

Research Article

Determinants of Ethiopia Export Performances: Evidence from an Auto Regressive Distributive Lag Model

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Abstract

Export was to drive productive capacity of domestic businesses, employment generation, better source of resource allocation and distribution. As a result, export to be an engine for economic growth and development. The objective of this study was to identify determinants of export in Ethiopia for the period 1996-2023 by applying auto regressive distributive lag model with bound testing approach of co-integration and error correction model. The Error Correction Term is negative (-0.889642) and is significant at 1% confidence level which indicates that any deviation from the long run equilibrium between variables is corrected about 88.96% each year. As evidenced from the estimation result of Auto Regressive Distributive Lag Model with bound testing approach of co-integration and error correction model, foreign direct investment, inflation rate, institutional quality index, taxes on international trade and trade openness of Ethiopia positively and statistically significantly affect the Ethiopian exports performance both in short-run and long-run. However, first lag of real exchange rate positively and statistically significantly affect Ethiopian exports performance only short run. Hence, government should encourage infrastructures attract foreign investors to directing produce exportable goods, reducing export duties to improve competitiveness on international trade improving the institutional quality through respect rule of law, government effectiveness, legal voice and accountability, regulatory quality and lowering corruption boost Ethiopian exports performance.

Keywords

Auto Regressive Distributive Lag Model, Bound Test, Error Correction, Institutional Quality Index, Taxes on International Trade, Export Performance, Ethiopia

1. Introduction

Economic development is one of the main objectives of every society in the world and economic growth is fundamental to economic development (Abebe and Degye) [1]. International trade is one of the major aspects that grow and export is regarded as main accelerators of growth in either developed or developing countries (Abebe and Degye) [1], (Thida et al.) [16]. Export performance is an integral component of international competitiveness as exports signal a

country's success in international trade (Abu Bakarr and Morris) [3]. Export performance is the success or failure of a company in exporting locally produced goods or services to other countries (Abebe and Quan) [2]. However, sub-Saharan African countries including Ethiopia exports agricultural products bulky in volume low in value leads to low performance and also low in diversity (Fisseha) [7].

Additionally, exports play a significant role in an economy

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by influencing the level of economic growth, employment and the Balance of Payments (Tumwebaze, et al. 2023) [18]. Although the percentage share of developing nations in total international commerce climbed from 25% to 33% during the period from 2010 to 2020, Africa's average contribution to worldwide trade remained below 3%. Similarly, even though Ethiopia has a relatively big potential for agricultural and horticultural products due to its broad geographical areas with varying climates and temperatures, Ethiopia's average contribution to foreign commerce has remained below 0.03% (World Bank, 2020) [20].

Furthermore, the Ethiopian economy is highly depending on agriculture and which takes the lion share in the export and overall economic performance in the country (Getaneh) [8]. From the total exports of the country coffee was the dominant export commodity accounting for about 52.27 per cent of the country's total exports, on average (Abebe and Degye) [1]. Similarly, Ethiopia's export value to import value ratio was 35% in 2000, but it has since dropped to 23% in 2021 (National Bank of Ethiopia, 2022) [14].

The difference between Ethiopia's import and export values has grown over the past three decades, although policy steps have been taken to improve the performance of the external sector. Ethiopia like other developing countries is highly dependent up on earnings from the sales of primary commodities and concentrating on small range of export commodities and market outlays to finance much needed capital goods imported (Mamo) [11]. For instance, from 2000 and 2021, exports rose in value from 3 to 128 billion Ethiopian Birr. Nevertheless, between 2000 and 2021, the value of imports raised from 12 billion to 559 billion Ethiopian Birr. This suggests that the major reason for the worsening of Ethiopia's trade balance is the lesser increase in export value when compared to the rise in import value (NBE, 2022) [14].

As evidence from previous studies by Deresse [5], Tiblets et al [17], Tumwebaze, et al [18], Yohannes [21] foreign direct investment, inflation, gross domestic product, exchange rate, openness are affect export performance. Ethiopian institutional quality, corruption index of Ethiopia, lagged export value, terms of trade, indirect tax revenue and domestic saving are the major determinants of exports in Ethiopia (Fassil and Abule [6], Israel [10] and Yohannes [21]).

