifiable framework, though it overlooks supply side of non-price determinants (Roy, 1991)

Msuya (2013) analyzes the performance of coffee exports strategies to harness opportunities in Tanzania, and discusses strategic to harmless opportunities in Tanzania. It employs an econometric analysis using the Autoregressive Distributed Lag Model (ARDL) to analyse the coffee export performance. The results indicate the Real GDP, real inflation rate, nominal exchange rate, coffee export price and coffee total production are relevant variable for explaining variations in coffee export performance. The study suggests that policymakers should focus on policies that increase coffee exports and stabilize coffee prices by encouraging increased coffee production.

Mwakalobo (2009) studded the determinants of coffee exports in Tanzania. For the period between 1985 -2010. It employ co-integration analysis techniques, the results shows that variables such as the real producers price received by farm, real exchange rate, foreign income and domestic coffee production significantly influence coffee exports. The study recommends policies aimed at improving produces prices and enhancing production to boost coffee exports

Kingu (2014) examine the impact of Trade reforms on Coffee in Tanzania, for the period of 1970 to 2010. it employs time series analysis focusing on variable such as Coffee export earnings, world price, real exchange rate, coffee production and trade reforms. The finding suggest that trade reforms have a significant impact on coffee export performance. The study recommends policies that enhance coffee production and stabilize price to improve export performance.

Murugesan (2019) studded an empirical Analysis of Agricultural Exports on economic growth in India. Using error correction model and variables like Agricultural exports, non-agricultural exports, GDP growth and trade policies. The study recommended that both agricultural and non-agriculturist exports significantly contribute to India's economic growth, trade policy should balance both agricultural and industrial exports,

Lukonga (1994) investigated Nigeria's non-oil agricultural exports, emphasizing the role of price elasticity and domestic market conditions. The study revealed weak relationship between agricultural output and exports, suggesting that internal market inefficiencies influence export performance. This aligns with the need to explore Tanzania's domestic marketing structure and deregulation impact on coffee exports.

Menji (2010) explored Ethiopia's export performance using co-integration analysis, showing that production capacity and trade liberalization significantly influence merchandise exports. This underscore the importance of considering production variables the Tanzanian context, such as the ratio of export to producer prices.

Ngaruko (2003) compared agricultural export performance between Africa and Asia, emphasizing diversification and governance quality as critical determinants. The study's focus on governance informs the inclusion of institutional quality as a moderating variable in this research but does not specifically address the Tanzania coffee sector's challenges.

Gbetnkom and khan (2002) analyzed agricultural export in Cameroon, focusing on cocoa,coffee, and banana. Using Ordinary Least Square (OLS), they found positive but limited supply responses to price changes due to constrained international market prices. Their study also highlighted infrastructure and credit assess as significant factors influencing export performance. While their analysis provides a foundation for understanding price responsiveness, it does not address the interaction between domestic price indices, producer price and export price that are central to this study.

Generally, Coffee is a vital foreign exchange earner for Tanzania, consistently ranking among the top three export crops since independence. However, the industry has faced persistent challenges, including competition from emerging coffee producing countries like Indonesia and Thailand, leading to a market and price pressures. The suspension of the International Coffee Agreement in 1989 further intensified competition, making production costs, marketing efficiency, and quality critical for success. Despite government reforms such as liberalization of producer prices and restructuring of the Tanzania Coffee Board, challenges like inadequate irrigation systems, insufficient farm inputs, fluctuating prices, and high marketing costs continue to undermine the industry's

performance. A central concern emerges as to the extent to which farmers can respond to price incentives (both input prices and output sale prices), both in static and dynamic domestic and international markets with view to increase volume of export as desired policy outcome.

This observation underlines the importance of understanding the role of price incentives and export pricing dynamics remain less researched, it impedes Tanzania's efforts to achieve the goals outlined in the third Five Years Development Plan (FYDP III), which prioritizes agricultural transformation and industrialization as drivers of economic growth. The coffee sector, a key component of the Agricultural Sector Development Programme Phase II (ASDP II), is crucial for improving rural livelihoods, boosting productivity, and increasing export competitiveness.

