Journal of Economics and Behavioral Studies (ISSN: 2220-6140)
Vol. 17, No. 3, pp. 27-43, September 2025

REER, Inflation, Interest Rate and Uganda's Coffee Exportation

*Benjamin Musiita, Frederick Nsambu Kijjambu, John Bosco Nsengiyumva
Faculty of Business and Management Sciences, Mbarara University of Science and Technology, Uganda
Email: *bmusiita@must.ac.ug, nsambu.kijjambu@must.ac.ug, habimana@must.ac.ug
Corresponding Author: Dr Benjamin Musiita

Abstract: This study examines the effect of the REER (real effective exchange rate) known as the relative currency value, inflation, and interest rate on the exportation of coffee in Uganda. To achieve the study's objectives, the study employed an Auto Regressive Distributive Lag Model using annual data from 1990-2019. It was discovered to have a beneficial effect on coffee export volumes in the long run when the relative currency value appreciates, while short-run appreciation of the effective currency rate has a negative effect that carries over to a three-year period. An increase in the rate of inflation has a positive effect on coffee exports in the two-year short run, but in the longer term, an increase in the inflation rate has a negative effect. An increase in the lending rate has a negative effect on coffee exports in the two-year short term as well as in the first and third year, but in the long run, the effect is positive. The coffee production capacity of Uganda was captured by the estimated model through the incorporation of a variable on the volume of coffee production that was found to have a positive effect in both the short and long run periods. The study observes that the responsiveness of the volume of coffee exports to the responsiveness of IVs is low, an indicator that Ugandan coffee exports are facing inelastic demand on the global market. The study thus recommends that the government seize this golden chance with its hands by making cheap capital available to farmers, processors, and exporters, issuing more export licenses and encouraging more households to produce more coffee.

Keywords: *REER, inflation, interest rate, Uganda, coffee exportation*

1. Background of the Study

Improving coffee performance in export is critical to any coffee-producing economy as it leads to increased export earnings, tax returns, and ensures employment of many nationals (Sänger, 2018). Al-Abdulkader, Al-Namazi, AlTurki, Al-Khuraish, and Al-Dakhil (2018) also speculate that the position of the second-largest coffee exporter across sub-Saharan Africaat coffee is becoming more popular throughout the world as it has a spillover effect on the economic growth of most of the producing countries. The beverage is one of the most drunk commodities in the entire world, with a market that is valued at more than $20 billion across the entire world in exportation alone; however, world levels of exports are not constant. Uganda holds the position of the second-largest coffee exporter across sub-Saharan Africa and is positioned to continue this through growing coffee export levels to more than 20 million bags every year (UNCTAD, 2018). Annual coffee exports, though, have settled at below 5million bags and do not increase despite the government setting up the Uganda Coffee Development Authority (UCDA) and providing the producers with credit through the Agricultural Credit Facility.

In spite of the enhanced coffee exportation in the past decade, an increase of 40% to 4.6 million bags during the 2016/2017 season mainly on the back of a good Robusta crop production, the ten-year average has been approximately 3.5 million bags per year. This is far from the desired 20million bag exportation level. The UCDA reports of indicated may be explained in part by unfavorable exchange rates, inflation, and interest, which have a tendency to raise Ugandan coffee's relative price (UCDA, 2015). The UCDA is of the view that coffee processing in Uganda for export is labor- and capital-intensive work, with the payment of initial costs, which are met through the utilization of the processors' own funds and outside resources. The processors usually buy the farmers' raw dry coffee and factory overheads on bank credit. It thus follows that an increase in lending rates and inflation would be correlated with an increase in the cost of processing coffee for exportation.

Whilst the interest rate can determine the quantum of credit the processors would need, the inflation rate can determine the purchasing power of their working capital with regard to the processing inputs, i.e., the raw coffee. This can be argued in Uganda since the macroeconomic variables have not been constant. Empirical results provide evidence that exchange rates, interest rates, and inflation are the most significant macroeconomic determinants of coffee exportation. Evidence from research by Muchtolifah and Muljani (2020) and Hussien (2015) and others, citing the exchange rate, inflation, and interest rates as major drivers of coffee export volumes in Indonesia and Ethiopia, respectively, confirms this. Although little research has been done to establish comparable variables as determinants of Uganda's coffee exportation, evidence exists to show that not only has it remained low but also been consistently volatile. The macroeconomic conditions in Uganda have also been mostly volatile with, for instance, the exchange rate varying between 2000 and 3500 in the last five years, as highlighted by the Bank of Uganda (BOU).

The interest rate has ranged from 17% to 25% over the same period, and inflation has ranged from 5% to 9% (BOU, 2019). It is against such that the present study aims to conduct a coffee shipments abroad analysis to determine the link between exchange rate, inflation, interest rate, and Uganda's coffee exportation.

Statement of The Problem

Uganda exports a total of between 5.5 million bags of coffee annually, a volume that ranks the country eighth among the world's largest coffee exporters (MAAIF, 2016). The earnings from coffee export account for approximately 18% of the nation's total export earnings, and coffee is the nation's single largest export earner. In a bid to improve coffee exportation, Uganda's government in 2015 set out to promote the production and export of 20million bags of coffee, an initiative that has so far not been achieved. Coffee exportation, among others, was liberalized to create opportunities for exporters, and UCDA was created and mandated to regulate coffee quality; however, coffee exportation (in coffee volumes) has not increased that much. By exporting just about 5.5 million bags annually, a gap of approximately 14.5 million bags is not met, hence the country loses about 500 billion shillings in revenues annually. (Shepherd, 2016). As Akinbode and Ojo (2017) averred Coffee exportation is greatly influenced by macroeconomic variables, including currency rate, inflation, and interest rate.

Underperformance of these macroeconomic variables impacts not only the relative cost of exporting coffee but also the relative price of coffee on the global market, which ultimately has an influence on the coffee shipments abroad. Unfortunately, existing literature in Uganda fails to sufficiently clarify the causal relationship between these macroeconomic drivers and the performance of Uganda's coffee exports, a knowledge gap that this study fills.

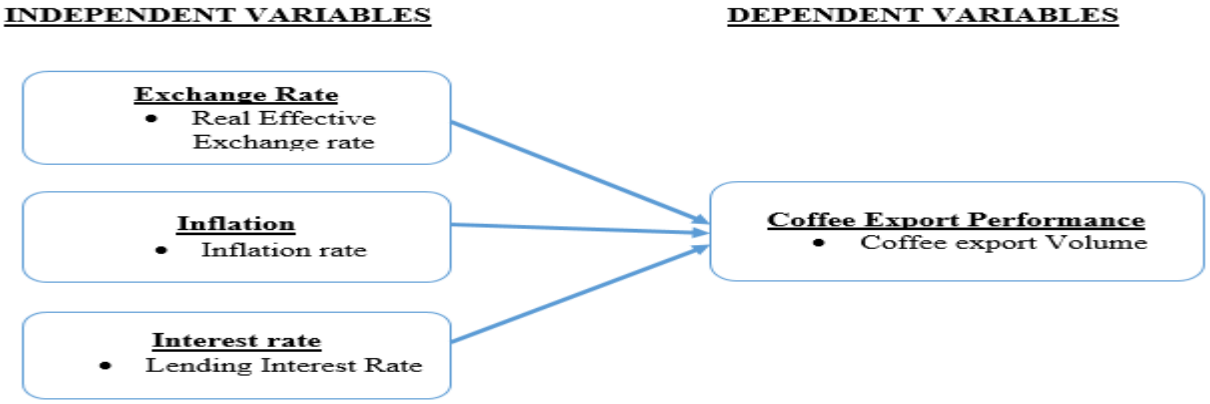
Objectives of the Study

- To determine the influence of the REER on coffee exportation in Uganda
- To determine the effect of inflation on coffee exportation in Uganda
- To determine the role played by the interest rate on coffee exportation in Uganda

