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Factors influencing export of haricot bean in Ethiopia

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Abstract
The objective of this study is to analyze factors influencing the export level of haricot beans in Ethiopia over the period 1981 to 2020. The study applied an ARDL model bound test approach. The study portrayed that GDP, export price, real exchange rate, and inflation rate had positive and significant impact on the level of haricot bean export. GDP showed positive and significant impact of GDP on export of haricot beans because higher economic growth of a nation will create higher capacity to export the product. A one period lagged export quantity, GDP, export price, and real exchange rate had negative impact on current export level of haricot beans. The negative and significant effect of lagged real exchange rate exemplifies that the shocks in real exchange rate during preceding year will discourage exporters to participate in international trade in subsequent year. Haricot beans producer price had negative impact on current year's haricot beans export level in both the long- and short-run, implying that the volatility of domestic prices will discourage exporters to engage in foreign export trade. Real exchange rate revealed negative and significant impact on haricot beans export level in the short-run while it had positive and significant impact on haricot bean export in the long-run. Conversely, GDP, export price, and inflation rate had positive impact on current year's export level of haricot bean both in the long- and short-run. In view the results of this study, it is recommended that the macroeconomic policy reforms aimed at improving the growth of GDP that enhances the total export supply of the countries to the rest of the world should be taken. The significant relationship between the real exchange rate and export performance indicates the need to ensure a stable exchange rate policy in order to avoid the exchange rate risk.

Keywords: Influencing factors, exports, haricot bean, Ethiopia

1. Introduction
With varied agro-ecological zones and diversified natural resources, Ethiopia has been known as home land and domestication of several crops. Pulse crops are among these crops cultivated, consumed and marketed in large quantities in the country for many years (Ali, *et al.*, 2014) [5]. Pulse crops play important role in achieving food security and contributing to the economy through export earnings (Francom, 2018) [12]. In 2018, exports of pulse crops reached 340, 000 metric tons, generating US$ 255 million foreign currency. Pulse exports are the third largest foreign currency earner after coffee and oilseeds.

Haricot bean (*Phaseolus vulgaris* L.) is among the major pulse crops cultivated by smallholder farmers of Ethiopia and exported to foreign markets for more than 50 years and probably been grown as food crop for a much longer period in the low and mid land altitude areas of the country (Lemu, 2016) [16]. It is the second-largest crop among pulse crops and third export commodity from the total export value of agriculture in Ethiopia (CSA, 2019) [9]. It is used as food crop, source of foreign currency, and as means of employment.

Haricot bean production in Ethiopia takes place almost in all regions with varying degree in the low and mid altitude Agro-ecologies. However, almost all haricot bean production (more than 99 percent) of the country comes from five major haricot beans producing regions: Oromia, Southern Nations Nationalities and Peoples Region (SNNPR), Amhara, Benishangul-Gumuz, and Tigray (Abele and Tefera, 2015) [2].

According to Kassie (2018) [14], haricot bean has been an export pulse crop for Ethiopia for more than 50 years and probably been grown as food crop for a much longer period in the low and mid land altitude areas of the country. Although haricot bean remained the significant contributors to the export sector and the economy, its export became worsening in

the past decade (Abdulkadir, 2020) [1] foreign price level, production level, quality of products, real exchange rate, and infrastructure (Rural road feeders) are an independent variables that determines the export performance pulses. Furthermore, Sawore (2015) [20] cites the main factors influencing the export level of haricot bean as low level of production, export price instability, volatility of domestic prices, and exchange rates. Hence, it becomes vital to further assess and identify factors influencing the export quantity of haricot bean in Ethiopia. Such a study and analysis particularly at national level is limited.

Some researchers have conducted studies on haricot bean in specific areas, however, the studies mainly focused on production aspect and did not address issues related to market supply and export performance conducted a study on market access, intensification and productivity of common bean in Ethiopia. The study mainly concentrated on production issue but not on market supply and export issues on his part conducted a study on technical efficiency of haricot bean production in Misrak Badawacho Wereda, Hadiya Zone, Ethiopia. However, the study mainly considered on production efficiency and did not address issues related to market supply and export market. It was also focused on single pocket area rather than covering wider area.

Generally, other studies were also conducted on market chain of haricot beans in different areas and there is no empirical study on export of haricot beans at national level. In order to fill this research gaps, this study examines the factors that determine haricot beans export trade in Ethiopia and its dynamics. The main objective of the study is to analyze factors influencing the export level of haricot beans in the country.

