Turkish Journal of Agriculture - Food Science and Technology, 14(1): 237-245, 2026
DOI: https://doi.org/10.24925/turjaf.v14i1.237-245.8305

Turkish Journal of Agriculture - Food Science and Technology

Available online, ISSN: 2148-127X | www.agrifoodscience.com | Turkish Science and Technology Publishing (TURSTEP)

Assessing the Impact of Internal and External Factors on Oilseeds Export Performance in Tanzania from 1990 to 2023

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A R T I C L E I N F O

Research Article

Received : 29.08.2025
Accepted : 11.12.2025

Keywords:
Oilseeds
Export
Impact
ARDL-ECM
Export performance

A B S T R A C T

This study examines the impact of internal and external trade factors on the export performance of oilseeds in Tanzania from 1990 to 2023. It uses secondary data sourced from the Food and Agriculture Organisation, the World Development Indicators, and the World Bank. Guided by preliminary diagnostic tests, the Autoregressive Distributed Lag–Error Correction Model was applied to estimate both short-run and long-run relationships. The findings show that a 1% increase in foreign direct investment reduces export performance by 0.22%. In contrast, the exchange rate exerts a strong positive effect, with a 1% rise improving export performance by 1.91%. World prices also strengthen performance, as a 1% increase raises export performance by 0.54%. However, trade liberalisation has the largest negative long-run influence, where a 1% increase results in a 2.17% decline in export performance. Overall, the study concludes that both internal and external factors play a significant role in shaping the performance of Tanzania's oilseeds exports. The key determinants identified are foreign direct investment, exchange rates, world prices, and trade liberalisation. Based on these findings, the study recommends directing foreign direct investment toward export-oriented oilseeds activities to enhance competitiveness. It also advocates for carefully sequenced trade liberalisation supported by capacity-building, institutional strengthening, and improved infrastructure. Maintaining a competitive yet stable exchange rate is further encouraged to boost international market performance. Additionally, exporters are advised to monitor global price developments and adopt flexible production and marketing strategies to respond effectively to shifts in world demand.

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Introduction

Domestic and international factors of export nowadays have raised debate among researchers about their contribution to the export earnings, especially agricultural exports in many developing countries like Tanzania (Gbetnkom & Khan, 2002; Kingu, 2015). The discussion is heated as people need to know if the factors have added something to the liberalised countries' external trade sector. In the ongoing debate, two schools of thought emerge; the first school asserts that external factors are not adequately supportive in enhancing the export sectors in the third world countries, while others emphasise that internal factors deter developing countries' export growth (Gbetnkom & Khan, 2002; Kingu, 2015).

Based on the ongoing debate, numerous endogenous and exogenous factors have been explored as important drivers of export outcomes. However, studies underline that there are inconsistent and sometimes contradictory findings on the influence of the said factors, as some have positive, others negative, and there are those claiming that the variables have neutral relationships with export performance (Beleska-Spasova, 2014). For instance, Pickson et al. (2019) investigated the influence of trade liberalisation as an internal determinant. They noted that the responses of exports to trade liberalisation had varied significantly across countries, with most benefiting while some were adversely affected. The present investigation aims to uncover the internal and external elements of the export achievements of oilseeds in Tanzania from 1990 to 2023.

It follows that the Agricultural Sample Census (ASC) data consistently confirm Tanzania as a significant producer of oilseeds. For instance, the 2016/2017 ASC reported that major oilseeds and nuts grown in the country include groundnuts, sunflowers, and sesame (URT, 2017). Similarly, the 2019/20 SCA reaffirmed this pattern, identifying groundnuts, sunflowers, sesame, and oil palm as the main oilseed and nut crops produced nationally (URT, 2021). These repeated findings demonstrate the importance and continuity of oilseed production in Tanzania. Again, the FAO dataset consistently confirms that Tanzania is a good exporter of oilseeds abroad. The revelation of SCA and FAO data provides a strong basis for investigating the factors influencing their export performance. It is claimed that worldwide, oilseeds are produced as raw materials for processing edible cooking oil, with their by-products used as livestock feed (Kamugisha et al., 2020). Because of the growing requirements for edible oil and livestock feed in the world, production and consumption are also increasing. According to Puttha et al. (2023), worldwide output and use of oil, whether for dietary or industrial applications, are anticipated to rise to twice their current levels over the coming twenty years. In the case of Tanzania, oilseed exports have doubled within a decade. Data shows that in 2023, Tanzania exported a total of 223,392.4 tons of the mainly produced oilseeds compared to 116,400 tons in 2013. On the other hand, it earned US dollars 2.26 million in 2023, far greater than US dollars 1.49 million in 2013 (FAO, 2025). Data on the double increase in oilseed exports in a decade aligns with that of the overall agricultural exports, which increased from US Dollars 634.12 million in 2014 to US Dollars 1.47 billion in 2024 (BoT, 2025). Therefore, oilseeds are strategically important to Tanzania's economy because they generate substantial export revenue. Besides, it supports rural livelihoods, stimulates agro-processing industries, and contributes to broader agricultural growth and food security.