The study aims to investigate price related determinants of coffee export performance, offering insight for policy makers though three specific objectives;

   i.   To determine the impact of the ratio of producer prices to the domestic prices index (inflation) on Tanzanian Coffee export

  ii.   To evaluate the effect of export prices relative to producer prices on Tanzanian coffee export

 iii.   To forecast Tanzanian coffee export performance up to 2030.

2. METHODOLOGY

Research Design

The study employs a time series research to analyze secondary data on coffee export performance in Tanzania. This design is well suited for examining patterns, trends, and dynamic relationships among variables over time. By utilizing time series econometric techniques, the study captures both short-run fluctuations and long-run equilibrium relationships between coffee exports and key macroeconomic and policy variables. This approach enables a deeper understanding of how historical shifts and economic factors influence export performance, as well as providing a basis for reliable forecasting.

Data Sources , types and collection procedure

The study relies exclusively on secondary data sources, including statistical publication from the National Bureau of Statistics. To ensure the quality and reliability of the data, the study used data from NBS; this is the official government Agents for providing official statistics in Tanzania.

Data analysis

Model specification and Estimation technique

To examine the macroeconomic determinants of coffee export performance in Tanzania from 1991 to 2024, this study adopts the Autoregressive Distributed Lag (ARDL) modeling framework developed by Pesaran, Shin, and Smith (2001). The choice of the ARDL model is motivated by its flexibility in handling time series data with mixed levels of integration, i.e., a combination of I(0) and I(1) variables, and its ability to estimate both short-run and long-run relationships simultaneously. The ARDL model remains valid irrespective of whether the regressors are stationary at level or first difference.

In addition, the study also employs the Autoregressive Integrated Moving Average (ARIMA) model to forecast future trends in coffee export performance in Tanzania. The ARIMA model, developed by Box and Jenkins (1976), is a widely used univariate time series forecasting method that captures autocorrelation patterns in the historical data through autoregressive (AR) terms, differencing (I) to achieve stationarity, and moving average (MA) components.

Ethical considerations

This study observes all ethical principal, given that secondary data will be used from official sources. The study also implements quality control to ensure data used to be accuracy and relevance.

Results and discussion

The trend of coffee export volume (kg) from 1991 to 2024

Export trend characterized by annual fluctuations, which shows non-stationary movements of export volume over years as shown in figure 1. However, overall trends show the increasing in export volumes over time.
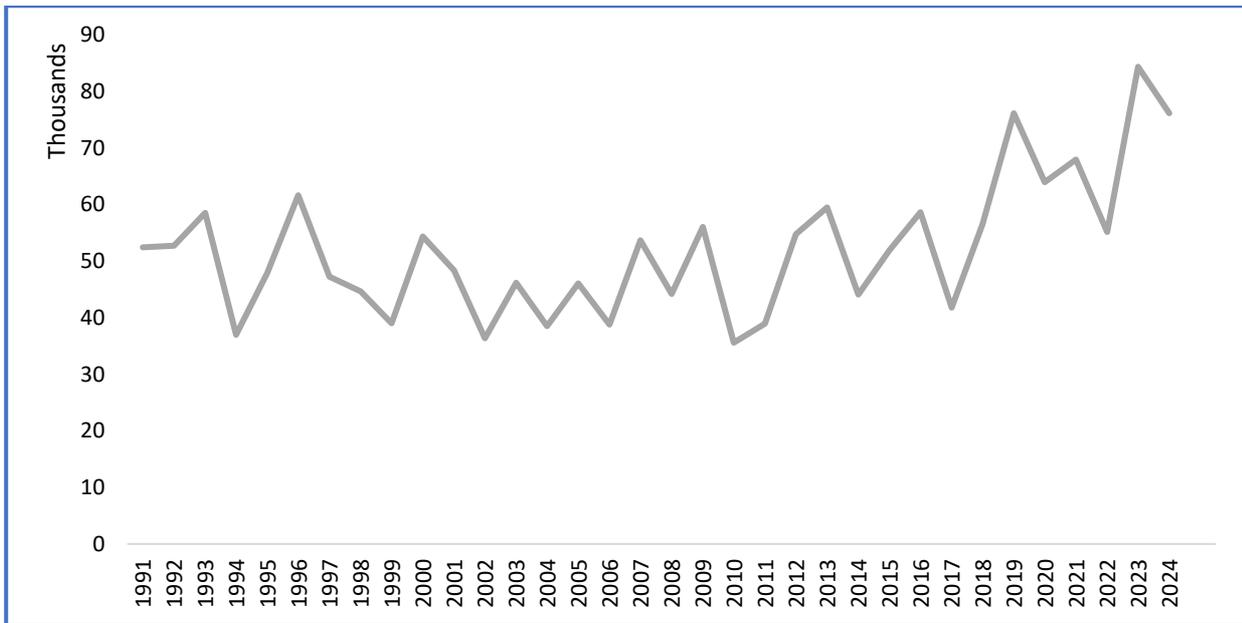
Figure 1: Trend Coffee export volume from 1991 to 2024 in Tanzania