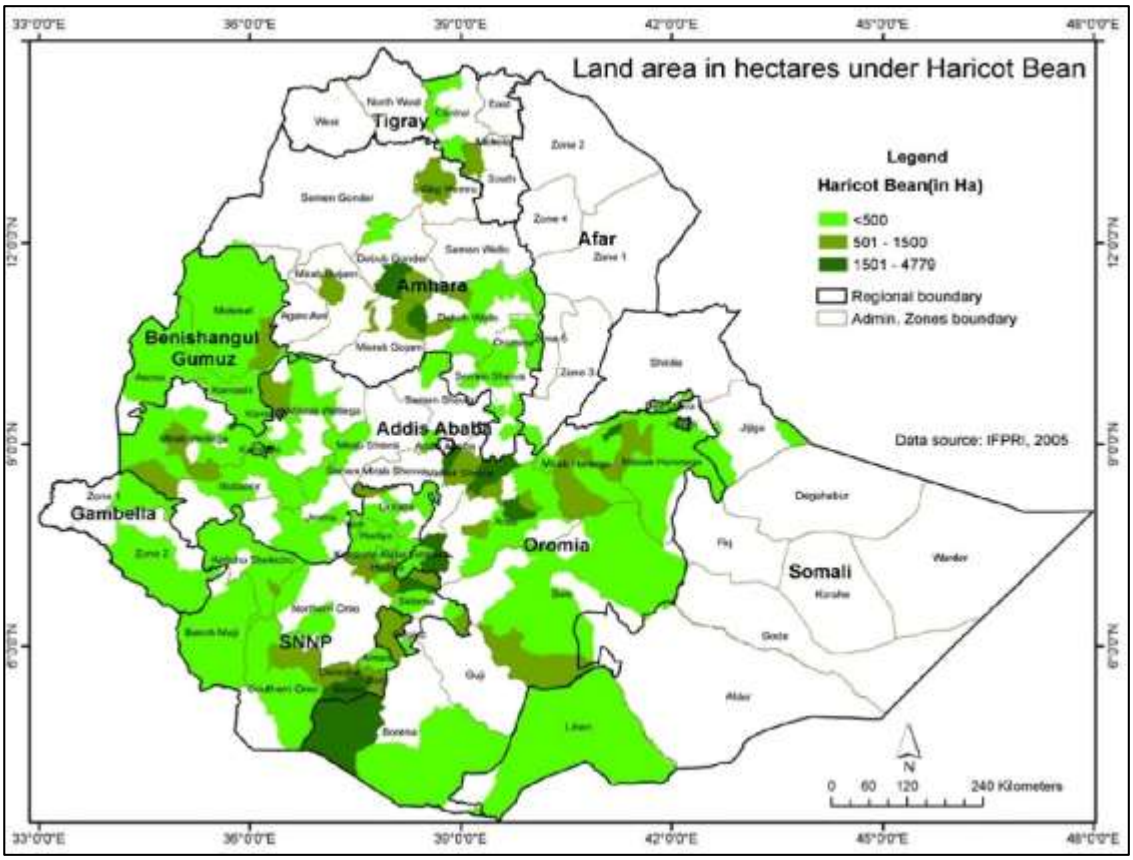
2. Materials and Methods

2.1 Description of Study Area

The study was conducted in Ethiopia covering the major haricot bean growing belts of Ethiopia. With a total area of 1.1 million km^2, Ethiopia is located in East Africa and bounded with Eritrea in the north, Djibouti in the east, Somalia to the east and south east, Kenya in the south, South Sudan in the south west, and Sudan in the west (FAO, 2016) [11]. The country's latitudinal and longitudinal locations are between 3º to 15º N and 33º to 48ºE, respectively. The country is administratively divided into four levels: regions/ city administrations, zones, woredas, and the Kebeles. According to the United Nations Population Fund (2021), the population of Ethiopia has reached 117.90 million with an annual growth rate of 2.6 percent.

According to Zenebe (2016) [22], Haricot beans (*Phaseolus vulgaris legume)* are one of the major types of pulses grown in Ethiopia especially in the lowlands and in the rift valley. In Ethiopia, haricot bean best suits with an altitude between 1200 to 2200 meters above sea level (M.A.S.L), having maximum and minimum temperature mean of less than 30 to 32 °C and greater than 10 to 12 °C, respectively, and a rainfall of 350 to 500 mm well distributed over 70 to 100 days (Merga, 2021) [24].

The major haricot beans producing regions in Ethiopia are Oromia, SNNPR, Amhara, Benshangul Gumuz, and Tigray (see Fig. 1 for the map), which contribute more than 99% of total haricot bean output. In 2019/20 agricultural production, Oromia took the lion share (42.5%) of haricot bean production in the country, followed by SNNPR (29.2%), Amhara (25.3%) Benishangul-Gumuz 1.5% and the other regions contributed the rest to the country's total production (see Table 1).