Nevertheless, the previous studies have been inconclusive on the impact of the variables identified as export performance. For instance, inflation has negative effect exports (Deresse) [5]. However, inflation has a positive effect on international trade or export (WB, 2020) [20]. Moreover, foreign direct investment negatively related to Ethiopian agricultural exports (Deresse) [5]. Foreign direct investment is positively associated with exports in Ethiopia (Deresse) [5], (Yohannes) [21].

Most previous studies Abebe and Degye [1], Bekele [4], Fassil and Abule [6], Wondesen and Fekadu [19] examined the determinants of single commodity exports rather total exports. In addition, some of previous studies Bekele [4],

Fassil and Abule [6], Thida et al. [16], Yohannes [21] applying static panel data rather than time series. Additionally, previous studies conducted Abebe and Degye [1], Yohannes [21] their method of analysis are Johanson co-integration method of vector autoregressive method and Engle Granger two step procedures. However, ARDL more important through first, ARDL is the most reliable and valid in small sample size. Secondly, the ARDL can be employed, whether the underlying series are $I(1)$, $I(0)$ or mixed order Narayan [13], Pesaran, Shin and Smith found [15].

Moreover, previous study conducted on determinates export using Auto Regressive Distributive Lag Model (Deresse) [5], Tiblets et al [17], Tumwebaze, et al [18], panel data previous studies Bekele [4], Fassil and Abule [6] and other time series model Abebe and Degye [1], Yohannes [21] ignored the impact of institutional quality and taxes on international trade on export performance. Hence, the study aimed to examine major determinants of export in Ethiopia for the period 1996-2023 applying auto regressive distributive lag model with bound testing approach of co-integration and error correction model.

2. Research Methodology

2.1. Data Sources and Variables

This study conducted to investigate determinants of export in Ethiopia based on annual time series data 1996-2023 periods. The study was used secondary data obtained from different sources as Food and Agricultural Organization (FAO), World Development Indicators (WDI), World Wide Governance Index (WGI) and International Monetary Fund (IMF) data source answer the objectives of the study. Accordingly, data on gross domestic product, export value and volume to calculate openness, obtained from Food and Agricultural Organization (FAO).

More so, data on consumer price index where obtained from International Monetary Fund (IMF), while data of foreign direct investment, exchange rate, taxes on international trade, inflation and export volume obtained from World Development Indicator (WDI). Finally, data on institutional quality index obtained from Worldwide Governance Index (WGI). Regarding the data on the institutional quality index (IQI), six indicators whose values range from -2.5 (weak governance) to 2.5 (strong governance) were used to develop a single institutional quality index whose value ranges from 0(weak) to 1(strong).

2.2. Model Specification

To empirically analyses the long-run relationships and dynamic interactions among the variables of interest, the model has been estimated by using the bounds testing (or autoregressive distributed lag (ARDL) co-integration procedure, developed by Pesaran, Shin and Smith found [15].

Based on both the theoretical and empirical literature, the econometric model to show the determinants of export performance model are Foreign Direct Investment, Inflation, Institutional Quality Index, Real Exchange Rate, Trade openness and Taxes on international trade.

$$EXP = f(FDI, INF, INQ, RER, TOP, TX) \quad (1)$$

Accordingly, the regression equation is expressed as;

$$\ln EXP_t = \beta_0 + \beta_1 \ln FDI_t + \beta_2 \ln INF_t + \beta_3 \ln IQI_t + \beta_4 \ln RER_t + \beta_5 \ln TOP_t + \beta_6 \ln TX_t + U_t \quad (2)$$

Where, EXP is Ethiopian Export Performance at time t , FDI is Foreign Direct Investment at time t , INF is Inflation at time t , INQ is Institutional Quality Index at time t , RER is Real Exchange Rate at time t , TOP is Trade openness at time t , TX is Taxes on international trade at time t , U_t is white noise determining; and $\ln$ is Natural logarithm.