Basic Descriptive Statistics

In this, the study discussed the measures of central tendency like mean, standard deviation, maximum and minimum. This helps to understand the behaviors of data and the distribution before getting into analysis and estimation. Table 1 provides the summarized descriptive statistics for the data.

Table 1: Descriptive statistics.

Variable	Mean	SD	Median	Min	Max
Coffee Export Volume(Export_V)	52065.32	12004.84	52182	35600	84400
Real Producer Price (RP_Price)	60.41762	26.42811	61.79619	22.41992	125.8254
Relative Export Producer Price Index (REP_PPrice)	231.1296	73.73422	225.2428	100	386.7008
Inflation	10.37579	8.517769	6.027037	3.057299	35.28098
Exchange Rate (Exchange_R)	1359.649	714.9354	1248.468	219.1574	2590.908

Results in table 1 presents descriptive statistics for the variables used in the study, based on 34 observations. All variables are strictly positive and exhibit varying degrees of dispersion around their central tendencies. In addition to the mean, standard deviation, minimum, and maximum values, the median (50th percentile) is also reported to provide a clearer view of the data's distribution and to reduce the influence of outliers.

The **Volume of Exports** (Export_V) has a mean of 52,065.32 and a median of 52,182, with values ranging from 35,600 to 84,400, indicating relatively symmetric distribution around the center with steady but notable variation. Real Producer Price (RP_Price) shows a mean of 60.42 and a median of

61.80, ranging from 22.42 to 125.83, reflecting fluctuations in producer prices but with a relatively balanced central distribution.

Inflation has a mean of 10.38 and a median of 6.03, with a wide range from 3.06% to 35.28%. The lower median relative to the mean suggests a right-skewed distribution, indicating that a few high inflation periods raised the average. Relative Export to Producer Price Index (REP_PPrice) shows a mean of 1,281.93 and a median of 1,152.37, with a standard deviation of 890.30 and a range from 100 to 2,886.37, pointing to significant dispersion and some high outliers. Similarly, the Exchange Rate has a mean of 1,359.65 and a median of 1,248.47, with values ranging from 219.16 to 2,590.91, indicating considerable variation in currency valuation over the study period.

Time series analysis

Normality test

The study conducted Skewness/Kurtosis test for normality among the study variables to assess whether the key variables follow a normal distribution and free from biasness. The results are presented in the table. At the 5 percent significance level, Inflation and Volume of Export do not follow a normal distribution, as indicated by their statistically significant joint test p-values < 0.05. Conversely, Real Producer Price (RP_Price), REP_PPrice and Exchange_R do not reject the null hypothesis of normality, suggesting they are approximately normally distributed.

Table 2: Skewness/Kurtosis Test for Normality

Variable	Observation	Pr(skewness)	Pr(kurtosis)	Adj chi2(2)	Prob>chi2
Coffee Export Volume(Export_V)	34	0.0391	0.3693	4.98	0.0828
Real Producer Price (RP_Price)	34	0.1781	0.9362	1.96	0.3760
Relative Export Producer Price Index (REP_PPrice)	34	0.7708	0.1775	2.05	0.3592
Inflation	34	0.0012	0.1167	10.53	0.0052
Exchange Rate (Exchange_R)	34	0.5916	0.0072	6.77	0.0339

Transformation of Non-Normal variable

The study applied log Transformation method was conducted to make inflation, and Coffee Export Volume to be normally distributed. To meet assumptions of normal distribution of errors. Below are the results of transformed variables.