Source: IFPRI, 2010

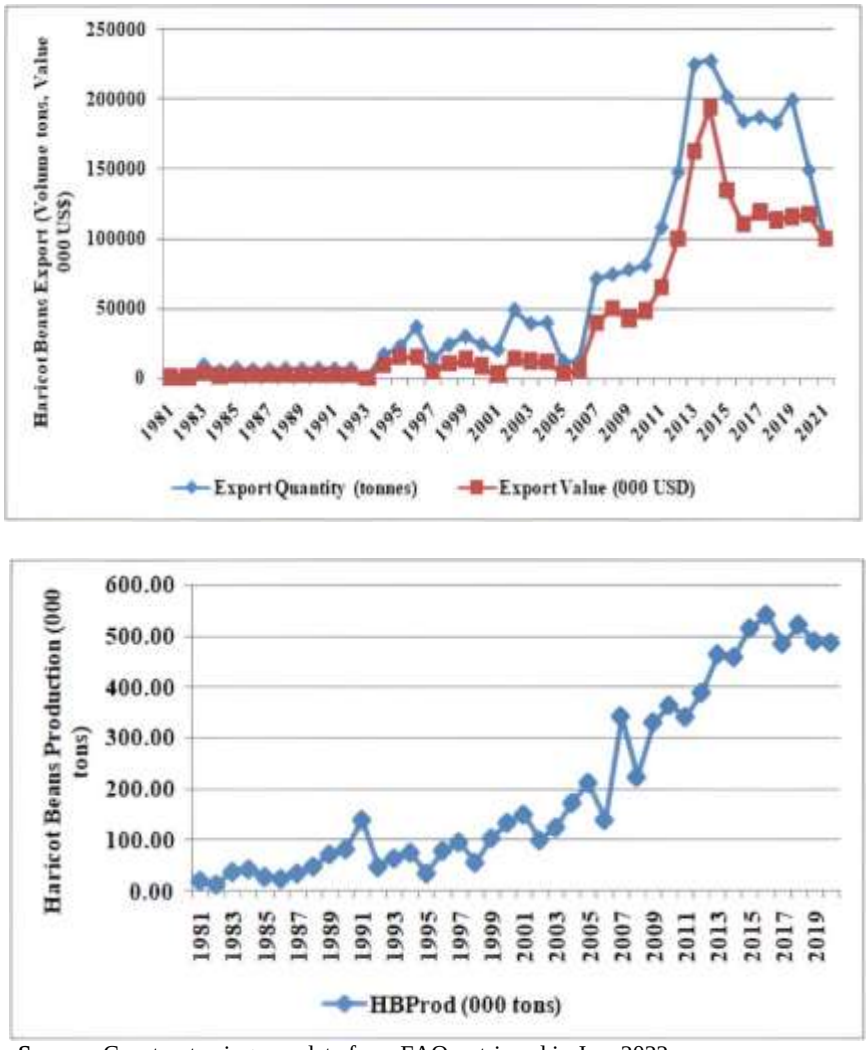
Fig 1: Map of Haricot Bean Growing Areas of Ethiopia

Table 1: Production of Haricot Bean by Regions in Ethiopia, during 2019/20

Region	Area	% share	Production	% share
Amhara	70, 443.51	25.1	1, 226, 897.93	25.3
Oromia	110, 597.54	39.3	2, 065, 813.29	42.5
SNNPR	90, 849.56	32.3	1, 419, 056.72	29.2
Benish.-Gumuz	4, 050.65	1.4	74, 467.93	1.5
Tigray	3, 516.37	1.3	56, 653.35	1.2
Others	1, 625.86	0.6	12, 581.71	0.3
Total	281, 083.49	100.0	4, 855, 470.93	100.0

***Source*:** CSA, 2019/20 Agricultural Sample Survey Report

Although suitable agro-ecologies are available for haricot beans production, there is no stability in the production and export the crop over the years. Figure 2 presents the trend of haricot beans production and export volumes from 1981 to 2021. It can be been that both production and export quantities followed the same trend, i.e. increasing over the period from 1981 to 2014 and then started declining. The quantities of production and export of haricot beans were almost stagnant from 1981 to 1995 (Ranging between 19, 650-33, 870 tons for production and between 2, 000 – 22, 551 tons for export quantities). Starting from 1996, the production volume has increased from 78, 360 tons to 540, 240 tons in 2016 and then started declining. Similarly, the export volume increased from 36, 650 in 1996 to 227, 633 tons in 2014 and then continuously declined up to 2021. The trend of haricot beans export performance particularly from the year 2015 gives clue for the poor export performance calling for policy interventions.



Source: Construct using raw data from FAO, retrieved in Jan. 2022.

Fig 2: Trend of Haricot Beans Export and Production in Ethiopia, 1981 to 2021

2.2 Data Types and Sources

This study used time series secondary data for the variables selected for this study. The variables selected for this study included: Exported quantities of haricot beans, production volume of haricot beans, national GDP, export and producer prices of haricot beans, real exchange rate, and inflation rates. The data pertaining to these variables, except production quantities, were collected from the FAOSTAT database. Data on production of haricot beans have been compiled from CSA Agricultural Sample Survey Reports on area and production of major crops.

2.3 Empirical Model Specification

To examine the determinants of haricot beans export trade, an autoregressive distributed lag (ARDL) model was employed. ARDL model is more statistically significant approach to determine the co-integration relation between variables in small samples than Johansen co-integration techniques, which require large data samples for valid estimation of the parameters (Pesaran, *et al*., 2001) [19]. Most importantly, the ARDL estimation can be applied whether the regressors are purely ordered zero [I(0)], purely order one [I(1)], or a mixture of both.

The general representation of the ARDL model can be written as:

$$Y_t = \mu oi \sum_{i=1}^{p} \alpha j y_{t-1} + \sum_{i=1}^{q} \beta j X_{t-1} + \varepsilon_{it} \quad (1)$$

Where Y_t is a vector, μoi is the intercept, and variables in X_t are allowed to be purely I(0) or I(1) or fractionally integrated; β and α are coefficients; and $j = 1, \ldots k$ is several independent variables. P is the lag length of dependent variable and q is the optimum lag for independent variables, while the term ε_{it} represents a vector of error term.