It should be noted that although oilseeds have become an increasingly important high-value export sub-sector in Tanzania, limited empirical research has rigorously examined their export performance and its underlying determinants. Most existing studies focus on aggregate agricultural exports or other crops, and even those that touch on oilseeds have not analysed the specific drivers of export performance. In this context, the present study is committed to investigating both the internal and external factors that influence oilseeds export performance in Tanzania, guided by the central question: "What internal and external factors significantly influence the export performance of oilseeds in Tanzania?" By applying the ARDL–ECM approach, the study fills key empirical and knowledge gaps and identifies the main aspects affecting oilseeds export efficiency. The findings of the study are intended to provide evidence-based insights to support policy formulation and trade development initiatives aimed at improving the production and export of oilseeds and related crops. Without such a study, Tanzania would lack essential evidence on the drivers of oilseeds export performance, undermining its ability to craft effective trade and agricultural strategies. Consequently, opportunities to enhance competitiveness, increase export earnings, and strengthen the agricultural sector could be missed, ultimately slowing economic growth.

Materials and Methods

Data Source and Variables

The study employed secondary data obtained from several reputable databases. Data on Tanzania's domestic output, imports, and exports were sourced from the World Development Indicators (WDI). Meanwhile, information on production quantities of selected oilseeds, nominal exchange rates, and export values was gathered from the FAOSTAT database. To consolidate the analysis, production quantities of the three selected oilseeds were aggregated into a weighted production measure, and similarly, export values were combined to represent the oilseeds sub-sector as a whole. Trade openness, serving as a proxy for trade liberalisation, was calculated using Tanzania's export, import, and GDP data from the sources mentioned earlier. Due to the unavailability of complete world price data from 1990 to 2023, the world price variable was estimated by computing unit export values (export values divided by quantities) from FAOSTAT, and subsequently, a weighted average world price was derived for the oilseeds sub-sector. In addition, data on foreign inflows were gained from the World Bank. The explained element in the study is oilseeds export performance, and the explanatory parameters include Tanzania's GDP, production quantity, world price, nominal exchange rate, Foreign Direct Investment, and trade liberalisation.

Conceptual Framework

The framework gives a picture of how the predicted and predictors are connected in a structured manner. It employs arrows to indicate the direction of influence, demonstrating how changes in the predictors are expected to impact the dependent variable. This visual representation not only clarifies the flow of influence but also helps to conceptualise the underlying theoretical assumptions that guide the study.

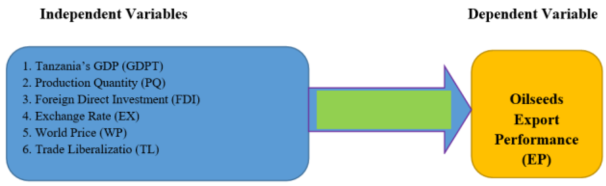

Figure 1. Conceptual framework
Source: Own construction (2024) Source: Own construction (2025)

Theoretical Framework of the Model: ARDL - ECM

In this study, the Autoregressive Distributed Lag (ARDL) – Error Correction Model (ARDL-ECM) bounds testing approach developed by Pesaran, Shin, and Smith (2001) is employed as the core estimation technique. The ARDL method is particularly suitable because it can be applied regardless of whether the explanatory variables are purely stationary at level [I(0)], purely stationary at first difference [I(1)], or a combination of both, provided that none of the variables are integrated of order two [I(2)]. This flexibility makes ARDL ideal for the time series data used in this research, covering the period from 1990 to 2023. In case there is cointegration in the model, which is confirmed through the bounds test, the technique also incorporates an error correction mechanism (ECM) to measure the speed at which short-run deviations adjust towards long-run equilibrium. In this scenario, the method becomes the ARDL-ECM. Moreover, ARDL-ECM allows for different optimal lags for each variable, which helps capture both the short-run dynamics and the long-run equilibrium relationship between export performance and its determinants. This makes it a strong and efficient choice for analysing the dynamic nature of export performance determinants over the study period.