Conceptual Framework

The framework below shows the relationship between the study variables. Exchange rate, Inflation, and interest rate are IVs, and coffee export volume is the dependent variable. The conceptual framework shows that the Exchange rate, inflation, and interest rate are related to coffee export volumes. The conceptual framework, adapted from Hussien (2015) and Muchtolifah and Muljani (2020), is shown in the figure below

Figure 1: Conceptual framework



Source: Hussien (2015); Muchtolifah and Muljani (2020)

Description of the Conceptual Framework

The conceptual framework assumes that the Exchange or currency rate, inflation, and the rate of interest all influence coffee exportation. The Exchange Rate as reflected by the REER affects coffee exportation in a way that a high REER makes exports less expensive to trade partners and thus leads to an increase in coffee export units, while a low REER makes exports more costly to trade partners and thus leads to a fall in coffee export units. REER is thus expected to be positively correlated with coffee exportation

Inflation is represented as the Inflation Rate. As inflation rises, the quantity of processed (and ultimately exported coffee falls because the exporters (who are also processors) would purchase less coffee volume than before. This is as per Tarawalie and Conteh (2021), who opine that inflationary pressures influence exportation by directly influencing input costs. Rising inflation increases input costs, while a drop in inflation decreases input costs. It, therefore, logically follows that when the inflation decreases, more quantities of coffee will be bought by exporters from farmers and hence they will export more. Inflation will hence be inversely related to the performance of coffee exports. The interest rate will be represented by the lending Interest Rate (RIR). It is the cost of capital (money) charged by the coffee exporters. A rise in lending rates raises borrowing costs for the exporters, and when they fail to borrow, the amount of processed coffee declines. Reducing the interest rate reduces the export price of coffee and also the price of borrowing money for coffee exporters, who in turn can buy and process more coffee. According to the UCDA national coffee strategy, many coffee processors and exporters in Uganda (almost 50%) operate on bank credit (UCDA, 2015). The interest rate is thus expected to be negatively correlated with coffee exportation

2. Literature Review

Overview of Coffee Exports in Uganda

One of the finest producers of coffee in the world is Uganda. Uganda is selling wet-processed Arabica, which smallholder farmers produce in central and southern areas (57%), Eastern Uganda (23%), and Western Kasese (10%) (Morjaria & Sprott, 2018). Uganda is selling and producing wet-processed Robusta, which the villagers cultivate in small farms. Coffee export charges went up by 40% to 4.6 million bags in 2016/2017 mainly because of the production of West Florida-style Robusta crops, but the average over the long run has been approximately 3.5 million bags annually (UCDA, 2020). Those cooperatives that market their coffees as 'Wugar' (Washed Uganda Arabica) and 'Drugar' (Dry Uganda Arabica) grow on mountain ridges near the border with the Democratic Republic of Congo on Uganda's western border (UCDA, 2020). Production of coffee began increasing in the 1980s but fell drastically in the late 1990s. But it has remained one of Uganda's leading foreign exchange earners, with a total of making contribution of 17.4% of overall export earnings, supported by rising volumes and worth. (UCDA, 2020). The European Union is responsible for over 70% of the overall coffee exports of Uganda. It is trailed by Sudan, which imports almost 10% of the Ugandan coffee, and afterwards the USA, which imports almost 3%. The export market of coffee in Uganda is wide, with over sixteen countries importing. The market has approximately twenty-nine multinational and national companies. Around 10 companies control eighty-five percent of the export market, while the largest company, Ugacof (U) Ltd, controls the majority share of around 15% of the exports of coffee (UCDA, 2020).

Theoretical Literature Review

This study applied the H-O (Heckscher-Ohlin) theory of international trade in exploring how inflation, interest rates, exchange rates, and the volume of coffee exportation interact with each other in Uganda. The Heckscher-Ohlin theory maintains that relative differences in factor endowments and their prices are the most potent forces behind importation and exportation. (Abolagba, Onyekwere, Agbonkpolor, & Umar, 2010). According to the theorem, countries only continue to trade goods with each other owing to differences and continued changes of their individual pre-trade product prices, arising from changes in their relative factor prices. Subsequently, countries with lower capital costs (i.e., lower interest rates) will enjoy a comparative advantage in capital-intensive commodities, which they should produce and export to countries with labour-intensive commodities, and vice versa. (Salvatore, 2013). Consequently, from the theory, some of the determinants upon which the export volume of any country may depend are the relative export price of its trade partners (through the exchange rate), the factor prices (through wages and interest rates) and the pre-trade product price changes (through inflation) among others. (Hussien, 2015; Muchtolifah & Muljani, 2020).

Empirical Literature Review

The Effect of the Exchange Rate on Coffee Exportation

The research that has tried to find out the impact of currency rate appreciation on performance in coffee exports has established that exchange rate appreciation can be either a significant and positive appreciation or a non-significant appreciation. Other research has established the negative relationship between exchange rate appreciation and coffee exports. Hence, the literature argument over the exchange rate effect on coffee export quantity is mostly whether or not there is any considerable effect. All of the articles have made use of time series analysis in constructing their arguments. Prajanti, Pramono, and Adzmin (2020) examined the determinants of Indonesian coffee export quantity using a Multiple Linear Regression Analysis with Ordinary Least Squares (OLS) over the 1983-2017 period. The study analyzed the effect of several variables on coffee export quantities and established that although appreciation in exchange rates was statistically positively correlated with coffee export quantities, its effect was not significant. In Ethiopia, Eshetu and Goshu (2019) using a dynamic gravity model and system Generalized Moment Method of estimation (GMM) for the 1998-2016 period validated that appreciation of the exchange rate has a diminishing effect on coffee export quantities for Ethiopia. Gebreyesus (2015) had earlier investigated the major determinants of coffee export supply in Ethiopia for the 1981-2011 period. According to the Vector Auto Regressive model (VECM), the study revealed that real appreciation of the exchange rate had no statistical effect on coffee exports in both the short and long run. In another study in Ethiopia, Goshu (2020) developed a direct effect of exchange rate appreciation on the export of spice crops whose primary crop was coffee.

Employing time series data from 1992/93 to 2015/16, in this study, the VECM has been employed to determine this. Although this particular study incorporated coffee exports into a pair of other crops, compared to the earlier studies carried out in Ethiopia, the results of the three studies can give a hypothesis that the impact of exchange or currency rate appreciation on coffee exports can change over time. In the study of the firm-level effect of exchange rate on coffee export and production, Salamat (2017) established that exchange rate appreciation positively affects the intensive and extensive margins of the firms. The study further developed the point that the intensive margin (efficient scale of production) is affected whenever the input prices change in response to exchange rate changes. The study indicates a substantial effect of exchange rate depreciation on volumes of coffee exports. The study also highlights that exchange rates have an impact at the firm level that, in turn, affects the volume of coffee export. One among the limited studies done on coffee exports in Uganda is research conducted by Nahanga, Bamwesigye and Antwi (2015).