Post-transformation results showed substantial improvement in the distribution of the variables. All transformed variables exhibited p-values greater than 0.05 in the joint normality test, indicating that they no longer significantly deviate from a normal distribution. All variables passed the normality test, thereby satisfying the assumption of normality required for most parametric econometric models.

The original variables Export Volume, inflation rate, REP_PPrice and RP_Price also showed acceptable levels of normality with large probability of skewness of 0.3908, 0.5009, 0.2258, 0.105 and 0.0622, respectively.

Table 3: Post-transformation results

Variable	Obs	Pr(skewness)	Pr(kurtosis)	Adj chi2(2)	Prob>chi2
ln_Export_V	34	0.3908	0.751	0.88	0.6439
ln_RP_Price	34	0.5009	0.1328	2.94	0.2298
ln_REP_PPrice	34	0.2258	0.5029	2.06	0.3566
ln_Inflation	34	0.105	0.2317	4.22	0.1214
ln_Exchange_R	34	0.0622	0.8159	3.8	0.1494

Correlation analysis

Correlation analysis shows the relationship or the association between the two variables. It used as an indicator for testing the strength of the relationship between the variables. It was used as an indicator for testing the strength of the relationship between the variables. Table 4 presents the Pearson correlation coefficients among the variables used in the study. The results provide preliminary insights into the relationships between the key explanatory indicators and coffee export performance.

Export Volume (ln_Export_V) exhibits a weak negative correlation with ln_RP_Price ($r = -0.3001$), ln_REP_PPrice ($r = -0.3272$), and ln_Inflation ($r = -0.2703$), and a weak positive correlation with ln_Exchange_Rate ($r = 0.3286$). This suggests that while higher exchange rates may be mildly associated with increased export volumes, rising producer prices and inflation could have dampening effects on export performance.

ln_REP_PPrice shows a moderate to strong positive correlation with ln_RP_Price ($r = 0.7052$) and a moderate positive correlation with ln_Exchange_Rate ($r = 0.4649$), indicating that relative producer price dynamics are influenced by both domestic price levels and currency movements.

ln_Inflation is strongly and negatively correlated with ln_Exchange_Rate ($r = -0.8126$), suggesting that inflation may significantly erode currency value. It also shows a weak to moderate positive correlation with ln_RP_Price ($r = 0.4136$) and a weak negative correlation with ln_REP_PPrice ($r = -0.1981$), implying mixed interactions between inflation and price competitiveness.

While several moderate to strong associations are evident, particularly involving inflation and exchange rates, these correlations do not establish causality. Further regression and time series

econometric analysis is required to determine the direction and magnitude of these relationships in explaining the performance of Tanzania's coffee exports.

Table 4: Correlation Matrix

Variable	Export_V	RP_Price	REP_PPrice	Inflation	Exchange_R
ln_Export_V	1	-0.3001	-0.3272	-0.2703	0.3286
ln_RP_Price	-0.3001	1	0.7052	0.4136	-0.0112
ln_REP_PPrice	-0.3272	0.7052	1	-0.1981	0.4649
ln_Inflation	-0.2703	0.4136	-0.1981	1	-0.8126
ln_Exchange_R	0.3286	-0.0112	0.4649	-0.8126	1

Unit root test for variables

It is important to determine the stationary condition of the study variables before estimating the model. This is done to ensure the econometric analysis to be valid and meaningful since running regression with non-stationary variables can lead to misleading results. In this study, the Philips-Perron Test for unit root is performed on each variable in levels. Table below present Unit root test results for each variable.

From table 5 shows Phillips–Perron unit root test results show that all the variables except ln_Exchange_R are Non Stationary at level but become stationary after first differencing. This indicates that each of the variables is integrated of order one, I(1) The results are statistically significant at the 1% level. This excluding In_Exchanger_R which its integration is in order (0).