The ARDL with ECM can be expressed in a general form as follows: for a dependent variable Y_t and independent variables X_{1t}, X_{2t}, …, X_{kt}, an ARDL $(p,q_1,q_2…,q_k)$ is written as:

$$Y_t = \beta_0 + \sum_{i=1}^{p} \emptyset_i Y_{t-i} + \sum_{j=1}^{q_1} \beta_{1j} X_{1,t-j} + \sum_{j=1}^{q_2} \beta_{2j} X_{1,t-j} + \cdots + \sum_{j=1}^{q_k} \beta_{kj} X_{1,t-j} + \varepsilon_t \quad (1)$$

Where p is the lag length for the dependent variable, q_1 is the lag length for each independent variable, and ε_t is an error term.

Once cointegration is established, the ARDL model can be rewritten in an ECM form:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{p-1} \emptyset_i \Delta_{t-i} + \sum_{j=0}^{q_1-1} \beta_{1j} \Delta X_{1,t-j} + \cdots + \sum_{j=0}^{q_k-1} \beta_{kj} \Delta X_{k,t-j} + \lambda ECT_{t-1} + \varepsilon_t \ \ldots \quad (2)$$

Where Δ is a first difference operator, ECT_{t-1} is the lagged coefficient, indicating how quickly deviations from long-run equilibrium are corrected, and λ represents the speed of adjustment coefficient, indicating how quickly deviations from long-run equilibrium are corrected.

Model Specification

Model specifications in this study attempt to investigate the determinants of export performance in oilseeds in Tanzania from 1990 to 2023. The regression equation is the first difference in reducing the problem of autocorrelation, which may affect the precision of estimation by overstating the estimates. The research model specifications consider the demand conditions in importing countries, similar to those given by Kibona et al. (2022) and Amani (2025). For oilseeds from Tanzania, the demand is highly price elastic as importers have alternative sources, such as other producers of the said oilseeds in the world. Additionally, the elasticity results from the fact that Tanzania is not such a commanding figure in the export market regarding oilseeds. In this regard, the study estimates the export performance equation (multiple regression analysis) under the supply function (approach) for the oilseeds. Export trade modelling in this study follows the imperfect substitute model, similar to many scholars like Tekalign and Goshu (2021), Bojan (2021), Achille et al. (2020), Abdullahi et al. (2021), Feyisa (2021), Amani (2025) and Utouh and Ng'wina (2024), amongst others. The central assumption about the imperfect substitute model is that neither exports nor imports is a perfect substitute for domestic products, particularly agricultural products.

Mathematically, the function is given as;

$$EP = F(WP, FDI, ER, TL) \quad (3)$$

Where EP is export performance, WP is the world prices, EX is the exchange rate, FDI is foreign direct investment, TL is trade liberalisation proxied by trade openness, and F is a function of. Since the study applies time series econometrics analysis as the data analysis method and ARDL-ECM as an estimation technique, equation (3) was then transformed to form econometric models. The econometrics equation was formulated to accommodate the needs of ARDL–ECM in the measurability of the variables. The variables, too, were transformed to natural logarithm (ln) to allow coefficients to be interpreted as elasticities, making results easier to understand, easily comparable across different units and studies, and more relevant for policy analysis. It follows that policymakers often think in terms of growth rates and percentage changes rather than in absolute terms. For that, the econometrics model with variables in natural logarithms was formulated.

$$\Delta lnEP_t = \alpha_0 + \sum_{i=1}^{p-1} \emptyset_1 \Delta lnEP_{t-1} + \sum_{j=0}^{q1-1} \beta_{1j} \Delta lnTL_{t-j} + \sum_{j=0}^{q2-1} \beta_{2j} \Delta lnWP_{t-j} + \sum_{j=0}^{q3-1} \beta_{3j} \Delta lnFDI_{t-j} + \sum_{j=0}^{q4-1} \beta_{4j} \Delta lnER_{t-j} + \lambda ECT_{t-1} + \varepsilon_t \quad (4)$$

Whereby, ε_t is the error term, β_s stands for the coefficients of the respective determinant, i refers to the number of periods (lags), and the sign Δ stands for change in a variable. Similarly, ln represents the natural logarithm of the respective variable.

Stationarity Test (Unit root test)

Unquestionably, numerous macroeconomic statistics are significantly exaggerated by the unit root problem, implying that the mean and variance are time-variant. In this perspective, checking for the presence of a unit root is of particular importance. If data are used without checking their stationary properties, the results derived would be spurious (Gujarati, 2004). Moreover, the stationarity test results are crucial as they aid in selecting the appropriate time series estimation technique for the study. To that end, a unit root test needs to be carried out to serve the said purposes. There are two sets of testing approaches: informal and formal. The formal approaches include the Dickey-Fuller (DF) tests, Augmented Dickey-Fuller (ADF) tests, and the Phillips-Perron (PP) tests, among others (Watson & Teelucksingh, 2002). The mentioned formal tests are primarily applied in modern econometrics (Gujarati, 2004). This study employed the Phillips-Perron (PP) test due to its ability to account for both the influence of serial correlation and structural changes that may be present in the data.