Autoregressive distributed lag models are models that contain the lagged values of the dependent variable, the current and lagged values of regressors as explanatory variables. As Pesaran, Shin and Smith found [15] ARDL Models can be

$$\begin{aligned} \nabla \ln EXP_t = & \beta_0 + \sum_{i=0}^q \beta_1 \nabla \ln EXP_{t-i} + \sum_{i=0}^q \beta_2 \nabla \ln FDI_{t-i} + \sum_{i=0}^q \beta_3 \nabla \ln INF_{t-i} + \sum_{i=0}^q \beta_4 \nabla \ln IQI_{t-i} + \sum_{i=0}^q \beta_5 \nabla \ln RER_{t-i} + \\ & \sum_{i=0}^q \beta_6 \nabla \ln TOP_{t-i} + \sum_{i=0}^q \beta_7 \nabla \ln TX_{t-i} + \theta_1 \ln EXP_{t-i} + \theta_2 \ln FDI_{t-i} + \theta_3 \ln INF_{t-i} + \theta_4 \ln IQI_{t-i} + \theta_5 \ln RER_{t-i} + \\ & \theta_6 \ln TOP_{t-i} + \theta_7 \ln TX_{t-i} + \varepsilon_t \quad (3) \end{aligned}$$

The coefficients $\theta_1 - \theta_7$ correspond to the long-run relationship. The remaining expressions with the summation sign ($\beta_1 - \beta_7$) represent the short-run dynamics of the model.

$$\begin{aligned} \nabla \ln EXP_t = & \beta_0 + \sum_{i=0}^q \beta_1 \nabla \ln EXP_{t-i} + \sum_{i=0}^q \beta_2 \nabla \ln FDI_{t-i} + \sum_{i=0}^q \beta_3 \nabla \ln INF_{t-i} + \sum_{i=0}^q \beta_4 \nabla \ln IQI_{t-i} + \sum_{i=0}^q \beta_5 \nabla \ln RER_{t-i} + \\ & \sum_{i=0}^q \beta_6 \nabla \ln TOP_{t-i} + \sum_{i=0}^q \beta_7 \nabla \ln TX_{t-i} + \theta_1 \ln EXP_{t-i} + \theta_2 \ln FDI_{t-i} + \theta_3 \ln INF_{t-i} + \theta_4 \ln IQI_{t-i} + \theta_5 \ln RER_{t-i} + \\ & \theta_6 \ln TOP_{t-i} + \theta_7 \ln TX_{t-i} + \delta ECT_{t-i} + \varepsilon_t \quad (4) \end{aligned}$$

To examine the existence of long-run relations between the FDI , INF , IQI , RER , TOP , TX and EXP , bound testing under Pesaran, Shin and Smith found [15] procedure is used. The bound testing the ARDL bound test was processed through F-test (Wald test) showing the significance levels of long run long run correlation among variables in this study, thus null hypothesis say no co-integration among the variables against the existence or presence of co-integration among the variables, denoted as;

$H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = \theta_7 = 0$; There is no co-integration between the variables.

$H_A: \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 = \theta_6 \neq \theta_7 \neq 0$; There is co-integration among variables.

Therefore, based on the Wald-test (F-statistic) ARDL bound test there are two critical values given by Pesaran, Shin and Smith found [15] for the co-integration test. The lower critical bound assumes all the variables are $I(0)$ meaning that there is no co-integration relationship between the examined variables. The upper bound assumes that all the variables are $I(1)$ meaning that there is co-integration among the variables, in other word, when the computed F-statistic is greater than the upper bound critical value the variables are long run rela-

specified and used developed this model: first, if the variables are integrated of different orders. That is, a model having a combination of variables with $I(0)$ and $I(1)$ order of integration. The second, if the variables are co-integrated, one can specify and estimate both the long-run and short run models simultaneously. Thirdly, ARDL model is relatively efficient in small sample data sets. Moreover, by applying ARDL model, unbiased long run estimates are obtained.

Therefore, the standard ARDL model explained as:

The above equation also called unrestricted error correction model. Therefore, the model with additional trend included in equation (3) and stated as:

tionships. Therefore, the study has to estimate both the short run and long run models. However, if there is no co-integration, we estimate only the short run model.

2.3. Variable Description and Expected Sign

Export Performance (EXP): refers to annual volume of export of Ethiopia to between 1996 to 2023, which is used as dependent variable. World demand is considered to be an important determinant in the export function that affects export performance from the demand side. To measure world demand various variables have been used across studies (Thida et al.) [16].

Foreign Direct Investment (FDI): economic theory predicts that foreign direct investment increases the export capacity of a nation by supplying capital goods and services. foreign direct investment, have a positive effect on exports in Ethiopia both in the short term and long term (Deresse [5], Thida et al. [16], Tiblets et al [17]). A study conducted by Yohannes [21] to examine the impact of foreign direct investment on export growth in Ethiopia, the result shows that a FDI inflow has supply-increasing and positive FDI-specific effects on export growth in the long run. However, foreign direct investment negatively and significantly related to Ethiopian agricultural exports (Fassil and Abule) [6].