The study analyzes the effect of certain economic determinants on coffee production and exports. The level of production and the world price index were among the determinants that were revealed to affect Ugandan coffee exports. The study did not incorporate the exchange rate, and thus it is not known what effect the exchange rate has on Uganda's coffee exports. Conclusion of the recent studies on exchange rates effect to coffee exports does not seem to indicate any convergence in the specific effect of exchange rates on the levels of coffee exports. Whereas there are some studies indicating a positive effect, there are other studies indicating a negative effect, and there is other research that has established no effect. The effect seems to be based on different characteristics of economies. It also leaves room for exploration on the impact of the exchange rate on coffee export levels. This research will therefore draw on the Ugandan example to add to the debate.

The Effect of Inflation on Coffee Exportation

The effect of inflation on coffee export has mostly been debated within the general package of the effect of inflation on the export of agricultural products by the exporting nations in the agricultural sector. This is because the products are mostly homogeneous products with a mostly similar process of exportation in the majority of the nations. It is also because inflation has been found to affect the input costs of agro-processing factories that manufacture agricultural exports. The findings of most of the studies have been that inflation is negatively related to agricultural commodity exports. There are some, however, which, to their surprise, found positive correlations, while others found no effects at all. In South Africa, Vanzyl (2016) discovered that an increase in inflation had a negative effect on agricultural exports by creating cash flow problems for farmers through increased operational management costs. Their test employed a Vector Auto Regressive (VAR) model. Equivocally, in causality testing, Oyakhilomen and Zibah (2014) discovered that the trend of inflation had a negative effect on Nigeria's agricultural exports, and also discovered that, from 1970 to 2011, inflation caused agricultural exports one-way.

Investigating the causal effect of volatility in Nigeria's macroeconomic variables for the period 1970-2010, Akpan, Udoka, and Patrick (2015) uncovered highly negative relations between agricultural export, external debt, external reserves, and short-run and long-run inflation. Industrial capacity utilization and exchange rate also uncovered highly positive relations under the cointegration model employed in the study. Identifying the long-run determinants of Nigerian agricultural exports for the span 1960 – 2014, Udah, Nwachukwu, Nwosu, Mbanasor and Akpan (2015) regressed a number of macroeconomic variables on agricultural exports. Rising inflation rate, growth in the manufacturing sector, agricultural credit, per capita income, unemployment, energy consumption, and external reserves were found to have positive long-run effects on agricultural exports. On the contrary, FDI in agriculture, oil prices and banks' lending capacity had a negative impact in the long term on exportation.

The Effect of Interest Rate on the Performance of Coffee Exports

Investigating the effect interest rate has had on South African agricultural exports, Ngondo and Khobai (2018) used the Autoregressive Distributed Lag (ARDL) model and yearly time series for the period 1994 to 2016. Their study established a highly negative association between the interest rate and agricultural exports. In contrast, Adofu, Abula, and Audu (2010) investigated the trends in agricultural exports following the deregulation of Nigeria in 1986. Employing the OLS method, their work established the significantly positive impact of the rise in interest rates on Nigerian agricultural exports. In a second empirical study that assessed determinants of Nigerian agricultural exports, Udah, Nwachukwu, Nwosu, Mbanasor, and Akpan (2015) showed that an increase in the interest rate was negatively linked with increases in agricultural exports and that changes in nearly 66.4% of the exports were accounted for by changes in the IVs used. For Uganda, empirical examinations explaining how coffee export volumes are related to macroeconomic drivers have been limited.

Byanyima (2011) examined the determinants of Uganda's coffee export volume using the time series data for the period 1991-2007. Of the determined factors, exchange rate appreciation was negatively impacted and an increase in the price of coffee internationally was positively significant. The rest of the determinants, i.e., interest rate and the GDP, were not significant. However, Shire (2018) in examining the impact of exchange or currency rate volatility on Ugandan coffee exports using ARDL models established that inflation and interest rate were highly and positively related to coffee exports, while exchange rate volatility was insignificant. This reveals that the participation of macroeconomic variables in the performance of coffee exports in Uganda is still disputed. The results of this study will hence try to bring to a close this controversy.

3. Methodology

Research Design

Time series analysis rooted in a quantitative research approach was used in the study. Time series analysis has been used because it can determine relationships among variables. This assists in attaining the entire objectives of this research. Annual data from UBOS and the Bank of Uganda for the period 1990 to 2019 were used for the study.

Data Analysis

This study employed the Stata Statistical package version 14 to establish the effects of the rate of exchange, inflation, and interest rates on the level of coffee export volume in Uganda.

Theoretical Model

This study was anchored in the Heckscher-Ohlin theory of comparative advantage as expressed by Abolagba, Onyekwere, Agbonkpolor, and Umar (2010). Under the framework, countries engage in international trade because of discrepancies and continuous changes in their individual pre-trade product prices, which arise out of changes in their relative factor prices. Subsequently, countries with lower prices of capital (i.e., lower interest rates) will have a comparative advantage in capital-intensive commodities, which they produce and export to countries with labour-intensive commodities, and vice versa. Thus, from this theory, some of the factors on which the volume of exports of any given country could depend are the relative price of its exports to trade partners (seen through the exchange rate), the factor prices (seen through interest rates and wages) and the changes in pre-trade product prices (seen through inflation) among others (Hussien, 2015; Muchtolifah & Muljani, 2020). Thus, the framework yields an export supply function of the form below.

COFFEE = f (REER, INF, INTR) …… (3.0)

Where, **COFFEE** is the Coffee export volume, **REER** is the REER, **INF** is the Inflation Rate, and **LR** is the lending Interest Rate.

Model Specification

The functional form of the model in equation 3.0 was specified in econometric form and augmented to include other variables following Tadese (2015). Thus, apart from the main variables, the model included the amount of coffee produced as a control variable to account for domestic coffee production (Tadese, 2015). Thus, the econometric form of the model was expressed as;

$COFFEEt = \beta_0 + \beta_1 REER_t + \beta_2 INF_t + \beta_3 LR_t + \beta_4 PROD_t + \mu_t$ …….. (1)

Where: COFFEE denotes the Coffee export volume measured in the form of coffee bags exported per annum; REER denotes the Real effective exchange rate; INF stands for the Inflation Rate; and LR denotes the lending Interest Rate. PROD stands for Coffee Produced measured in the form of the quantity of coffee kilograms (kgs) produced per annum; μ denotes the Error term. A priori expectations are that $\beta 1, \beta 4 > 0$, and $\beta 2, \beta 3 < 0$.

The model was adjusted to a log-log form to reduce tendencies of multicollinearity, and thus specified as;

$LNCOFFEEt = \beta_0 + \beta_1 REER_t + \beta_2 LNINF_t + \beta_3 LR_t + \beta_4 LNPROD_t + \mu_t$ ……. (2)

Definition and Measurement of Variables

Coffee Export Volumes (COFFEE): This is the yearly volume of 60kg coffee bags exported. Data were derived from the UBOS database.