The most reliable estimation results are obtained when the data exhibit stability. Therefore, if temporal data are unstable at a level, they are typically differenced to achieve stability. Empirical evidence indicates that most economic series are unstable at level but attain stability after the first differencing, formally denoted as I(1), meaning the series requires a single transformation to become stable. However, some series need multiple differencing steps before reaching equilibrium properties. Such series are described as being integrated of higher orders, for instance, order "n" and represented as I(n) (Watson & Teelucksingh, 2002; Gujarati, 2004).

Lag Selection

In economics, the influence of the independent variable on the dependent variable is rarely instant. Very often, the dependent variable responds to an independent variable with a time-lapse. Such a lapse of time is called a lag. There are three main reasons for the occurrence of lags: psychological, technological, and institutional. For the mentioned reasons, lag occupies a central role in economics (Gujarat, 2004). When analysing data related to time, the number of lags influences the effect of the current time. So, selecting a lag number is crucial as the lags are included as predictors in the model. For that, a correct number of lags must be chosen to be included in the model to aid the estimation. There are several techniques for selecting the number of lags, but the existing study concentrated on the Information Criteria (IC) method. The Information Criteria have three types: Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC) and Hannan-Quinn Information Criterion (HQIC). However, the selected number doesn't need to be exactly applied since, in some cases, it is limited by technical requirements.

Cointegration Test

It is suggested that, after testing for the unit root, if the data are stationary at level, there will be no need to run Cointegration, since there will be no possibility of spurious regression. However, the Cointegration test must be performed if the variables are non-stationary. Cointegration is used to simultaneously explore the long-run relationship between the response and causal conditions. It is contended that "regression of one-time series variable on one or more time series variables often can result in spurious regression leading to nonsensical results (Gujarati, 2004). One way to guard against it is to determine if the time series is co-integrated. Several methods are employed in Cointegration testing, including the Durbin-Watson (CRDW), Johansen's (1988) Cointegration test, Engle-Granger and the bounds test for cointegration (Pesaran et al, 2001).

The present study employed the bounds test for cointegration because it is the most suitable method when using the ARDL–ECM estimation technique, particularly because it handles variables integrated at different orders. The Bounds Test, developed by Pesaran et al (2001), allows researchers to test for the existence of a long-run relationship among variables regardless of whether they are I(0) or I(1), provided they are not I(2). This flexibility makes it superior to traditional cointegration tests such as Johansen or Engle–Granger, which require strict integration conditions. Moreover, the method performs well in small samples, making it appropriate for macroeconomic studies that rely on annual or quarterly data with limited observations. Importantly, the Bounds Test assesses the joint significance of lagged level variables using an F-statistic, which is then compared with critical values to confirm the presence of cointegration. For these reasons, the Bounds Test is the preferred approach in ARDL modelling, as it aligns theoretically and empirically with the structure of the ARDL-ECM framework (Pesaran et al., 2001).

Autoregressive Distributed Lag – Error Correction Model (ARDL-ECM)

The ARDL - ECM estimation technique is applied because it offers a flexible and powerful framework for analysing both short-run dynamics and long-run equilibrium relationships among economic variables, even when they are integrated of different orders. According to Pesaran et al (2001), ARDL models can be used when variables are a combination of I(0) and I(1), unlike Johansen or Engle–Granger approaches that require all variables to be I(1). This flexibility eliminates strict pre-testing requirements and reduces the risk of spurious decisions about integration levels. The ARDL structure captures dynamic behaviour through optimally selected lags, while the ECM component provides the error-correction term that measures the speed at which short-run deviations adjust back to the long-run equilibrium (Pesaran et al., 2001). The approach is fundamentally suitable for small sample sizes, making it particularly valuable for empirical macroeconomic research in developing economies, where long-running data may be limited. It clearly distinguishes between short-run and long-run effects, accommodates mixed integration orders, and produces reliable results even with limited observations. ARDL-ECM stands out as an important and appropriate estimation method for analysing dynamic economic relationships.