Inflation (INF): rate of inflation has negative and significant effect exports in Ethiopia (Deresse) [5]. However, inflation has a positive effect on international trade both in the short term and in long term (Tiblets et al [17], Wondesen and Fekadu [19]).

Institutional Quality Index (IQI): The world governance indicator (WGI) project (Kaufmann et al 2009) [12] estimates the institutional quality of a particular country in terms of six parameters: rule of law, political stability and absence of violence or terrorism, voice and accountability, government effectiveness, regulatory quality and control of corruption. Therefore, this study developed by using Ethiopian six institutional quality indicators such as corruption control, rule of law, government effectiveness, voice and accountability, regulatory quality and political stability, which are obtained from worldwide governance indicator (WGI). Ethiopian institutional quality were found to be the determinant factors of Ethiopia's coffee exports performance (Wondesen and Fekadu [19]).

Real Exchange Rate (RER): measures the international competitiveness of goods produced domestically. The study applied the IMF definition of the real exchange rate: real exchange rate as the price of domestic currency against foreign currency, which is obtained by multiplying the nominal exchange rate of Ethiopia with Untied State America by the ratio of consumer price index of Untied State America to consumer price index of Ethiopia. Exchange rate volatility positively and significantly affects international trade both in the short and in the long term (Tiblets et al 2021) [17]. On the other hand, in the long run real exchange rate has a positive significant effect on exports growth (Abebe and Degye) [1]; (Tumwebaze, et al.) [18].

Trade openness (TOP): trade openness measures the degree of government control of the free flow of goods and services across nation's boundary. This variable measured as the ratio of the sum of export and import values to gross domestic product. Trade openness have a positive and significant effect on exports growth in the short run (Abebe and Degye [1]; Israel [10]; Tumwebaze, et al. [18]; Wondesen and Façade [19]).

Taxes on international trade (TX): taxes that become payable, when goods cross the national or customs frontiers of the economic territory or when transactions in services exchange between residents and non-residents (WB, 2020) [20]. It measures the degree of trade liberalization and the participation of a nation in international trade. Indirect tax revenue and domestic saving are the major determinants of agricultural exports in Ethiopia (Fassil and Abule) [6].

2.4. Diagnostic Tests of the Model

2.4.1. Unit Root Test

To get rid of any spurious regression in the estimation, it is important to examine the time-series data properties that were

employed in this study. A series is said to be stationary if its mean, variance and structure don't change over time. To this end, the augmented dickey fuller (ADF) test was used to identify the non-stationary of the variables in level. If the variables have unit roots in level, the ADF test is still used to check whether the variables are stationary at first difference or not. ARDL co-integration technique does not require pre-testing for unit roots, stationary condition has to be checked for all series as an initial step of model estimation to avoid ARDL model crash in the presence of integrated stochastic trend of I(2) variables Pesaran, Shin and Smith [15].

2.4.2. Autocorrelation

Autocorrelation is problem when disturbance term of one period correlated with disturbance term of other period. Therefore, the study was used Breush-Godfrey Correlation LM test to check the problem of autocorrelation. Decision rule is state that if the probability value is significance at 5% there is problem of auto/ serial correlation, then reject the null hypothesis and otherwise, no serial correlation (Gujarati, 2004) [9].

2.4.3. Heteroscedasticity Test

One of the basic assumptions is that the probability distribution of the disturbance term remains same over all observations of explanatory variables. As such, it is desirable to examine whether or not the regression model is in fact homoscedastic. This study used the Breush-Pagan-Godfrey test to test the presence of heteroscedasticity. The decision rule is state that study have heteroscedasticity problem, as probability value is significance at 5%, and vice versa.

2.4.4. Omitted Variable Test

Omitted variable problem is when necessary variables excluded from the model. In order to check when the model hurts from omitted variable problem or not, the study used the Ramsey's RESET test. The decision rule state that the study have omitted variable bias probability value is significance at 5%, otherwise there is no omitted variable problem.

3. Result and Discussion

3.1. Stationarity Unit Root Test

Accordingly, the Augmented Dickey Fuller unit root test found that inflation is I(0) variable while export, foreign direct investment, real exchange rate, taxes on international trade, institutional quality index and trade openness variables are I(1) variables.

Table 1. Unit Root test result using Augmented Dickey-Fuller Test.