Inserting the variables of the current study into equation (1) and converting into natural logarithmic form, the standard ARDL model can be given by the equation:

$$\Delta \ln HExpor_t = \beta_0 + \beta_1 \ln HExpor_{t-1} + \beta_2 \ln HProd_{t-1} + \beta_3 \ln GDP_{t-1} + \beta_4 \ln ExpoPri + \beta_5 \ln ProdPri_{t-1} + \beta_6 \ln ExR_{t-1} + \beta_7 \ln InfR_{t-1} + \sum_{i=1}^{q} \alpha i \, \Delta \ln HExpor_{t-i} + \sum_{j=1}^{r} \alpha j \, \Delta \ln HProd_{t-j} + \sum_{k=1}^{s} \alpha k \, \Delta \ln GDP_{t-k} + \sum_{l=1}^{v} \alpha l \, \Delta \ln ExpoPri_{t-l} + \sum_{m=1}^{y} \alpha m \, \Delta \ln ProdPri_{t-m} + \sum_{n=1}^{x} \alpha n \, \Delta \ln ExR_{t-n} + \sum_{p=1}^{w} \alpha p \, \Delta \ln InfR_{t-p} + \varepsilon_t \quad (2)$$

Where, $\ln HExpor_t$ is export volume, $\ln HProd_t$ is production volume, lnGDPt is gross domestic product, $\ln ExpoPri_t$ is export price, $\ln ProdPri_t$ is producer price, $\ln ExR_t$ is exchange rate, and $\ln InfR_t$ is inflation rate. The symbol Δ is the first difference operator, q, r, s, v, y, x and w are the lag length with their respective variables, and ε_t is the error term; β1, β2, β3, β4, β5, β6, β7 are the coefficients that measure long-run elasticities between the variables. Whereas α_i, α_j, α_k, α_l, α_m, α_n, and α_p indicates coefficients that measure short- run elasticities between variables. Based on economic theory and prior empirical results, the expected signs of the coefficients are $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$, $\beta_5 > 0$, $\beta_6 < 0$, $\beta_5(\pm)$.

If there is evidence of long-run relationship (co-integration) between the variables, the following long-run model will be estimated:

$$\ln HExpor_t = \alpha_0 + \sum_{i=1}^{q} \alpha i \ln HExpor_{t-i} + \sum_{j=1}^{r} \alpha j \ln HProd_{t-j} + \sum_{k=1}^{s} \alpha k \ln GDP_{t-k} + \sum_{l=1}^{v} \alpha l \ln ExpoPri_{t-l} + \sum_{m=1}^{y} \alpha m \ln ProdPri_{t-m} + \sum_{n=1}^{x} \alpha n \ln ExR_{t-n} + \sum_{p=1}^{w} \alpha p \ln InfR_{t-p} + v_t \quad (3)$$

From the cointegration series, the short-run elasticities can be derived through constructing the error correction model (ECM) in the following form:

$$\Delta \ln HExpor_t = \beta 0 + \sum_{i=1}^{q} \alpha i \, \Delta \ln HExpor_{t-i} + \sum_{j=1}^{r} \alpha j \, \Delta \ln HProd_{t-j} + \sum_{k=1}^{s} \alpha k \, \Delta \ln GDP_{t-k} + \sum_{l=1}^{v} \alpha l \, \Delta \ln ExpoPri_{t-l} + \sum_{m=1}^{y} \alpha m \, \Delta \ln ProdPri_{t-m} + \sum_{n=1}^{x} \alpha n \, \Delta \ln ExR_{t-n} + \sum_{p=1}^{w} \alpha p \, \Delta \ln InfR_{t-p} + \rho ECM_{t-1} + \varphi_t \quad (4)$$

Where, the variable ECM_{t-1} is the error correction term which captures the long-run relationship whereas $\alpha's$ are the coefficients associated with short-run dynamics of the model converging to equilibrium.

Before estimating the ARDL model using the above specified equations, ti is customary to test the presence of unit root and long-run cointegration in the data series of variables included in the model. Towards this end, an Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) tests were considered the best approach and used to test the presence of unit root in the data series. To estimate the bound tests, all the variables included in the model needs to be stationary at I(0), I(1), or both. Therefore, each data was checked for stationary in levels and first difference for testing their level of integration.

Subsequently, a cointegration test has been conducted to detect the presence of a stable equilibrium relationship between the variables included in the model. According to ARDL model the existence of co-integration relationship can be investigated between the time series regardless of whether they are I(1) or I(0). If the presence of cointegration is confirmed with the model for at least two I(1) series and some I(0), the variables can be added to the ARDL model for the estimation which may not alter the I(0) characteristics of the error term. In this study, cointegration analysis was carried out using the Johansen procedure as recommended by Akter and Hong (2011), which first defines an unrestricted vector auto regression (VAR). All of the analyses have been conducted using Eviews 9 Econometric Software.

3. Results

3.1 Unit Root Tests

Table 2 presents the results of the unit root test for the variables included in the current study. The results show that all the data series were found co-integrated of the order I(0), i.e. the dependent variable lnHEpoQ, the explanatory variables lnHProQ, lnGDP, lnlnExpoPri, lnProdPri, lnRExR, and lnInfR are co-integrated at levels (I(0)). Thus, the ARDL approach is more suitable than other approaches for examining the relationships between the given dependent and independent variables.