Post-estimation Tests

It is important to explain that after estimating the ARDL-EC model, the study conducts several post-estimation diagnostic tests to ensure the reliability and robustness of the results. The Breusch–Godfrey LM test is applied to detect serial correlation in the residuals, as the presence of autocorrelation can bias coefficient estimates and produce unreliable standard errors. Similarly, the Breusch–Pagan/Cook–Weisberg test is used to examine heteroskedasticity, since non-constant variance of residuals can affect the efficiency of the estimates. Additionally, the stability of the model is assessed using the CUSUM and CUSUM of squares (CUSUMSQ) tests, which check for structural breaks or parameter instability over the sample period. Running these tests allows the study to confirm that the model is well-specified, free from serial correlation and heteroskedasticity, and structurally stable, thereby ensuring that both short-run and long-run estimates from the ARDL-EC model are reliable and suitable for interpretation.

Results

Descriptive Statistics

The examination analysed the variables used in the estimation by examining measures of central tendency and dispersion, to understand their overall behaviour. Additionally, measures of distributional shape, such as skewness, were assessed to capture the asymmetry in the data. Table 1 points out that the Export performance (lnEP) has a mean of 17.215 with a standard deviation of 1.397 and a Coefficient of Variation (CV) of 8.12%, indicating moderate variability around its mean, while its nearly zero skewness (–0.003) suggests a symmetric distribution. Similarly, production quantity (lnPQ) exhibits a slightly higher relative dispersion, having a CV of 9.58% and a small negative skew (–0.207), indicating a minor tendency toward lower values. In contrast, the Tanzania GDP (lnGDPT) shows low variability with a CV of 3.51% and an almost symmetric distribution (skew = –0.055), suggesting that the economic size across observations is relatively stable.

However, Foreign Direct Investment (lnFDI) displays a high negative skew (–1.469), implying that while most values are above the mean, a few extremely low values exist. Similarly, world prices (lnWP) and exchange rates (lnEX) show moderate dispersion (CV ≈ 8–10%) but also negative skewness (–0.803 and –0.805, respectively), indicating a slight tendency toward lower values. Meanwhile, trade liberalisation (lnTL) is consistently negative, with a mean of –1.008 and high relative variability manifested by a CV of –22.921%, yet it maintains approximate symmetry (skew = 0.055). Overall, these descriptive statistics suggest that while most variables are moderately variable and fairly symmetric, skewness in lnFDI, lnWP, and lnEX may influence regression estimates and should be considered in subsequent analyses.

Multicollinearity Test

The study conducted a multicollinearity test using the Variance Inflation Factor (VIF) to assess whether the explanatory variables were highly correlated, as such relationships can inflate standard errors and undermine the reliability of coefficient estimates. Detecting and addressing multicollinearity was therefore essential to ensure the stability, accuracy, and interpretability of the regression results. The decision rule is that multicollinearity is considered problematic if the VIF exceeds 10 (or tolerance falls below 0.1). Based on the results from Table 2, after testing all involved variables for multicollinearity, GDPT, PQ and EX seem to be more collinear as their VIFs were greater than 10. Being the case, if estimated will result in unreliable results and interpretation. It was imperative to drop the collerated variables to remain with the ones that can not distort the final results. Therefore, GDPT and PQ were dropped, and all remained variables became free from the multicollinearity problem. See the results in Table 2 below.

Unit Root Test of the Study Variables

It was essential to test for unit roots to ensure the reliability of the time series analysis. The Phillips-Perron (PP) test was used due to its robustness against serial correlation and heteroskedasticity, and because it does not require additional lags like the Augmented Dickey-Fuller (ADF) test. As shown in Table 3, all variables were stationary at level, integrated of order one [I(0) except trade liberalisation. It was then necessary to difference the non-stationary variable to become stationary. After differencing, the variable became stationary, indicating that it is integrated of order one [I(1)]. The p-values of all variables were finally found to be less than 5%. At level, only lnTL had a unit root, but after the first difference, all became stable. These results are crucial for selecting appropriate econometric methods and avoiding spurious regression.

Bound- Cointegration Test

The null hypothesis (H_0) of the bounds test for cointegration states that there is no level relationship among the variables. The decision rule is as follows: accept H_0 if the computed F-statistic is less than the lower critical bound (I(0)), and reject H_0 if the F-statistic is greater than the upper critical bound (I(1)). According to the results presented in Table 4, the computed F-statistic is 11.3. This value is greater than the upper critical bounds of all significance levels, 1%, 5% and 10%. Therefore, the null hypothesis of no cointegration is rejected, and the conclusion is that the variables in the model are cointegrated, indicating the existence of a long-run equilibrium relationship among them.