Variables	ADF t-statistic at level I(0)		ADF t-statistic at level I(1)		Order of integration
	Intercept (C)	Trend and Intercept	Intercept	Trend and Intercept	
Export	-0.804879 (0.8017)	-1.141138 (0.9026)	-4.073225*** (0.0043)	-3.994668** (0.0219)	I(1)
Foreign Direct Investment	-2.128907 (0.2359)	-6.048933*** (0.0002)	-9.355685*** (0.0000)	-4.248371** (0.0142)	I(1)
Taxes on international trade	-0.284022 (0.9150)	-2.092373 (0.5267)	-5.522631*** (0.0001)	-5.402614*** (0.0009)	I(1)
Real Exchange Rate	-0.293347 (0.9136)	-2.643941 (0.2655)	-4.051822*** (0.0047)	-4.206094** (0.0144)	I(1)
Trade openness	-1.793143 (0.3757)	-2.307772 (0.4160)	-4.626619*** (0.0011)	-4.968319*** (0.0025)	I(1)
Inflation	-2.835031** (0.0667)	-3.976078** (0.0222)	-7.015066*** (0.0000)	-6.855592*** (0.0000)	I(0)
Institutional Quality Index	-2.591851 (0.1068)	-2.999396 (0.1506)	-5.267735*** (0.0003)	-5.205008*** (0.0017)	I(1)

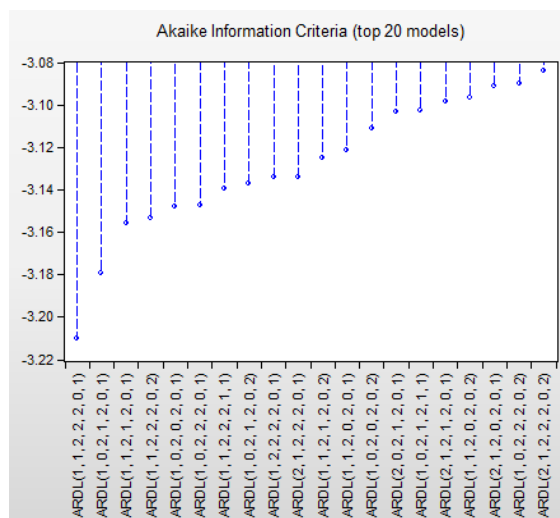
Note: ***, ** and * are statistical significance at 1%, 5% and 10% level respectively.

Source: Author's Computation using E-view 9, (2025)

Based on the ADF of stationary test results all variables under the study are either I (0) or I (1), in indicate the is no problem of stationary. Therefore, the study can proceed with ARDL bound testing approach to the current study in order to examine the presence of long-run and short run relation between the study dependent variable and independent variables.

3.2. Determination of the Lag Length

Because the computation of F-Statistics for co integration is very sensitive to lag length, in the study need to select a lag order based on the AIC. Therefore based on the Akaike information criteria the selected lag length of ARDL model (1, 1, 2, 2, 2, 0, 1).



Source: Author's Computation using E-view 9, (2025)

Figure 1. Akaike information criteria of lag length selection.

3.3. Bound Test for Co-Integration

The bound test procedure is based on the assumption that the variables are $I(1)$ or $I(0)$, as existence of $I(2)$ variables the computed F-statistics developed by Pesaran, Shin and Smith found [15] are not valid. For various situations, those authors give lower and upper bounds on the critical values. In each case, the lower bound is based on the assumption that all the variables are $I(0)$, and the upper bound is based on the assumption that all the variables are $I(1)$. If the estimated F-statistic falls below the lower bound, the study cannot reject the null hypothesis, so no co-integration is possible. If the F-statistic exceeds the upper bound, we can reject the null hypothesis and conclude that the variables are co-integration. Finally, if the F-statistic falls between the bounds, the test is inconclusive. If the long-run relationship is established between the variables, the long-run and short-run coefficients can be obtained by using the ARDL approach Narayan [13].

Table 2. Bound test for existence of long-run relationship.

F-statistic	Level of significance	Lower bound $I(0)$	Upper bound $I(1)$
9.439250	1%	1.12	3.23
	2.5%	2.45	3.61
	5%	2.75	3.99
	10%	3.55	4.43

Source: Author's Computation using E-view 9, (2025)

Since the value of the test statistics (9.44) was greater than the upper bound critical values at 1% level of significance, reject the null hypothesis and conclude that the variables are co-integration. Therefore, there existed a long-run relationship between the export performance (EXPT) and all covariates such as real exchange rate (RERt), Foreign Direct Investment (FDIt), Taxes on international trade (TXt), Trade openness (TOPT), Inflation (INFt) and Institutional Quality Index (IQIt).