REER: REER is the minimal effective exchange or currency rate (valuation of a currency's value in terms of a weighted average of a set of foreign currencies) in terms of a price deflator or cost index. Information was retrieved from the Bank of Uganda database.
Inflation Rate (INF): The speed at which the general level of prices for a basket of selected goods and services in an economy increases over time. Source: Bank of Uganda
Lending rate (LR): The average amount of money lent by commercial banks in a year, as a percentage of money lent. Data sourced from the Bank of Uganda
Coffee Produced (PROD): The amount in kilograms of coffee produced in a year. Source from UBOS.

Checking For Unit Roots

ADF test was utilized in the present research to check the stationarity of the independent and dependent variables. ADF testing checks for unit roots in a series of data to ascertain whether the series is stationary or otherwise. Libanio(2005) asserts that there is a need to check the stationarity of time series data since series are highly dependent on whether they are stationary or not. As economic theory does (and only) assume long-run stationarity of stationary series, it is very crucial to check that the series used in a study are indeed stationary. Non-stationarity of the variables would mean that the means and variances of the series change over time and thus make any hypothesis tests performed on the parameters of the regression invalid. The ADF test process entails estimating an equation of the form:

$\Delta y_t = \theta y_{t-1} + \sum_{i=1}^{p} \mu_i \Delta y_{t-i} + u_t$:

Where H_o: $\mu_1 = 0$; H_A: $\mu_1 > 0$

Where, $\mathbf{y_t}$ is a vector representing the time-series variables in the model under consideration, **t** represents the time trend; **Δ** is the first-difference operator; $\mathbf{u_t}$ is the error term; and **p** represents the optimal lag-length of each chosen variable.

The ADF tests the hypothesis, Ho: $\mu_1 = 0$, suggesting that the series are non-stationary against the alternative hypothesis, H_A: $\mu_1 > 0$, suggesting that the series are stationary. When the null hypothesis is rejected, then the series (y_t) is stationary and is said to be integrated of order zero; that is, I(0). Non-stationary series can be differenced once and then tested again for stationarity, and if the ADF null hypothesis at first-difference is rejected, then the first-difference of the series can be said to be stationary and integrated of order one; that is, I(1)(Greunen, Heymans, Heerden, & Vuuren, 2014).

Co-Integration Test

The cointegration bounds test through the ARDL framework was undertaken to verify for any long-run relationship between the variables in question. The Pesaran, Shin, and Smith (2001) test offers an f-statistic (the Wald f-statistic), which is then contrasted with critical values for different significance levels to determine whether the variables are or are not long-run related. The bounds test is used to test the null hypothesis, H0: $\beta1 = \beta2 = \beta3 = \beta4 = 0$, denoting no long-run relationship to the alternative hypothesis, HA: $\beta1 \neq \beta2 \neq \beta3 \neq \beta4 \neq 0$, denoting a long-run relationship. If in instances where the f-statistic is higher than the upper band of critical values, then there is a long-run relationship between the series, and consequently, the null hypothesis needs to be rejected. If the f-statistic falls below the lower band of critical values, then the null cannot be rejected and consequently, there is no long-run relationship. If the f-statistic is between the lower and upper bands of critical values, then as per Narayan(2005) the test is referred to as inconclusive.

Model Estimation

This study estimated a single ARDL (Auto Regressive Distributed Lag) model in examining the relationship between the exchange rate, inflation, interest rate, and quantities of Ugandan coffee exports. The rationale for employing the ARDL method is that this study had a small sample period, and the ARDL is efficacious in determining the relationship between variables when the sample period is small, i.e., fewer than 80 observations (Narayan, 2005).

Post Estimation Diagnostics

Serial Correlation Test
Serial correlation is the correlation of values at a point in time of one variable with its own values over time. Serial correlation is a problem for time series because it affects the OLS estimates of standard errors' efficiency to make them lower than they ought to be (Roberto & Jódiney, 2019). For the purpose of obtaining serial correlation in the aforementioned estimated model, the Breusch-Godfrey test with the Lagrange Multiplier was utilized. It tests against a null hypothesis of no autocorrelation.

Testing For Normality
Normality tests of econometric analysis are used to ascertain whether error terms for econometric models are consistent throughout all variables and observations of the study period; i.e., normally distributed with zero mean and equal variance throughout the model. Non-normality of the error term renders the independence of the predictability of IVs inconsistent over the sample period (Gujarati, 2004). Therefore, based on the Jarque-Bera test, there will be a test of the distributional nature of the error term in the model estimate. The Jarque-Bera test is used to test the null hypothesis of normal error terms.

Ethical Considerations
The data collected for the study were used for purely academic purposes only.

4. Presentation and Explanation of Study Findings

Description of Variables in the Study
A brief description of the variables based on how they were distributed across the study period is given in order to give a general idea about the nature of the variables selected. Specifically, a summary of the distribution of the variables and the nature of their correlation is discussed below

Distribution Summary of the Variables
The distribution data of the variables of study are shown in Table 1 below, focusing on the mean, maximum values, minimum values, and the standard deviation.

Table 1: Distribution summary of variables

Variables	Mean	Std Dev	Min	Max
COFFEE	3,446,021	1,454,126	2,002,324	8,473,931
REER	83.67307	17.38161	44.73116	108.4172
INF	7.968508	3.260338	2.887225	20.77518
LR	23.11015	5.43231	18.47639	40
PROD	197,000,000	48,800,000	110,000,000	302,000,000

Note: Observations = 30. Source: Author's calculations using Stata 14 based on UCDA and BOU annual data

The results in Table 1 above indicate that coffee exports averaged about 3.4 million 60kg bags. The highest number of exported bags was about 8.5 million, while the smallest was about 2 million. Generally, the number of exported bags deviated by about 1.45 million. The REER averaged about 83 US dollars, hitting the highest rate of 108 dollars and was lowest at about 45 dollars. The rate deviated by about 17 dollars. The inflation rate averaged about 8 percent, was highest at about 21% and lowest at about 2.9%. The rate deviated by about 3.3%. The lending rate averaged 23% over the study period, reaching a high point at 40% and was lowest at about 18.5% deviating by about 5.4%. Coffee production averaged about 197 million kilograms and was highest at 302 million kilograms. It was lowest at about 110 million, deviating by about 48.8 million. The descriptive statistics show tendencies of high spread with large differences between the lowest and highest values. Since the standard deviations are lower than the means, however, the study variables can be said not to be very volatile. Generally, these data characteristics show the instability of the macroeconomic environment within which coffee exports happen.

Correlation of the Variables

The variables were subjected to a Pearson correlation test to check how strong their relationships were. It is important to check for correlations between variables because it enables us to make certain that the variables are not highly similar, which could result in multicollinearity issues. The results from the pairwise correlation analysis are presented in Table 2.