Table 1. Descriptive statistics results

Variable	Mean	Std. Dev.	CV	Min	Max	Skewness
lnEP	17.215	1.397	8.116	14.720	19.600	-0.003
lnPQ	12.127	1.162	9.582	10.275	13.614	-0.207
lnGDPT	23.829	0.835	3.505	22.545	25.095	-0.055
lnFDI	20.042	1.301	6.492	16.118	21.460	-1.469
lnWP	6.013	0.485	8.072	4.425	7.029	-0.803
lnEX	6.967	0.694	9.961	5.273	7.776	-0.805
lnTL	-1.008	0.231	-22.921	-1.427	-0.577	0.055

Source: Author's construction (2025)

Table 2. Multicollinearity test results

Variable	Original		After Dropping	
	VIF	1/VIF	VIF	1/VIF
lnGDPT	31.21	0.03204		
lnPQ	16.34	0.0612		
lnER	49.55	0.02018	4.68	0.21387
lnFDI	5.47	0.18266	4.93	0.20305
lnWP	2.68	0.37313	1.91	0.52327
lnTL	2.15	0.46424	1.03	0.97396
Mean VIF	17.9		3.13	

Source: Stata output (2025)

Table 3. Unit root test results

Variable	Level I(0) Test Statistic (P-Value)		1st Difference I(1) Test Statistic (P-Value)		Order of Integration
	Coeff.	P-Value	Coeff.	P-Value	
lnEX	-4.918	0.000			I(0)
lnFDI	-5.003	0.000			I(0)
lnWP	-2.923	0.043			I(0)
lnTL	-1.885	0.339	-3.793	0.003	I(1)

Source: Author's construction (2025)

Table 4. Bound-cointegration test results

F-statistic	Significance Level	Lower Bound I(0)	Upper Bound I(1)	Remark
11.2	1%	3.74	5.06	Cointegrated
	5%	2.86	4.01	Cointegrated
	10%	2.45	3.52	Cointegrated

Source: Author's Construction (2025)

Table 5. Lag selection results

Lag	LL	df	P	AIC	HQIC	SBIC
0	-42.429			3.3878	3.46053	3.6257
1	74.8281	25	0	-3.202	-2.7657	-1.77465*
2	95.2843	25	0.023	-2.8775	-2.0775	-0.2606
3	123.284	25	0	-3.0917	-1.9281	0.71456
4	171.932	25	0	-4.78088*	-3.25363*	0.21488

Source: Author's construction (2025)

Lag Selection

The performance of time series models greatly depends on the appropriateness of the number of lags used. The number of lags should not be too big or too small, as too many lags can lead to model overfitting, while too few might miss key dynamics in the data. As hinted, the study employed AIC to select the ideal lag. Results from Table 5 show that Akaike Information Criterion (AIC) and Hannan–Quinn Information Criterion (HQIC) both selected lag 4, while Schwarz Bayesian Information Criterion (SBIC) suggested lag 1. To that end, the study picked the lag suggested by the majority.

ARDL – ECM Estimations

The Phillips–Perron unit root test revealed that the variables exhibited mixed orders of integration, with some stationary at level [I(0)] and others at first difference [I(1)], none were integrated into order two [I(2)], as shown in Table 3. This justified the application of the ARDL model, which is appropriate when variables are a combination of I(0) and I(1), but not I(2). Furthermore, the bounds test for cointegration confirmed the existence of long-run relationships among the variables, a prerequisite for estimating the ECM. Together, the outcomes of the unit root and bounds tests validated the adoption of the ARDL–ECM framework, which facilitates the joint estimation of short-run dynamics and long-run relationships. With these conditions satisfied, the ARDL–ECM was estimated, and the results are presented.

Table 6 indicates that the error-correction term is negative and highly significant, confirming a stable long-run relationship between export performance (EP) and its determinants. The coefficient of 1.347 means that approximately 135% of the last period's deviation from equilibrium is corrected within one period, indicating a very fast adjustment process. Results keep noting that in the long run, a 1% increase in FDI reduces EP by 0.22%, suggesting that FDI may be directed toward sectors with weak export orientation. On the other hand, the exchange rate has a strong positive impact, where a 1% increase in the exchange rate raises EP by 1.91%, implying that currency depreciation (if EX is defined such that an increase means depreciation) strongly stimulates export competitiveness. Similarly, World prices also strengthen export performance, with a 1% rise in global prices increasing EP by 0.54%, likely reflecting improved external demand conditions. In contrast, trade liberalisation exerts the largest negative long-run effect in such a way that a 1% increase in TL reduces EP by 2.17%. This suggests that either premature or poorly sequenced liberalisation may expose domestic exporters to stiff external competition, thereby weakening their long-run performance.