3.4. Long Run Relationship Analysis

As evidenced from the estimation result of the long-run of ARDL model, foreign direct investment, inflation rate, taxes on international trade, institutional quality index and trade openness of Ethiopia positively and statistically significantly affect the value of Ethiopian exports.

Foreign direct investment is a category of cross-border investment associated with a resident in one economy having a significant degree of influence on the management of an

enterprise that is resident in another economy. As evidenced from the estimation result of the long-run ARDL model, the coefficient of the foreign direct investment found have a positive and significant effect on export of Ethiopia. The coefficient of the foreign direct investment 0.14 which means that a percentage increase in the foreign direct investment on average the export performance of Ethiopia increases by 14 percent, other variables remain constant. It is suggest that the foreign direct investment significantly strengthens the export capacity of host countries by providing financial resources, facilitating technology transfer, and enhancing workforce skills and managerial capabilities. Regarding this variable, studies conducted by Deresse [5], Thida et al. [16], Tiblets et al [17], Yohannes [21].

Table 3. Estimations results of long-run ARDL model.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LFDIT	0.140075***	0.040982	3.417950	0.0066
LINFT	0.313171***	0.060765	5.153813	0.0004
LIQIT	1.641646**	0.623994	2.630867	0.0251
LRERT	0.292029	0.222319	1.313560	0.2183
LTOPT	0.246613***	0.065271	3.778283	0.0036
LTXT	0.497513***	0.044856	11.091419	0.0000
C	10.008017***	1.228286	8.147950	0.0000

Note: ***, ** and * are statistical significance at 1%, 5% and 10% level respectively. Dependent Variable: LEXPT, Selected Model: ARDL (1, 1, 2, 2, 2, 0, 1)

Source: Author's Computation using E-view 9, (2025)

From the estimation, result of long-run ARDL model the coefficient of trade openness of Ethiopia carries a positive sign with statistically significant effect on export volume at the 1 percent level. In other word, as Ethiopian trade openness increase by one percentage for that causes the Ethiopian Export performance increase by 0.247 percent, on average *circa paribus*. This may indicate trade openness promotes cross-border interchange of knowledge, technologies, and ideas to increases productive capacity of domestic businesses. Regarding this variable, studies conducted by Abebe and Degye [1], Tumwebaze, et al [18], Wondesen and Fekadu found [19] found similar results.

In addition, inflation has a positive significant at 1% level of significance long-run effect on Ethiopian export Performance. The relative pricing effect can account for this beneficial impact of inflation. Depreciation in the value of Ethiopian currency is partly, as a result, of inflation. Exports from Ethiopia become more competitive on the global market as the value of the local currency declines. Since they are comparatively less

expensive for international consumers due to this pricing advantage, exports experience greater growth. This result is in agreement with the studies conducted by Tiblets et al [17] and Tumwebaze, et al found [18] on the determinants of exports who found positive and significant effect.

More so, the coefficient of institutional quality is positive and statistically significant at 5 percent significant level, on average *citrus paribus*. As estimation result of the long-run ARDL model shown, a percentage increase in institutional quality increases the value of Ethiopian export by 0.313 percent, holding other factors remain constant. Studies conducted by Yohannes Kumie Mekuriaw found [21] found positive and significant relationship between export and institutional quality. Besides, the coefficient of taxes on international trade is positive and statistically significant at a 1 per cent level of significance, *citrus paribus*. This is because the export sector is exempted from taxes. Hence, as taxes on international trade increases, the Ethiopian exports increases. The result also in agreement with the prediction of the imperfect substitutes model of international trade.

3.5. Short Run Error Correction Model

Error Correction Model (ECM) in time series econometrics is the lagged values of the residuals from the long run model is used in the short run regression analysis and this is because the last period's disequilibrium or equilibrium error affects the direction of the dependent variable in the current period. The coefficient of the error-correction term of about -0.8896 suggests that about 88.96% of the discrepancy between long-run

and short-run Export performance is corrected within a year (yearly data), suggesting a high rate of adjustment to equilibrium. This indicates that deviation from the long-run equilibrium is corrected at the speed of 88.96 percent over each year implies that there is "an over correction" toward long run equilibrium after a short run shock. Thus, we conclude that the speed of adjustment to equilibrium after a shock is high implied by the equilibrium error correction coefficient (ECT) which suggests that there is existence of a stable long-run equilibrium co-integrated relationship among the dependent variable and explanatory variables in the model.