Table 5: Philips-Perron Test for unit root results for each variable

Variable	Level Z(t)	P-value (Level)	Stationary at Level?	First Diff. Z(t)	P-value (1st Diff.)	Order of Integration
ln_Export_V	-3.638	0.0051	No	-13.391	0	I(1)
ln_RP_Price	-2.587	0.0958	No	-5.191	0	I(1)
ln_REP_PPrice	-3.658	0.0047	No	-6.794	0	I(1)
ln_Inflation	-1.579	0.494	No	-5.904	0	I(1)
ln_Exchange_R	-4.543	0.0002	Yes			I(0)

Lag selection

For optimal Lag-order selection criteria, results In Table 6, **lag 4** shows superior performance in AIC and HQIC, and passes a highly significant LR test **(p = 0.000)**. Since AIC and HQIC are commonly used for model selection in time series due to their balance of fit and complexity, **lag 4** is considered the optimal lag

Table 6: Optimal lag selection

Sample: 1996 - 2024   Number of obs = 29

Lag	LL	LR	df	P	FPE	AIC	HQIC	SBIC
0	-19.3045				3.5e-06	1.6203	1.69501	1.85383
1	76.9059	192.42	25	0.000	3.1e-08	-3.12706	-2.67880	-1.72586*
2	97.0826	40.353	25	0.027	5.0e-08	-2.80550	-1.98370	-0.23664
3	117.7390	41.313	25	0.021	1.0e-07	-2.51594	-1.32059	1.22059
4	177.9890	120.50*	25	0.000	2.8e-08*	-4.86596*	-3.29706*	0.03823

ARDL model analysis

ARDL Bounds Test for Cointegration and Long-run Relationship

The Autoreggressive Distributed Lag (ARDL) Bound test was used to examine the existence of long run relationship between coffee export volume and selected macroeconomics variables. The dependent variable (Export Volume) and independent variables are Real producer price, Relative Export price to producer price, inflation and exchange rate.

ARDL model was estimated using a maximum lag (4), with automatic selection based on SIC. The selected model was ARDL (1,0,0,0,0) and the corresponding error correction version was obtained.

The ARDL bounds test results in Table 4.7 confirm the existence of a long-run cointegration relationship between coffee exports and the selected macroeconomic variables. The calculated F-statistic (9.033) exceeds the upper bound of the critical values at the 1% significance level (I(1) = 5.06), indicating that the null hypothesis of no long-run relationship can be rejected. Similarly, the t-statistic (-4.851) is more extreme than the lower-bound critical value at the 1% level (I(0) = -3.43), further supporting the presence of cointegration.

Table 7: ARDL Bounds Test for Cointegration

Test Statistic	Value	Critical Value (I(0))	Critical Value (I(1))	Decision
F-statistic	9.033	3.74 (1%)	5.06 (1%)	Reject H_0 – Cointegration exists
t-statistic	-4.851	-3.43 (1%)	-4.60 (1%)	Reject H_0 – Cointegration exists

ARDL longrun Estimation Results

From results in table 8 provide the estimated long run relationship between Coffee Export Volume and explanatory variables. The results indicate that The Error Correction Term (ECT), represented by the lagged value of the dependent variable (L1. ln_Export_V = -0.766, p < 0.00), is statistically

significant and correctly signed (negative), indicating a stable long-run relationship. The coefficient suggests that approximately 76.6% of the disequilibrium from the previous period is corrected within one year, implying a very rapid adjustment toward the long-run equilibrium. This strong correction speed reflects a high level of responsiveness of coffee exports to deviations from equilibrium, possibly influenced by the structure of the Tanzanian export market or external shocks.

The estimated longrun relationship model is illustrated as it follows.

$$Ln\_Export\_V_t = 8.38 + 0.25\ln(RP\_Price_t) - 0.79\ln(REP\_PPrice_t) + 0.04\ln(Inflation_t) + 0.43\ln(Exchange\_Rate_t)$$

Where:

- **Ln_Export V = Coffee Export Volume**
- **Ln_R_PPrice$_t$ = Real Producer Price**
- **Ln_REP_PPrice$_t$ = Relative Export to Producer Price**
- **Ln_Inflation$_t$ = Inflation**
- **Ln_Exchange_Rate = Real Exchange Rate**

Among the long-run coefficients, real producer prices and the real exchange rate were found to be statistically significant at the 5% level. This implies that:

- A percent increase (1%) of relative export to producer prices lead to is associated with a decrease of **0.79 %** in coffee exports volume.
- A percent increase (**1%**) will increase in the exchange rate (depreciation) leads to a **0.43%** increase in coffee exports, holding other factors constant.