Table 2: Results of the Unit Root Test

Variables	ADF		PP		Result
	Level	First Difference	Level	First Difference	
LnHExpoQ	-2.7523***	-9.5999	-5.4525	-28.5743	I(0)
LnHProd	-1.0541***	-7.5613	-1.2981***	-10.8740	I(0)
LnGDP	-1.0247***	-4.0122***	-0.6989***	-3.9484***	I(0)
LnExpoPri	-3.0198***	-6.6494	-2.9617***	-12.9286	I(0)
LNPRODPRI	-1.6127***	-5.9466	-1.5599***	-5.9759	I(0)
LNREXR	-3.0298***	-3.6156***	-2.3478***	-3.5776***	I(0)
LNINFR	-3.3054***	-11.5231	-5.7924	-38.9312	I(0)

***, ** & * indicates significance level at 1%, 5% and 10% respectively.

3.2 Diagnostic Tests

Next to the unit root test, different diagnostic tests such as co-integration bound test, diagnostic tests for normality, heteroscedasticity, and serial correlation were conducted. The first step of data analysis using ARDL model requires checking the long relationship between the variables included in the study. Table 3 presents the outcomes of the cointegration bound test. The F-test statistic computed within the co-integration test framework is compared with the upper and lower critical values and found to exceed the upper bound at the 1% critical value. This implies that haricot beans export and its determinant variables are co-integrated, epitomizing the existence of a long-run relationship among the dependent and explanatory variables.

Table 3: Estimated cointegration bound test for haricot bean export determinants

Dependent variable	Type of test	Test statistics	Critical values	Conclusion
Haricot Beans Export	Wald test	8.5403***	5.643	Long-run cointegration exists

Note: *** Statistically Significant at 1% level

To test the robustness of the ARDL model, residual diagnostic tests for normality, heteroscedasticity, and serial correlation were carried out. The results of the diagnostic tests are presented in Table 4. It can be seen from the table that the p-values for normality (Jarque-Bera), serial correlation (Breush–Godfrey Lagrange Multiplier - LM), and heteroscedasticity are greater than 5% level of significance. The results imply that the residuals are normally distributed; there is no evidence of serial correlation; and no autoregressive conditional heteroscedasticity (ARCH) in the series.

Table 4: Residual properties of barley output response equation

Type of test	Test statistic	Test statistic value	Probability
Normality test - Histogram	Jarque-Bera	0.3897	0.8229
Serial Correlation (LM)	Obs*R-squared	1.5985	0.4497
Heteroscedasticity (ARCH)	Obs*R-squared	17.6529	0.4110

In addition to the above diagnostic tests, stability diagnostics has been conducted to measure parameter constancy. To achieve this, the study tested the stability of long-run estimates based on the cumulative sum of recursive residuals (CUSUM) and cumulative squares of recursive residuals (CUSUMQS) tests. Table 5 shows CUSUM stability test results. The result indicates that the model does not suffer from any form of misspecification. Equally, the plot of CUSUM test shown in Figure 3 reveal that the estimated parameters are stable over the observation period at a 5% level of significance.

Table 5: CUSUM stability test results

Dependent Variable	F – statistic	Probability	Conclusion
Haricot Beans Export	5.32327**	0.0525	No indication of misspecification

** Indicates significance at 5% level.

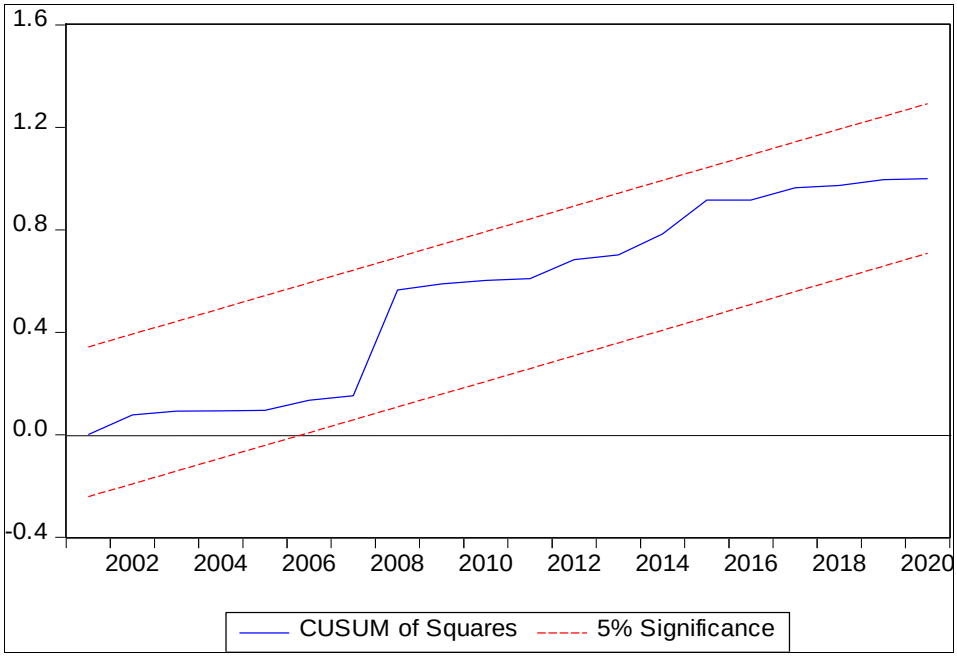


Fig 3: Plot of cumulative sum of squares of recursive residuals.