In the short run, the exchange rate shows mixed and mostly negative dynamic effects. While the contemporaneous change in the exchange rate is insignificant, the lagged short-run effects are substantial. A 1% increase in the exchange rate at lag 1 reduces EP by 2.22%, and at lag 2 reduces EP by 2.43%, indicating exchange rate volatility or adjustment costs that temporarily weaken export performance before long-run gains materialise. Again, short-run world prices have a marginal negative impact, where a 1% increase at lag 1 lowers EP by 0.41%, revealing short-term price sensitivity in global markets. On the other hand, trade liberalisation positively affects export performance in the short run: a 1% increase in TL raises EP by 1.65% at lag 1, and by 1.26% at lag 2, meaning that immediate benefits such as easier market access and reduced trade barriers enhance short-run export activity. With an R-squared of 0.8048, the model explains about 80% of the variations in export performance, and the strong ECM term supports the reliability of the ARDL-ECM structure. Overall, the results show that while long-run forces dominate export performance, short-run adjustments are influenced by exchange rate fluctuations and immediate responses to liberalisation policies.

Table 6. ARDL-ECM estimation results

D.lnEP		Coeff.	Std. Error	T-Statistic	P-Value
ADJ: lnEPL1		-1.34708	0.194878	-6.91	0.000
LR	lnFDI	-0.224508	0.1438581	13.26	0.040
	lnEX	1.908207	0.1438581	13.26	0.000
	lnWP	0.543724	0.1752866	3.1	0.006
	lnTL	-2.17084	0.2111054	-10.28	0.000
SR	lnEX -D1	-1.26921	1.204878	-1.05	0.307
	lnEX- LD	-2.22233	1.107839	-2.01	0.061
	lnEX- L2D	-2.43494	0.970388	-2.51	0.023
	lnWP -D1	-0.40557	0.19688	-2.06	0.055
	lnTL -D1	1.646388	0.567854	2.9	0.010
	lnTL LD	1.257889	0.566702	2.22	0.040
	Cons.	4.288324	1.899128	2.26	0.037
R-Squared			0.8048		
Adj. R-Squared			0.6785		
Root MSE			0.2609		

Source: Author's construction (2025)

Table 7. Serial correlation test results

lags(p)	chi2	df	Prob > chi2
2	3.035	2	0.2192

Source: Stata output (2025)

Serial Correlation Test

Serial correlation in the residuals can violate the assumption of independent errors, leading to biased coefficient estimates, unreliable standard errors, and invalid statistical inference. In the context of the ARDL-EC model, ensuring the absence of autocorrelation is therefore crucial for the reliability of both short-run and long-run estimates as well as the error correction mechanism. The results in Table 7 show a chi-square statistic of 3.035 with a p-value of 0.2192. Since the p-value is greater than 0.05, we fail to reject the null hypothesis of no serial correlation. This indicates that the model's residuals are free from autocorrelation, confirming that the ARDL-EC model is properly specified and that the estimated coefficients and standard errors are reliable.

Heteroskedasticity Test

Heteroskedasticity occurs when the variance of the residuals in a regression model is not constant, which can lead to inefficient estimates and unreliable standard errors. Detecting heteroskedasticity is therefore essential to ensure valid statistical inference. In the present study, the Breusch–Pagan (B–P) test was applied to examine whether the residuals of the model have constant variance. The test results show a chi-square value of 1.56 with a p-value of 0.2121. Since the p-value is greater than 0.05, we fail to reject the null hypothesis of homoskedasticity, indicating that the residuals are free from heteroskedasticity and that the model's estimated coefficients and standard errors are reliable.

Stability Tests

Testing for stability in an ARDL-EC model is essential because it ensures that the estimated short-run and long-run relationships remain consistent over the sample period, which is crucial for reliable economic interpretation. In the present study, the CUSUM and CUSUM of squares (CUSUMSQ) tests were applied to examine whether there are any structural breaks or parameter changes that could undermine the model's reliability. As shown in Figure 2, the results indicate that the plotted lines for both tests remain within the upper and lower critical bounds at the 5% significance level, confirming that there are no structural breaks or parameter instability. This demonstrates that the ARDL-EC model is stable, and the short-run and long-run estimates can be interpreted with confidence.

Discussion

The results of this study align closely with existing literature, reinforcing the credibility of the findings. The study's results reveal that foreign direct investment (FDI), exchange rates, trade liberalisation, and world prices significantly influence Tanzania's oilseeds export performance, with distinct effects in the short and long run. The finding that FDI reduces long-run export performance aligns with empirical studies in Ethiopia and Tanzania (Eshatu & Mahare, 2020; Kabote & Tunguhole, 2022; Misati & Ngoka, 2021) and mirrors observations from Indonesia and Malaysia (Tundra et al., 2023), suggesting that foreign investment may be directed toward sectors with weak export orientation. This contrasts with theoretical predictions under the Eclectic Paradigm and New Trade Theory, which anticipate that FDI enhances exports through technology transfer and efficiency gains, highlighting that its benefits are highly context- and sector-specific. In contrast, exchange rate depreciation shows a strong positive long-run effect, consistent with studies from Indonesia, Gambia, and Ethiopia (Ramli, 2020; Asliyana & Setyowati, 2022; Bojang, 2021), indicating that a weaker domestic currency improves international competitiveness. However, in the short run, lagged depreciation produces negative effects, reflecting adjustment costs and volatility that temporarily weaken export performance, a dynamic not fully captured in gravity-model studies (Etuk, 2021).