Table 2: Correlation summary of the variables

	COFFEE	REER	INF	LR	PROD
COFFEE	1.0000				
REER	0.4217*	1.0000			
INF	-0.3906*	-0.2120	1.0000		
LR	-0.2957*	-0.3734*	0.2052	1.0000	
PROD	0.7028*	0.2795	-0.3503	-0.4507*	1.0000

Source: Author's calculations using Stata14, based on UCDA and BOU annual data

The results in Table 2 indicate that the REER (REER) and coffee production (PROD) are positively and significantly correlated with coffee exports. Inflation rate (INF) and lending rate (LR) are negatively correlated with coffee exports. The results of the Pearson correlation analysis above indicate that the correlations of selected variables are below the 0.8 threshold above which multicollinearity would arise. Thus, the variables selected can be included in the model for estimation.

The Test For Stationarity of Variables

The study examined the type of stationarity of the variables. The type of stationarity of variables can be employed in describing the long-run relationship among the variables, and thus it forms a model estimation framework. Stationarity can be verified by verifying the unit roots in the data series. First, some variables were re-specified into log form and the study thereafter employed the Augmented Dickey Fuller (ADF) test as one of the most commonly applied unit root tests within time series data analysis employed by analysts. The null hypothesis of the ADF test is non-stationarity against the stationarity alternative hypothesis. The ADF test statistic is compared to its respective critical values at three significance levels. The null hypothesis cannot be rejected if the test statistic is less than the critical values for any of the three significance levels, which would imply that the series is not stationary. The ADF test statistics of the variables at their variable levels and their first differences are given in Table 3 below.

Table 3: Results from ADF test on variables at levels and at first difference

Variable Name	Variables at Levels	First difference	Integration
logCOFFEE	-0.064 (0.9529)	-6.077*** (0.0000)	I(1)
REER	-1.292 (0.6330)	-5.031*** (0.0000)	I(1)
INF	-3.320** (0.0140)	-	I(0)
LR	-3.066** (0.0292)	-	I(0)
logPROD	-1.856 (0.3531)	-5.855*** (0.0000)	I(1)

Notes: ***, ** Indicate significance at 1% and 5% levels of significance. Values in brackets are p-values. Source: Author's calculations using Stata14, based on UCDA and BOU annual data

The result in Table 3 above shows that the variables are of differing orders of integration. While logCOFFEE, REER, and logPROD are order one, INF and LR are order zero. Because some of the variables were non-stationary at levels, and yet non-stationarity of these variables in levels is an indication of the possibility of long-run interrelationships known as cointegrations, the research proceeded to test the likelihood of cointegration of the variables.

The Test For Cointegration among The Variables

The Johansen cointegration test, a common empirical technique, was employed in the research. The test yields a trace statistic that identifies the number of cointegrating equations for the model relative to the critical values at the 5% significance level. The order of the model is represented by the number of cointegrating equations tested under the null hypothesis of having 'r' cointegrating vectors against the alternative of 'r+1' cointegrating vectors. Since the trace statistic is less than the critical value, the null hypothesis cannot be rejected. The results are shown in Table 4 below.

Table 4: Results from the Johansen Cointegration test

Null Hypothesis	eigenvalue	Trace statistic	5% critical value
r ≤ 0		82.5713	68.52
r ≤ 1	0.75741	42.9121*	47.21
r ≤ 2	0.51817	22.4677	29.68
r ≤ 3	0.37497	9.3087	15.41
r ≤ 4	0.27406	0.3408	3.76
r ≤ 5	0.01210		

Note: * indicates non-rejection of null at 5% significance level. Trend: constant. Sample: 1992 - 2019. Number of observations = 29. Lags = 2.
Source: Author's calculations using Stata14, based on UCDA and BOU annual data

The findings of Table 4 show the presence of a single cointegrating equation. This follows from the fact that the null hypothesis of at most one cointegrating equation (r ≤ 1) is not rejected, as the trace statistic is below the 5% critical value (42.9121 < 47.21). On this premise, the study established the presence of a linear combination to produce an enduring long-run relationship among the variables in question. Since some variables were non-stationary at levels, cointegration was established to merit the use of an Autoregressive Distributed Lag (ARDL) model, which is demonstrated below.

The Auto Regressive Distributed Lag Model

The study employed an ARDL model since it is most suitable when integration orders of variables are heterogeneous and less than I(2). The model is also efficient in yielding parameter estimates even with fairly small samples. The model includes short-run coefficients as well as long-run coefficients, along with an error correction term representing the long-run relationship driven by short-run disturbances in the independent variables. The best lag structure for the model was chosen automatically by employing the Akaike Information Criterion (AIC). The chosen lags were 4, 4, 3, 4, 4, indicating that each of the variables had a maximum lag of four except for inflation which had three. This selection was felt to be reasonable as the existing empirical literature suggests that macroeconomic determinants have the ability to impact coffee exports within five years (Gebreyesus, 2015).

The Long-Run Results of The ARDL Model

The results for the long-run relationship are reported in Table 5.

Table 5: Results of long-run coefficients in the model

Dependent Variable: logCoffee			
IVs	**Coefficient**	**Standard Error**	**P-Value**
REER	0.0052273**	0.0005727	0.012
INF	-0.098407**	0.0021306	0.044
LR	0.0159176**	0.0032278	0.039
logPROD	0.173014***	0.0581427	0.001

Notes: ** Indicate significance at 5% significance level.
Source: Author's calculations using Stata14, based on UCDA and BOU annual data

The findings from Table 5 reveal that all of the variables significantly influence coffee export volumes in the long run. An increase in the real effective exchange rate, lending rate, and coffee production positively affects exports, while inflation negatively affects them. Specifically, an increase in the real effective exchange rate by one unit increases coffee export volume by 0.005%. An increase in the lending rate by one unit increases export volumes by 0.012%. Likewise, an increase in coffee production by 1% increases export volumes by 0.173%. On the other hand, inflation worsens export performance such that an increase in inflation by one unit decreases export volumes by 0.098%, while a decrease of one unit increases them by 0.0098%. In general, the evidence indicates that, in the long run, coffee production is the strongest determinant of export volumes, followed by lending rates, inflation, and finally the exchange rate.

The Short-Run Results

The results for the short-run relationship between the variables are presented in Table 6 below.

Table 6: Results of Short Run Coefficients in the Model

Dependent Variable: D.logCoffee			
IVs	Coefficient.	Std. Error	P>|t|
$logCoffee_{t-1}$	0.6061309**	0.1211926	0.038
$logCoffee_{t-2}$	0.1669729***	0.1123009	0.004
$logCoffee_{t-3}$	-0.2406288	0.0962858	0.130
REER $D_{1.}$	-0.0215153***	0.0005919	0.001
$REER_{t-1}$	-0.0235958***	0.0010044	0.002
$REER_{t-2}$	-0.036598***	0.0008415	0.001
$REER_{t-3}$	-0.0007095	0.0007158	0.426
INF $D_{1.}$	0.0473332***	0.0032045	0.005
INF_{t-1}	0.0875029***	0.0014636	0.000
INF_{t-2}	0.0298767***	0.0011421	0.001
LR $D_{1.}$	-0.0542473***	0.003301	0.004
$LRt-_{1}$	-0.0557629***	0.0031996	0.003
$LRt-_{2}$	0.0048324*	0.0012725	0.063
$LRt-_{3}$	-0.0096034**	0.0016308	0.028
logProd $D_{1.}$	0.1892278***	0.167188	0.008
$logProd_{t-1}$	0.3291638***	0.1382716	0.002
$logProd_{t-2}$	0.1663394***	0.1262677	0.006
$logProd_{t-3}$	0.8614618***	0.0480116	0.003
Constant	-28.36635***	1.579764	0.003
ADJ logCoffee L1.	-0.1522327**	0.1682494	0.012