Table 8: ARDL (1,0,0,0,0) Estimation Results – Long-run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	P-Value	Significant
L1. ln_Export_V	-0.766	0.158	-4.850	0.000	-1.092
RP_Price	0.255	0.214	1.190	0.246	-0.187
REP_PPrice	-0.793	0.300	-2.640	0.014	-1.412
Inflation	0.040	0.144	0.280	0.785	-0.258
Exchange_R	0.434	0.143	3.040	0.006	0.140
Constant (_cons)	8.376	1.804	4.640	0.000	4.652

*** 1 means first differencing*

Comparison with Other Studies

Several studies have examined determinants of agricultural exports in developing countries. The relationship between these determinants and export performance has varied depending on the data used, methodologies applied, country context, and sample periods. The findings of this study are broadly consistent with some previous empirical works conducted in Sub-Saharan Africa and elsewhere.

In the current study, the ARDL bounds test confirmed the existence of a long-run relationship between coffee exports and variables, including real producer price, relative export price to producer price, inflation, and exchange rate. Among these, the relative export price to producer price was found to have a negative and statistically significant effect in the longrun. This implies that higher international prices relative to domestic prices reduce the competitiveness of Tanzanian coffee exports; this result is consistent with Amoro and Shen (2013), who emphasized that in many African countries,

The exchange rate had a positive and statistically significant effect on coffee export performance. This finding supports the traditional view that exchange rate depreciation enhances export competitiveness by making domestic goods relatively cheaper in foreign markets. The result aligns with studies by Odhiambo (2011) for Kenya and Were et al. (2002), who found that exchange rate movements had a significant role in driving export growth in East Africa. Likewise, Kweka and Morrissey (2000) observed that exchange rate liberalization contributed positively to Tanzanian export performance during economic reforms.

The error correction term (ECT), estimated at −0.77, is statistically significant and correctly signed, confirming the presence of a stable long-run equilibrium relationship. The magnitude of the ECT implies that approximately 77% of the previous year's disequilibrium in coffee exports is corrected within one year. This relatively fast adjustment speed suggests strong policy and market forces that help restore equilibrium in Tanzania's coffee export sector. Similar high adjustment speeds have been reported in ARDL-based studies such as Tumaini (2018) for non-traditional exports in Tanzania.

Forecasting coffee export performance from 1991 to 2030

This subsection presents the coffee export forecasts. The study used ARIMA model arima (1, 1, 3) to predict future trends of the coffee export from 1991 up to 2030.

White noise test in ARIMA model

Portmanteau test for white noise in table 9 suggests presence of white noise in the residuals of arima (1, 1, 3) model meaning that the model produces stable AR and MA estimates. This is justified since P-value (0.9450) > 0.05.

Table 9: White noise test on ARIMA model

Portmanteau test for white noise	
Portmanteau (Q) statistic	6.7185
Prob > chi2(14)	0.9450

H0: there is white noise in the residuals. Reject if P-value is less than 5%.

AR and MA Parameters stability test

All the eigenvalues in table 10 and 11 lie inside the unit circle for both AR and MA meaning that parameters satisfy stability condition as shown in figure 2.

Table 10: AR Eigenvalue stability condition

Eigenvalue	Modulus
0.816028 + 0.578336i	1.00019
0.816028 - 0.578336i	1.00019
-0.4030754	0.403075