3.3 Impact of Factors Influencing Export of Haricot Beans: This study has been carried out to examine the factors influencing the export of haricot beans from Ethiopia over the period 1981 to 2020. Using the general to specific approach, an ARDL model with lag length (0, 0, 1, 1, 1, 1, 0) has been selected as optimum to estimate the regression coefficients for the variables included in the model. The estimated ARDL model demonstrated good fitness to the

haricot beans export data series with high value of adjusted R^2 (0.869). The result implies that the explanatory variables included in the model explained 86.9% of the variations in the export volume of haricot beans. Furthermore, the Durban-Watson showed no evidence of serial autocorrelation (1.7364). Subsequently, the F-test does not show the presence of any heteroscedasticity of the residual. The tests, therefore, exemplify that the model becomes viable and fits at lag length 1 and first-order differences.

Table 6 presents the regression coefficients estimated for determinants of haricot beans export. The result demonstrated that lnProdq, lnGDP, lnExpoPri, lnRexR, and lnInfR had positive and significant (at 1%) impact on the export level of haricot bean, except LnProdq which is statistically insignificant. The results imply that a 1% increase or change in LnGDP, lnExpoPri, lnRexR, and lnInfR will lead to an augment in the level of haricot bean export by 0.79%, 2.8%, 1.4%, and 0.67%, respectively.

Conversely, a one period lagged lnExpoQ quantity and current year's lnProdPri had negative and significant (at 1% level) effect on current level of haricot beans export. The results imply that a 1% increase in one period lagged export quantity and current year's producer price will lead to a decrease in haricot beans export level by 1.26% and 2.4%, respectively. Furthermore, a one period lagged lnGDP, lnExpoPri, and lnRexR had negative impact on current export level of haricot beans, but only lnGDP and LnRexR are statistically significant at 1% level. The result revealed that a 1% increase or change in one period lagged lnGDP and lnRexR will cause a decline in current export level of haricot beans by 3.34% and 6.99%, respectively.

Table 6: Estimates of Regression Coefficients for Determinants of Haricot Beans Export

Variable		Coefficient	Std. Error	t-Statistic	Prob.
C	C(1)	-4.895231	3.659422	-1.337706	0.1960
LNEXPOQ(-1)	C(2)	-1.26114***	0.196272	-6.425492	0.0000
LNPRODQ(-1)	C(3)	0.24596	0.309358	0.795059	0.4359
LNGDP(-1)	C(4)	0.79012*	0.406773	1.942414	0.0663
LNEXPOPRI(-1)	C(5)	2.80386***	0.669731	4.186558	0.0005
LNPRODPRI(-1)	C(6)	-2.39678***	0.639724	-3.746589	0.0013
LNREXR(-1)	C(7)	1.40259***	0.397611	3.527530	0.0021
LNINFR(-1)	C(8)	0.66999***	0.229542	2.918817	0.0085
D(LNPRODQ)	C(9)	0.45885	0.326878	1.403721	0.1757
D(LNGDP)	C(10)	-6.77146***	1.544046	-4.385532	0.0003
D(LNGDP(-1))	C(11)	-3.34018**	1.401277	-2.383669	0.0272
D(LNEXPOPRI)	C(12)	0.90652*	0.479707	1.889747	0.0734
D(LNEXPOPRI(-1))	C(13)	-0.12287	0.543312	-0.226143	0.8234
D(LNPRODPRI)	C(14)	-0.73176	0.656436	-1.114750	0.2782
D(LNPRODPRI(-1))	C(15)	0.69683	0.556814	1.251467	0.2252
D(LNREXR)	C(16)	-9.59912***	1.431670	-6.704840	0.0000
D(LNREXR(-1))	C(17)	-6.98605***	2.425159	-2.880657	0.0092
D(LNINFR)	C(18)	0.181496	0.138731	1.308264	0.2056
R-squared		0.929180	Mean dependent var		0.113496
Adjusted R-squared		0.868983	S.D. dependent var		1.402595
S.E. of regression		0.507687	Akaike info criterion		1.787611
Sum squared Resid		5.154920	Schwarz criterion		2.563310
Log likelihood		-15.96461	Hannan-Quinn criter.		2.063599
F-statistic		15.43566	Durbin-Watson stat		1.736356
Prob(F-statistic)		0.000000			

***, ** & * indicates significance level at 1%, 5% & 10% respectively

Subsequently, the long-run elasticity's for the determinants of haricot beans export included in the model have been estimated. Table 7 presents the empirical results of the long-run model for determinants of coffee export. As can be seen from the table, one period lagged haricot beans export included as explanatory variable (lnHExpoQ(-1)) and haricot beans producer price (lnProdPri) had negative and significant (at 1% level) impact on current year's haricot beans export level in the long-run. The results imply that a 1% increase or change in the first lag order of haricot bean export level and haricot beans producer price will result in a decrease of current year's haricot beans export level by 0.56% and 1.1% respectively. Conversely, lnGDP, lnExpoPri, lnRexR, and lnInfR showed positive and significant (at 1% level) impact on haricot beans export quantity in the long-run. The results imply that, holding the other variables constant, a 1% increase in lnGDP, lnExpoPri, lnRexR, and lnInfR will cause an increase in export level of haricot bean by 0.35%, 1.245%, 0.62% and 0.3%, respectively.