Notes: ***, **, * Indicate significance at 1%, 5% and 10% significance levels, respectively. D1 = First difference in variable. LD = lagged difference. ARDL regression (4, 4, 3, 4, 4). R-square: 0.604. Source: Author's calculations using Stata14, based on UCDA and BOU annual data

Table 6 estimates indicate that the first and second lags of coffee export volumes have a positive and significant effect on the current export in the short run and that the third lag is not significant. This suggests that coffee exports of both the immediate preceding periods increase the current volumes by about 0.6 and 0.17 respectively, but decrease when in the reverse direction. The actual effective exchange rate (REER) appreciation was found to have a negative and significant effect on coffee export volumes, with a one-unit rise in the REER reducing coffee export volumes by 0.02%. Similarly, one-unit rises in the first, second, and third lags of REER reduce coffee export volumes by 0.024%, 0.037%, and 0.0007%, respectively. Inflation was statistically significant and positively affected exports. As inflation increases by one unit, the quantity of coffee exports increases by 0.047%. In the short run, the first lag and second lag of inflation raise exports by about 0.09% and 0.03% respectively.

The lending interest rate negatively and significantly affected coffee exports. A one-unit increase in the lending rate reduces exports by 0.054 percentage points. Similarly, its increases in its first and third lags decrease export volumes by 0.056 and 0.0096 percentage points. Instead, the lending rate is positively related to coffee exports in the second lag, with a 0.0048 coefficient that is significant only at the 10% level and is thus less powerful. Overall, the negative short-run effect is greater than the positive long-run effect, which means that the adverse effect of lending rates is greater than any benefit. Both effects, nonetheless, are small, meaning that coffee exports respond relatively little to changes in lending rates. Coffee production was found to have the largest beneficial effect on exports. A rise in one unit of production raises the amount of coffee exports by 0.189%, which is the highest coefficient for any of the model's variables. Its first, second, and third lags also have beneficial effects on exports' level, but the size declines over time: 0.329 in the first, 0.166 in the second, and 0.086 in the third.

The intercept coefficient of -28.4 shows the level of exports when the independent variables take a value of zero. The error correction term, negative and statistically significant at 5% (-0.152), captures the rate at which adjustment converges back to equilibrium following a shock. It suggests that around 15.2% of past shocks to coffee export volumes caused by explanatory variables are corrected in the current year. The R-squared for the model is 0.604, implying that the variables covered so far account for 60.4% of coffee export volumes' variation and that the remaining 30.6% is explained by other variables omitted in the model.

Post Estimation Diagnostic Tests

The study proceeded and applied diagnostic tests on the estimated model with a view to ensuring that it was free from any econometric problems. The tests applied are discussed below.

The Test For The Normality of Residuals

The Shapiro–Wilk (SW) normality test was used to find out whether residuals in the model were distributed normally. The null hypothesis of the SW test is that residuals are normally distributed (Ruxton, Wilkinson, & Neuhäuser, 2015). The null hypothesis won't be rejected if the test statistics 'w', 'v', and 'z' p-values are greater than the 5% significance level. Results are presented in Table 7 below.

Table 7: Results from the Shapiro–Wilk Normality test

Variable	Observations	W	V	Z	Prob>Z
Residuals	30	0.95172	1.534	0.885	0.18799

Null Hypothesis: Normality. Source: Author's calculations using Stata14, based on UCDA and BOU annual data

The results in Table 7 above indicate that the p-value (0.18799) exceeds the 5% significance level, showing that the null assumption of normality cannot be denied and hence the residuals are normally distributed.

The Test For Serial Correlation

The Breusch-Godfrey test for serial correlation was employed to check whether the variables are correlated with the lagged values. Serial correlation would mean that OLS estimates are no longer efficient. It produces a chi-square statistic, which is a p-value, and tests the null hypothesis of no serial correlation. If the p-value > 0.05, then the null hypothesis is accepted.

Table 8: Results from the Breusch-Godfrey Serial Correlation LM Test

Lags (p)	Chi-square	df	Prob >chi2
1	0.014	1	0.9064

Null Hypothesis: No serial correlation. Source: Author's calculations using Stata14, based on UCDA and BOU annual data

The values in Table 8 show that the p-value (0.9064) exceeds 0.05. It reflects the acceptance of the null hypothesis of no serial correlation. Therefore, a conclusion is made that the error term of the model does not reflect serial correlation.

The Test For Heteroskedasticity

The Breusch-Pagan test for heteroscedasticity was conducted to determine whether the residuals are of constant variance. The test is based on the null hypothesis that there is no heteroscedasticity. When the p-value is more than the 0.05 significance level, the null hypothesis will not be rejected. The results are presented in the table below.

Table 9: White Test results for Heteroscedasticity

Chi2(1)	Prob>Chi
1.78	0.1823

Null Hypothesis: Homoskedasticity. Source: Author's calculations using Stata14, based on UCDA and BOU annual data

The results in Table 9 indicate that the p-value (0.1823) exceeds 0.05, implying that the null hypothesis of no Heteroscedasticity cannot be rejected.

Test For Multicollinearity

The Variance Inflation Factor (VIF) test was applied to determine multicollinearity between the study variables. VIF measures the degree to which multicollinearity contributes to inflation of the regression coefficient variance. The test also produces Tolerance values such that values of VIF > 10 and Tolerance < 0.2 are used to indicate high multicollinearity. The result of the VIF test is discussed below.

Table 10: Results from the Variance Inflation Factor analysis

VARIABLE	VIF	1/VIF (Tolerance)
LR	1.47	0.680369
logProd	1.46	0.682839
REER	1.20	0.836044
INF	1.14	0.879353
Mean VIF	1.32	

Source: Author's calculations using Stata14, based on UCDA and BOU annual data

Values in Table 10 indicate that VIF values are well below 10 and the tolerance values are all above 0.2, beyond which Multicollinearity would have been a concern. The findings indicate that there is no high multicollinearity in the model.

Test For Model Specification Errors

The Regression Specification Error test of RESET was utilized to check the likelihood of model specification error. It identifies if non-linear functions of estimated values can influence the dependent variable. The null hypothesis assumes that there are no variables of relevance left out. The null hypothesis cannot be rejected if the p-value for the F-statistic is more than 0.05. Results of the Ramsey RESET test are summarized in Table 11.