Table 11: MA Eigenvalue stability condition

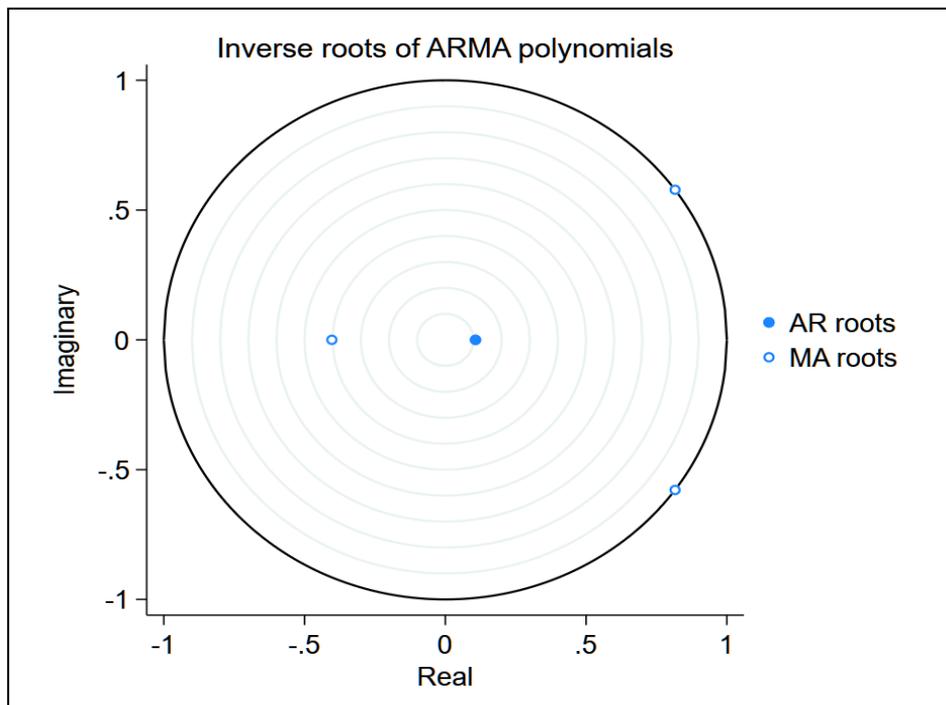| Eigenvalue	Modulus
0.107168	0.107168

Figure 2: Inverse roots of ARIMA polynomials

Coffee export volume forecast from 1991 to 2030

The coffee export volume forecast demonstrated on figure 3. The forecasts suggest that from 2024 to 2026, the trend will be almost the same but there is expected increase in the coffee export volume in 2027 to 79585 Kg. However there will be a slightly decrease in the coffee export volume in 2028 to 2029. On other side, on 2030 the trend will start rising again.
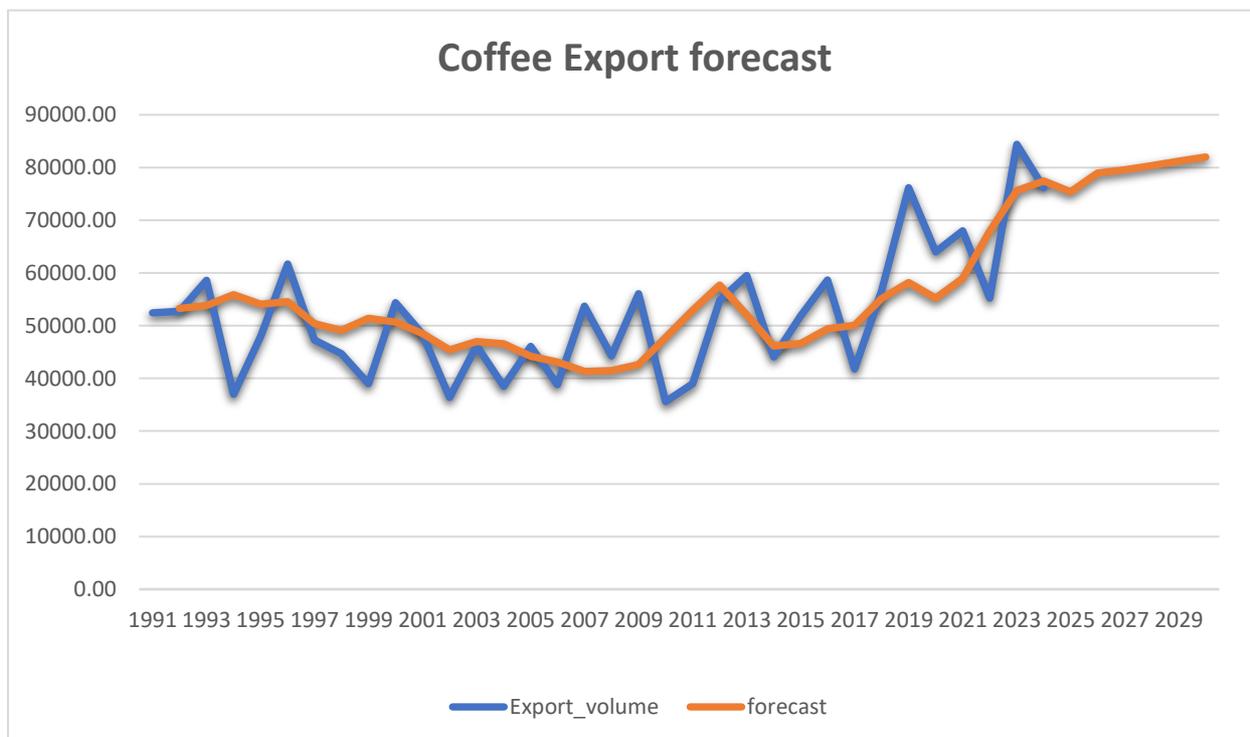