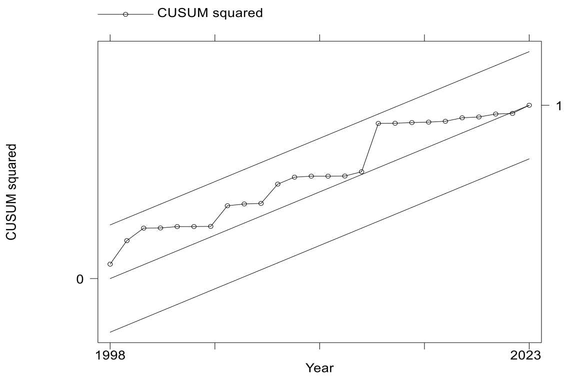

Figure 2. Stability test results for ARDL-EC Model
Source: Stata output (2025)

These contrasting short- and long-run patterns underscore the complexity of macroeconomic determinants in shaping export competitiveness.

Similarly, trade liberalisation and world prices exhibit differentiated impacts over time. While trade liberalisation enhances export performance in the short run, likely through immediate market access and reduced trade barriers, the study finds a large negative long-run effect, suggesting that premature or poorly sequenced liberalisation can expose domestic producers to competition before they build adequate capacity. This result diverges from broader empirical evidence, which often shows long-run benefits from openness when complemented by institutional support and infrastructure improvements (Etuk, 2021; Odebode & Aras, 2020; Kibona et al., 2022). Conversely, world prices consistently strengthen long-run export performance, aligning with both global and African studies (Hussain et al., 2020; Tekalign & Goshu, 2021), although short-run effects appear slightly negative due to volatility and supply adjustments. Overall, these findings suggest that while long-run dynamics driven by structural factors such as investment allocation, currency valuation, and global prices determine the sustained competitiveness of Tanzania's oilseeds exports, short-run outcomes are influenced by adjustment processes, market fluctuations, and immediate policy effects, highlighting the importance of carefully timed interventions to support export growth.

Conclusion

Based on the central research question, this study demonstrates that both internal and external factors play a significant role in shaping the export performance of oilseeds in Tanzania. Trade liberalisation, as an internal determinant, positively influences export performance in the short run, while foreign direct investment (FDI), the nominal exchange rate, and world prices act as critical external factors. The results reveal nuanced effects: FDI consistently exhibits a negative long-run impact, suggesting that foreign investments may not always align with export-oriented sectors, while exchange rate depreciation enhances long-run competitiveness but can temporarily reduce exports in the short run due to adjustment costs. Trade liberalisation, although beneficial initially, may have negative long-term effects if not sequenced with adequate domestic capacity, whereas world prices consistently support long-run export growth.

These findings reinforce insights from previous studies (Eshatu & Mahare, 2020; Kabote & Tunguhole, 2022; Ramli, 2020; Tekalign & Goshu, 2021), highlighting the context-specific and dynamic nature of export performance determinants. Overall, the study concludes that sustained improvement in Tanzania's oilseeds exports requires carefully coordinated policies that leverage favourable global prices, manage exchange rate effects, guide FDI toward export-oriented sectors, and sequence trade liberalisation with capacity-building initiatives. By linking the empirical results with prior literature, this study provides a coherent understanding of both the short- and long-run drivers of oilseeds export performance in Tanzania and offers actionable insights for policymakers to enhance the country's export competitiveness.

Declarations

Ethical Approval Certificate

This study did not use animals or human participants; therefore, ethical approval was not required. All procedures conducted complied with ordinary research procedures when macroeconomic, production capability and policy reform data are used.

Author Contribution Statement

The author solely conceived the study, collected and analysed the data, interpreted the results, and wrote the manuscript. For that, all aspects of the research were performed by the author.

Fund Statement

The author did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. So, the research was self-funded.

Conflict of Interest

The author declares that no conflict of interest might have influenced the results or their interpretation in the manuscript.

Acknowledgments

The author gratefully acknowledges the Eastern Africa Statistical Training Centre (EASTC) for granting the necessary time and support to complete this research paper. The institutional encouragement and flexibility provided were instrumental in the successful writing of this work.

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