Table 11: Results from the Ramsey RESET test

Dependent Variable	F (3, 22)	Prob > F
logCoffee	4.90	0.903

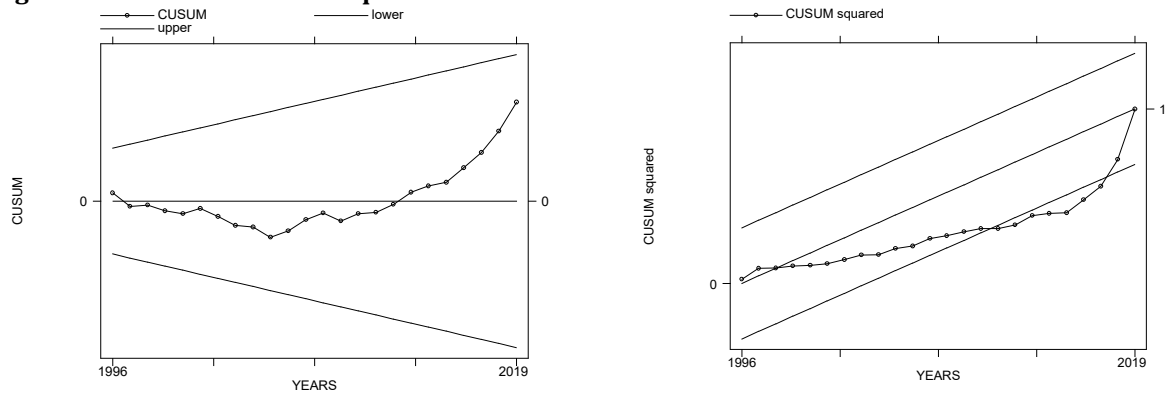
Null Hypothesis: Model has no omitted variables. Source: Author's calculations using Stata14, based on UCDA and BOU annual data

The results in Table 11 above indicate that the P-value (0.903) exceeds the 0.05 significance level and therefore the null hypothesis of the RESET test cannot be rejected. Hence, the model is properly specified.

The Test For Model Stability

The stability of the model was tested using the Cumulative Sum (CUSUM) test. The CUSUM test charts recursive regression residuals against potential break points in the model at 5% significance. The model is stable if the CUSUM of the residuals lies within these critical limits. The results are graphically presented below.

Figure 2: Cumulative Sum of Squares Test



The results of the CUSUM test in Figure 2 above indicate that the dotted line (the cumulative sum of residuals) entirely falls within the upper and lower critical bounds. This shows that the estimated model is stable.

5. Discussions, Conclusion and Recommendations

This study is based on three major objectives from which three important hypotheses were drawn and tested. The discussion below explains the findings in relation to the objectives that the study set out to achieve.

Exchange Rate and Performance of Coffee Exports in Uganda

The main purpose of the research was to examine how the exchange rate affects the performance of coffee exports in Uganda. Previous research had shown that exchange rate variations had a significant effect on coffee export volatility. The model estimates of this study in the ARDL model indicated that in the long run, the real effective exchange rate (REER) has a significant positive effect on coffee export quantities, but a significantly negative effect in the short run. The null hypothesis of no effect was therefore not rejected. The positive long-run relationship indicates that an appreciation of the exchange rate would increase coffee export quantities.

As the REER appreciates, it means a stronger local currency, which makes it more powerful as a buyer against trading partners (Hiep & Nha, 2016). This will make locally produced goods more expensive worldwide. Surprisingly, as much as this is contrary to the first instinct, the findings show that a higher REER in the long run actually favors Ugandan coffee exports. This is an interesting note, emphasizing the privileged position of coffee in the Ugandan economy. The REER coefficient of 0.00523 suggests that price has a small effect on demand for Ugandan coffee, which tends to suggest elastic demand. This supports that Uganda produces a large majority of Arabica coffee, one of the world's most sought-after coffees (Verter, Bamwesigye, & Darkwah, 2015). In the short run, the exchange rate negatively impacts coffee exports. With an appreciating domestic currency, Ugandan coffee is more expensive for international consumers, inhibiting demand. This impact is not limited to the current time but extends over a period of three periods ahead, that is, a stronger REER can discourage coffee exports over a period of three years, as contended by Hordofa (2021).

Inflation in the Performance of Coffee Exports in Uganda

The second objective of this study was to examine the impact of inflation on Uganda's coffee exports. It was assumed that inflation plays a significant part in the determination of coffee export volume fluctuations. The findings of the ARDL model revealed that inflation has a significant negative impact on coffee exports in the long run, while in the short run, it has a significant positive effect. The null hypothesis was therefore not rejected.

In the long run, rising inflation reduces coffee exports. Higher general prices in the country reduce the purchasing power of money, and it becomes challenging for processors and exporters to buy bulky coffee from farmers. They only purchase what they can process and export. This finding is in line with the study by Wondemu and Potts (2016). In the short run, however, inflation was found to increase coffee export volumes. The more the inflation, the more the exports, and a drop in inflation reduces them. This beneficial effect also carries over to the final two periods, indicating that inflationary changes continue to influence exports for at least two years. The inflation coefficient (0.047) shows that the effect is moderate, i.e., a rise in inflation affects coffee exports by approximately 5%. This shows that coffee exports are not highly sensitive to inflationary changes, at least in the short term. Tarawalie and Conteh (2021) also reached this conclusion.

Interest Rate and Performance of Coffee Exports

The third objective of the study was to find out the effect of interest rate on the performance of Uganda's coffee exports. The study henceforth presumed that the interest rate affected the variation in the performance of coffee exports in Uganda. Based on the result of the ARDL model, the lending interest rate was significant to coffee exports in the long run but with a contrary effect in the short run. The null hypothesis was thus not rejected. The positive long-run effect indicates that the cost of capital (lending interest rate) increases and coffee exports continue increasing. This also reflects that Ugandan demand for coffee is inelastic, and the relatively low long-run coefficient (0.0159) supports this. It is the measure by which quantities of coffee exports adjust only to a change in the price of capital by 1.6% in the long run. Only the presence of very high demand for coffee in world markets would make coffee exports not react to changes in interest rates. In the immediate future, however, the interest rate discourages coffee exports.

This is an indication that in the brief period, as the price of capital (lending interest rate) increases, coffee exports fall. Although the effect is small as the elasticities are not so large, the short-run effect technically lasts for three years, indicating that changes in interest rates in the short period continue to negatively affect coffee exports even after three years. Given that the agricultural sector is beset by some of the darkest interest rates in Uganda (Mugume Reagan & Lakuma). Such an effect can prove to be catastrophic. Similar results of the same trend were established by Boansi and Crentsil (2013).

Conclusion

The study aimed to test how the performance of coffee exports by Uganda has been influenced by some of the most pertinent macroeconomic variables, specifically the exchange rate, inflation, and lending interest rate. Owing to the fact that data on some variables were not long and tests of stationarity indicated that some series were not stationary at levels, the study used an ARDL model in testing the three hypotheses formulated from the research questions.

The findings showed that the exchange rate, as measured by the REER, has a positive effect on coffee export volumes in the long run but a negative effect over three years in the short run. Inflation negatively affects exports in the long run, but in the short run it positively affects exports for up to two years. The interest lending rate also has a long-term positive effect on coffee exports but a short-run negative effect for three years. The ability of Uganda to produce coffee was also added as a proxy variable in the model. Coffee production was shown to have a significant short-run and long-run effect on export levels, showing its role as a factor driving The country's coffee export performance.