In the short run, the first difference of variables such as foreign direct investment, inflation rate, taxes on international trade, lag of real exchange rate, institutional quality index and trade openness of Ethiopia positively and statistically significantly affect the volume of Ethiopian exports. On the other hand, the coefficient of lag of inflation rate negative and statistically significantly affect the Ethiopian exports performance only short run. Regarding, the rate of inflation still negatively and significantly affect the export in the short run (Deresse Dalango) [5].

In addition, in the short run, the first difference of lag of real exchange rate is positively and statistically significantly affects the volume of Ethiopian exports. This suggests that the increase of current exports is influenced by the exchange rate values from the previous year. This positive effect can be attributed to Ethiopia unstable exchange rate as the shilling weakens. Export prices on international markets are generally lower when the local currency is weaker. This raises the demand for the goods and boost export growth. Regarding this variable, studies conducted by Abebe and Degye [1], Tiblets et al [17] and Tumwebaze, et al [18] found similar results.

Table 4. Estimated Result of Short Run Error Correction model.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (LFDIT)	0.090862***	0.025894	3.509053	0.0056
D (LINFT)	0.124220***	0.021200	5.859508	0.0002
D (LINFT(-1))	-0.069002***	0.018444	-3.741177	0.0038
D (LIQIT)	0.790086**	0.295355	2.675039	0.0233
D (LIQIT(-1))	-0.445534	0.376042	-1.184796	0.2635
D (LRERT)	0.195655	0.167534	1.167850	0.2700
D (LRERT(-1))	0.636119***	0.139034	4.575280	0.0010
D (LTOPT)	0.219397***	0.064222	3.416229	0.0066
D (LTXT)	0.288136***	0.071772	4.014621	0.0025
CointEq (-1)	-0.889642***	0.147277	-6.040598	0.0001
Cointeq = LEXPT - (0.1401*LFDIT + 0.3132*LINFT + 1.6416*LIQIT + 0.2920 *LRERT + 0.2466*LTOPT + 0.4975*LTXT + 10.0080)				

Note: ***, ** and * are statistical significance at 1%, 5% and 10% level respectively. Dependent Variable: LEXPT, Selected Model: ARDL (1, 1, 2, 2, 2, 0, 1)

Source: Author's Computation using E-view 9, (2025)

3.6. Post Diagnosis Test Result

3.6.1. Omitted Variable Test

In order to test for variable omission, Ramsey's RESET-test was employed to understand whether the model

suffers from omitted variable bias or not. In addition, the test result found that it is insignificant the p-value is below the conventional critical value ($0.8236 > 0.05$), thus the null hypothesis has rejected there is on omitted variable.

Table 5. Ramsey's RESET-test of Omitted variable.

	Value	df	Probability
t-statistic	0.229466	9	0.8236
F-statistic	0.052654	(1, 9)	0.8236

Source: Author's Computation using E-view 9, (2025)

3.6.2. Autocorrelation Test

The result of Breusch-Godfrey of Serial Correlation LM Test revealed that null hypothesis of no serial correlation

(Brush and Godfray LM test) is failed to reject because that the p-value associated with test statistic is greater than the standard significant level of 5 percent ($0.4392 > 0.05$)

Table 6. Correlation Test.

Breusch-Godfrey Serial Correlation LM Test			
Type of Statistics	Statistics Coefficient	Prob. version	P-value
F-statistic	0.913498	Prob. F (2, 8)	0.4392
Obs*R-squared	4.833815	Prob. Chi-Square (1)	0.0892

Source: Author's Computation using E-view 9, (2025)

3.6.3. Heteroskedasticity Test

The study used the Breush-Pagan-Godfrey test to test the presence of heteroscedasticity. If the probability value is less than 5% then the model has heteroscedasticity and vice versa. the result, the null hypothesis of no heteroscedasticity is to be rejected, significant level due to its p-value associated is greater than the standard significance level ($0.8403 > 0.05$).

Table 7. Heteroskedasticity Test.