Table 7: Long-run Elasticity Coefficient for Export of Haricot Bean

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-2.16494	1.5717	-1.3775	0.1836
LnHExpoQ (-1)	-0.5578***	0.03839	-14.5298	0.0000
LnHProdQ	0.10878	0.13630	0.79807	0.4342
LnGDP	0.34944*	0.17936	1.9483	0.0656
LnHExpoPri	1.240***	0.26509	4.67774	0.0001
LnHProdPri	-1.060***	0.28119	-3.76970	0.0012
LNREXR	0.6203***	0.15241	4.07003	0.0006
LNINFR	0.2963***	0.10675	2.77573	0.0117

***, ** & * indicates significance level at 1%, 5% & 10% respectively

In this study, the short-run dynamic ECM (-1) model has also been estimated to capture adjustment towards the long-run and the model. Table 8 presents the short-run elasticity coefficients estimated for the determinants of haricot beans export model. The lagged error correction term (ECT (-1)) of negative and significant at 1% level of significance

confirms the existence of long-run association between the variables. The error correction coefficient measures the speed of adjustment toward long-run equilibrium after a short-run shock with a value of -0.391. This indicates that deviation from the long-run equilibrium is corrected at the speed of 39 percent over each year towards long-run equilibrium after a short run shock.

Table 8: Dynamic ECM short-run elasticity coefficients for determinants of haricot bean export

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.62994	0.25533	2.46714	0.0198
ECT(-1)	-0.39054***	0.10707	-3.64741	0.0010
D(LNEXPOQ(-1))	-0.39437***	0.12760	-3.09065	0.0044
D(LNPRODQ)	-0.3215	0.39919	-0.80533	0.4272
D(LNGDP)	0.5643	1.68306	0.33528	0.7398
D(LNEXPOPRI)	0.36173	0.66874	0.54091	0.5927
D(LNPRODPRI)	-0.60912	0.89008	-0.68434	0.4992
D(LNREXR)	-5.8197***	1.71446	-3.39448	0.0020
D(LNINFR)	0.05256	0.12762	0.41186	0.6835
R-squared	0.62358	Mean dependent var		0.11350
Adjusted R-squared	0.51974	S.D. dependent var		1.40260
S.E. of regression	0.97201	Akaike info criterion		2.98448
Sum squared reside	27.3991	Schwarz criterion		3.37233
Log likelihood	-47.7052	Hannan-Quinn criter.		3.12248
F-statistic	6.00528	Durbin-Watson stat		1.49812
Prob(F-statistic)	0.00014			

***, ** & * indicates significance level at 1%, 5% & 10% respectively

As can be seen from Table 8, a one period lagged lnExpoQ and LnRexR revealed negative and significant (at 1% level) impact on export level of haricot beans in the short-run. Equally, one period lagged lnProdQ and lnProdPri has negative impact on current year's export level of haricot bean, but statistically insignificant. Conversely, a one period lagged lnGDP, lnExpoPri, lnInfR had positive impact on export level of haricot bean in the short-run, although statistically insignificant. This implies that these variables have minimal impact on the level of haricot bean export in the short-run.

4. Discussion

The study result revealed that lnGDP, lnExpoPri, lnRexR, and lnInfR are important factors influencing export of haricot beans, which had positive and significant (at 1%) impact on the level of export. The results imply that a 1% increase or change in lnGDP, lnExpoPri, lnRexR, and lnInfR will lead to an augment in the level of haricot bean export by 0.79%, 2.8%, 1.4%, and 0.67%, respectively. LnGDP affects export of haricot beans positively and significantly, because higher economic growth of a nation will create higher capacity to export the product. This study result is consistent with the findings of Bereket (2020) [7] and Asres (2019. Bereket (2020) [7] studied the determinants of export level in Ethiopia and found that RGDP has a positive and significant impact on export level in Ethiopia, where a 1% increase in RGDP will cause an increase in the export by 0.69% on his part studied the determinants of Ethiopian export and reported that a unit increase in the GDP would highly and positively enhance the export of Coffee. With regards to exchange rate, this study supports the finding of who studied exchange rate and its volatility matter for international trade in Ethiopia. They found that the level of exchange rate has a positive impact on export trade in Ethiopia, implying that a 1% increase (devaluation) in domestic currency against foreign currency will result in a 0.14% increase in Ethiopian export trade.

Conversely, a one period lagged lnExport quantity had negative and significant (at 1% level) effect on current level of haricot beans export. The results imply that last year's export quantity will affect current year's export of haricot beans negatively. In view of last year's poor performance of haricot beans export to trade partners, exporters may discouraged to allocate their resources towards export of haricot beans in subsequent years. The result is similar the findings of Bonga (2018) [8] who examined import and export trade in Zimbabwe. He reported that past values of exports have a negative impact on current level of exports. However, the result of this study is contrary the finding of Eshetu and Mehare (2020) [10] who studied determinants of Ethiopian export and found that the coefficient of one period lagged value of export is positive and statistically significant at a 1 per cent level of significance. This implies that the level of export value in the preceding year has a positive and significant effect on the level of export value in the subsequent year.