Recommendations: To policymakers and the government, the world demand for Uganda's coffee export appears to be inelastic because their response to changes in relative price (REER) and other macro-economic determinants like inflation and interest rate is low, especially in the long term. This is therefore an opportunity window for Uganda to double its current coffee exportation to boost the nation's export earnings. As a starting point, the government needs to provide farmers, processors, and coffee exporters with access to affordable finance. Second, license more coffee processors and exporters, and push more Ugandan families to grow coffee as a source of revenue in the quest for middle-income status. To the coffee exporters, processors, and farmers, the cost of capital will only reduce the coffee exports in the short run, which is a 3-year duration, after which the exports will increase irrespective of the interest rate. The cost of capital should therefore not discourage new players into the coffee export business. They should plan to invest additional capital in the initial years of their firms.

Limitations of the study

Time series data on coffee exportation in Uganda is limited. The analysis of this study was based on a short time series, which lowers the degrees of freedom of most of the analytical tests carried out, and hence affects the results of the hypothesis tests.

Areas Recommended For Further Research

The researcher recommends that future studies on Uganda's performance of coffee exports should consider employing a panel study to understand how the government's national coffee policy is affecting coffee exports and coffee export earnings.

References

Abolagba, E. O., Onyekwere, N. C., Agbonkpolor, B. N., & Umar, H. Y. (2010). Determinants of agricultural exports in Nigeria. *Journal of Human Ecology, 29*(3), 181–184.

Adofu, I., Abula, M., & Audu, S. I. (2010). An assessment of the effects of interest rate deregulation on agricultural sector performance in Nigeria. *Current Research Journal of Economic Theory, 2*(2), 82–86.

Akinbode, S. O., & Ojo, O. T. (2017). Exchange rate volatility and agricultural exports in Nigeria. *Journal of Economics and Sustainable Development, 8*(24), 12–20.

Akpan, S. B., Udoka, S. J., & Patrick, I. V. (2015). Volatility of macroeconomic variables and agricultural exports in Nigeria. *Journal of Economics and Sustainable Development, 6*(7), 184–197.

Al-Abdulkader, A. M., Al-Namazi, A. A., AlTurki, S. M., Al-Khuraish, M. A., & Al-Dakhil, M. (2018). Coffee consumption trend and economic growth. *Journal of Food Research, 7*(3), 34–42.

Boansi, D., & Crentsil, C. (2013). Competitiveness and determinants of coffee exports, producer price, and production for Ethiopia. *Quarterly Journal of International Agriculture, 52*(3), 311–340.

Byanyima, F. (2011). Determinants of Uganda's coffee export performance. *Uganda Journal of Agricultural Economics, 3*(2), 45–59.

Eshetu, M., & Goshu, T. (2019). Determinants of Ethiopia's coffee export performance: Evidence from the dynamic gravity model. *Journal of Economics and Sustainable Development, 10*(7), 23–34.

Gebreyesus, M. (2015). Determinants of coffee export supply in Ethiopia: A vector error correction model. *African Journal of Economic Policy, 22*(2), 55–77.

Greunen, J., Heymans, A., Heerden, C. V., & Vuuren, G. (2014). Stationarity tests in econometrics: A practical approach. *South African Journal of Economic and Management Sciences, 17*(3), 257–273.

Gujarati, D. N. (2004). *Basic econometrics* (4th ed.). New York: McGraw-Hill.

Hiep, N. V., & Nha, V. T. (2016). Exchange rate volatility and export performance: Evidence from Vietnam. *Journal of Economics and Development, 18*(3), 5–22.

Hordofa, T. (2021). Exchange rate volatility and agricultural export performance in Ethiopia. *Cogent Economics & Finance, 9*(1), 1922345.

Hussien, A. (2015). Macroeconomic determinants of agricultural export performance in Ethiopia. *International Journal of Business and Economics Research, 4*(4), 180–188.

Libanio, G. (2005). Unit root tests in macroeconomic time series. *Revista de Economia Contemporânea, 9*(1), 7–37.

MAAIF. (2016). *Annual agricultural sector performance report 2016*. Kampala: Ministry of Agriculture, Animal Industry and Fisheries.

Morjaria, A., & Sprott, J. (2018). Coffee production and market structure in Uganda. *African Journal of Agricultural Economics, 13*(1), 87–102.

Muchtolifah, I., & Muljani, N. (2020). Macroeconomic variables and coffee export performance in Indonesia. *International Journal of Economics and Financial Issues, 10*(3), 171–178.

Nahanga, B., Bamwesigye, D., & Antwi, S. (2015). Economic determinants of coffee production and exports in Uganda. *African Journal of Economic Policy, 22*(1), 45–62.

Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics, 37*(17), 1979–1990.

Ngondo, M., & Khobai, H. (2018). Interest rate and agricultural export performance in South Africa: Evidence from the ARDL approach. *International Journal of Economics and Finance, 10*(5), 120–131.

Oyakhilomen, O., & Zibah, R. G. (2014). Agricultural production and economic growth in Nigeria: Implications for rural poverty alleviation. *Quarterly Journal of International Agriculture, 53*(3), 207–223.

Prajanti, S. D., Pramono, A., & Adzmin, M. (2020). Determinants of Indonesian coffee export quantity: An OLS approach. *Journal of Economics and Sustainable Development, 11*(14), 55–64.

Roberto, S. M., & Jódiney, J. (2019). Serial correlation in time series data: A methodological approach. *Economics Bulletin, 39*(4), 2475–2484.

Ruxton, G. D., Wilkinson, D. M., & Neuhäuser, M. (2015). A brief history of the use of the Shapiro–Wilk test in the biological and social sciences. *Behavioral Ecology and Sociobiology, 69*(3), 385–390.

Salamat, A. (2017). Firm-level effect of exchange rate on coffee export and production: Evidence from Indonesia. *Journal of International Trade and Economic Development, 26*(8), 897–915.

Salvatore, D. (2013). *International economics* (11th ed.). Hoboken, NJ: Wiley.

Sänger, C. (2018). Coffee markets and development: Global value chain analysis. *World Development, 103*, 21–34.

Shepherd, B. (2016). The coffee export performance gap in Uganda: An economic analysis. *Journal of African Development, 18*(2), 45–62.

Shire, A. (2018). Exchange rate volatility and coffee exports in Uganda: Evidence from ARDL models. *Uganda Journal of Economic Studies, 6*(1), 34–50.

Tadese, D. (2015). Determinants of agricultural exports in Ethiopia: An ARDL approach. *African Journal of Agricultural and Resource Economics, 10*(2), 75–89.

Tarawalie, A. B., & Conteh, A. (2021). Inflation and agricultural exports: Evidence from Sierra Leone. *African Development Review, 33*(S1), S66–S77.

UCDA. (2015). *Annual report 2015*. Kampala: Uganda Coffee Development Authority.

UCDA. (2020). *Annual report 2020*. Kampala: Uganda Coffee Development Authority.

UNCTAD. (2018). *Commodities and development report 2018*. Geneva: United Nations Conference on Trade and Development.

Vanzyl, S. (2016). Inflation and agricultural exports in South Africa: A VAR analysis. *South African Journal of Economic and Management Sciences, 19*(3), 357–368.

Verter, N., Bamwesigye, D., & Darkwah, S. A. (2015). Coffee trade and economic growth: Evidence from Uganda. *Agricultural Economics, 61*(11), 493–505.

Wondemu, T., & Potts, D. (2016). The impact of inflation on agricultural exports in Africa. *African Journal of Economic Policy, 23*(2), 98–115.