Breusch-Pagan-Godfrey Test of Heteroskedasticity			
Type of Statistics	Statistics Coefficient	Prob. version	P-value
F-statistic	0.572981	Prob. F (15, 10)	0.8403
Obs*R-squared	12.01753	Prob. Chi-Square (15)	0.6777
Scaled explained SS	3.989242	Prob. Chi-Square (15)	0.9987

Source: Author's Computation using E-view 9, (2025)

4. Conclusion and Policy Implication

Economic development is one of the main objectives of every society in the world and economic growth is fundamental to economic development. There many variables that contribute to economic growth, export considered as one of the very important accelerators factor, and greater access to world markets perceived as a necessary condition for more rapid growth. As a result, export to be an engine for economic growth and development. The objective of this study was to identify determinants of export in Ethiopia for the period 1996-2023 by applying auto regressive distributive lag model with bound testing approach of co-integration and error correction model.

The study was used secondary data obtained from different sources as Food and Agricultural Organization (FAO), World Development Indicators (WDI), World Wide Governance Index (WGI) and International Monetary Fund (IMF) data source answer the objectives of the study. Accordingly, data on gross domestic product, export value and volume to calculate openness, obtained from Food and Agricultural Organization (FAO). More so, data on consumer price index where obtained from International Monetary Fund (IMF), while data of foreign direct investment, exchange rate, taxes on international trade, inflation and export volume obtained from World Development Indicator (WDI). Finally, data on institutional quality index obtained from Worldwide Governance Index (WGI) data source.

Accordingly, the Augmented Dickey Fuller unit root test found that inflation is $I(0)$ variable while export, foreign direct investment, real exchange rate, taxes on international trade, institutional quality index and trade openness variables are $I(1)$ variables. The result of error correction model revealed that the deviation from the long-run equilibrium is corrected at the speed of 88.96 percent over each year implies that there is “an over correction” toward long run equilibrium after a short run shock.

As evidenced from the estimation result of Auto Regressive Distributive Lag Model with bound testing approach of co-integration and error correction model, foreign direct investment, inflation rate, institutional quality index, taxes on international trade and trade openness of Ethiopia positively and statistically significantly affect the Ethiopian exports performance both in short-run and long-run. On the other hand, the coefficient of lag of inflation rate negative and statistically significantly affect the Ethiopian exports performance only short run. However, first lag of real exchange rate positively and statistically significantly affect Ethiopian exports performance only short run.

Based on the findings of our study, the following recommendations are forwarded to Ethiopia on the basis of the understanding that auto regressive distributive lag model with bound testing approach of co-integration and error correction model to Ethiopia's export are quite supportive to configure policy recommendations targeted to improve performance of

Ethiopia's export in the international market.

As, foreign direct investment is positively and statistically significantly affecting the Ethiopian exports performance both in short-run and long run, the government should encourage infrastructures attract foreign investors, which produce exportable goods to increase the motive on international trade to boost export performance.

When positive and significant taxes on international trade affect the Ethiopian exports performance both in short-run and long-run, the government needs to increase tax on import and reduce export tax to substitute the high priced foreign products with cheapest Ethiopian product to improve competitiveness on international trade. As openness to trade has a positive impact on the Ethiopian exports performance both in short-run and long-run, to eliminate Ethiopia's export duties should be encouraged Ethiopian exports performance.

Since the coefficient of Ethiopian institutional quality has positive effects on Ethiopia's exports performance Ethiopian government well, improving the institutional quality would help to boost the value of Ethiopian export to its trade partners. In order to improve institutional quality, to adopt policies which will permit favorable market environments includes the lowering corruption, respect rule of law, government effectiveness, legal voice and accountability, regulatory quality and political stability should be encouraged Ethiopia's exports performance.

Abbreviations

ARDL	Auto Regressive Distributive Lag
ADF	Augmented Dickey Fuller
FDI	Foreign Direct Investments
EXP	Ethiopian Export Performance
GDP	Gross Domestic Product
INF	Inflation
IMF	International Monetary Fund
IQI	Institutional Quality Index
NBE	National Bank of Ethiopia
RER	Real Exchange Rate
TOP	Trade Openness at Time
TX	Taxes on international trade
WB	World Bank
WGI	Worldwide Governance Indicator

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Data Availability

The data is available from the author upon reasonable request.

Conflicts of Interest

No potential conflict of interest was reported by the author(s).

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