Figure 3: Coffee export forecast from 1991 to 2030

15

CONCLUSION AND RECOMMENDATION

Conclusion of the study

The study concludes that Tanzania's coffee export performance is influenced significantly particularly by the relative export to producer price and exchange rate. While coffee remains one of the country's major cash crops and foreign exchange earners, its export responsiveness to key variables like export price and exchange rate.

These findings reinforce the theoretical expectation that macroeconomic stability and sound trade policies are essential for boosting agricultural exports. However, price transmission mechanisms, market infrastructure, and institutional capacity must also be improved to enhance responsiveness and export competitiveness.

This conclusion is highly relevant to Tanzania's broader development goals. Coffee sector development aligns with Tanzania Development Vision 2025, which emphasizes transformation of agriculture and an export-led economy. Similarly, FYDP III (2021/22–2025/26) prioritizes boosting value chains in agriculture and increasing foreign exchange earnings through exports. The findings also contribute toward the achievement of SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation and Infrastructure) by identifying areas where policy can promote sustainable growth in export sectors.

Recommendations

Significant findings from this study have important ramifications for national development goals, including the growth and productivity of the agriculture industry as well as the whole value chain in export markets. Recommendations are put forward as follows:

Maintain a Competitive Exchange Rate: Exchange rate policies that encourage export competitiveness should be implemented by policymakers. Stronger worldwide market penetration for Tanzanian coffee exports can be achieved with a stable yet competitive currency rate. Improving Macroeconomic Stability: Measures should be taken to keep inflation under control and the macroeconomic climate stable. This will lessen the financial strain on farmers and exporters, supporting the objective of a stable and competitive economy set forth in Vision 2025.

Enhance Institutional Assistance for Farmers: Given the long-term insignificance of actual producer prices, it is possible that farmers are not receiving the full benefits of global price fluctuations. Price transmission may be enhanced by strengthening cooperatives, supplying timely market information, and guaranteeing price setting openness. Enhance the Mechanisms for Export Price Transmission: The importance of the relative export to producer price ratio emphasizes how important it is to

improve the relationship between producer profits and global market pricing. This may be accomplished by strengthening farmers' access to real-time price information, cutting out middlemen, and upgrading market infrastructure.

Invest in Infrastructure and Processing Capacity: Improved logistics, storage, and processing facilities are essential for reducing post-harvest losses and improving the quality of exports. This is in line with FYDP III and SDG 9, which emphasize infrastructure for economic transformation. Leveraging Regional and Global Trade Platforms: Tanzania should intensify participation in regional trade blocs and explore new markets under global trade initiatives. This is consistent with CCM Manifesto priorities on economic diplomacy and regional integration. In conclusion, sustained reforms that integrate institutional strengthening, and infrastructure development are key to realizing Tanzania's agricultural export potential and meeting the objectives of national and international development frameworks. Tanzania Development Vision 2025: By promoting competitive, semi-industrial agriculture. FYDP III (2021–2026): By identifying these factors to accelerate agricultural exports. ASDP II: By highlighting key constraints to coffee sector competitiveness. SDGs: Especially SDG 2, SDG 8, and SDG 9. CCM Manifesto 2020–2025: Through alignment with the goal to modernize agriculture and increase export revenues.

Areas for Further Research

The study opens several areas for further research: Investigating the role of institutional quality and governance in influencing export performance. Examining the micro-level transmission of prices to smallholder farmers and extending the model to include non-price determinants like access to credit, infrastructure, and market information systems.

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