Furthermore, a one period lagged lnGDP, lnExpoPri, and lnRexR had negative impact on current export level of haricot beans, but only lnGDP and lnRexR are statistically significant at 1% level. The coefficient of lagged lnRexR has negative and significant impact on haricot beans export level, because the shocks in real exchange rate during preceding year will discourage exporters to participate in international trade in the subsequent year. This result is collaborates with the findings of Fofanah (2020) [23] who in his study on the impact of real exchange rate on cocoa and coffee exports in Sierra Leone reported that a one period lagged LogRER had a negative effect on the subsequent year export levels of cocoa and coffee. However, the result contradicts with the findings of Ajao (2015) [3] who in his study on the determinants of real exchange rate in Nigeria found that a one period lagged real exchange rate had positive and significant influence on export levels of commodities.

Subsequently, a one period lagged exported quantity (lnExpoQ(-1)) of haricot beans had negative and significant (at 1% level) on current year's export of haricot bean in both the long- and short-run. The result implies that preceding year export level will negatively affect current year's haricot beans export. Equally, producer price (lnProdPri) of haricot beans had negative impact on current year's export level of haricot beans in both the long- and short-run, but statistically significant (at 1% level) in the long-run only. The result imply that domestic prices of haricot beans negatively affects current year's export level of haricot beans because of volatility of domestic prices which discourages exporters to engage in foreign export trade. On the other hand, LnRexR revealed negative and significant (at 1% level) impact on export level of haricot beans in the short-run while it had positive and significant (at 1% level) impact on export of haricot bean in the long-run. The justification for a positive relationship between the variables in the long-run implies that the exchange rate influences the trade surplus or deficit, the reverse being true. In general, a weaker domestic currency stimulates exports while a strong domestic currency hinders exports. This result is similar with the findings of who in their study on impact of real exchange rate and its volatility on export trade in Ethiopia

found that exchange rate had a positive impact on international trade in Ethiopia in the long-run. They reported that a 1% increase (devaluation) in domestic currency against foreign currency results in a 0.14% increase in Ethiopian international trade.

Conversely, lnGDP, lnExpoPri, and lnInfR had positive impact on current year's export level of haricot bean both in the long- and short-run, but significant in the long-run only. This implies that these variables have positive and significant effect on current year's export level of haricot bean in the long-run. This result is consistent with the findings of Bereket (2020) [7] in his study on the determinants of agricultural output in Ethiopia found that inflation rate has positive impact and significant at 1% level. Other thing remain constant a one percent increase in inflation rate increases agricultural output by 0.322 percent. Bereket (2020) [7] on his part studied the determinants of export in Ethiopia and reported that RGDP has a positive and significant impact on volume of exports in the long run. The result showed that holding other variable constant, a 1% increase in RGDP will cause increase in export volume by 0.69%.

5. Conclusion

The main objective of this study is to analyze factors influencing the export level of haricot beans in the country covering the period 1981 to 2020. The study applied the well-known autoregressive distributed lag (ARDL) model bound test as analytical tool. The variables considered for the study were: volume of haricot beans export, haricot beans production volume, gross domestic product, export price of haricot beans, producer prices of haricot beans, real exchange rate, and inflation rate.

The study portrayed that GDP, export price, real exchange rate, and inflation rate are important factors influencing export of haricot beans, which had positive and significant (at 1% level) impact on the level of haricot bean export. The results imply that a 1% increase or change in GDP, Export Price, Real Exchange Rate, and Inflation Rate will lead to an augment in the level of haricot bean export by 0.79%, 2.8%, 1.4%, and 0.67%, respectively. GDP affects export of haricot beans positively and significantly, because higher economic growth of a nation will create higher capacity to export the product. Conversely, a one period lagged export quantity considered as explanatory variable had negative and significant effect on current level of haricot beans export. The results imply that last year's export quantity will affect current year's export of haricot beans negatively. In view of last year's poor performance of haricot beans export to trade partners, exporters may discouraged to allocate their resources towards export of haricot beans in subsequent years. Furthermore, a one period lagged GDP, export price, and real exchange rate had negative impact on current export level of haricot beans, but only GDP and real exchange rate are statistically significant at 1% level. The coefficient of lagged real exchange rate has negative and significant impact on haricot beans export level, which was due the fact that the shocks in real exchange rate during preceding year will discourage exporters to participate in international trade in the subsequent year.

Subsequently, a one period lagged exported quantity of haricot beans had negative and significant (at 1% level) impact on current year's export of haricot bean in both the long- and short-run. This implies that the preceding year export level will negatively affect current year's haricot beans export. Equally, producer price of haricot beans had negative impact on current year's export level of haricot beans in both the long- and short-run, but statistically significant (at 1% level) in the long-run only. The result imply that domestic prices of haricot beans negatively affects current year's export level of haricot beans because of the volatility of domestic prices which discourages exporters to engage in foreign export trade. On the other hand, real exchange rate revealed negative and significant (at 1% level) impact on export level of haricot beans in the short-run while it had positive and significant (at 1% level) impact on export of haricot bean in the long-run. The justification for a positive relationship between the variables in the long-run implies that the exchange rate influences the trade surplus or deficit, the reverse being true. In general, a weaker domestic currency stimulates exports while a strong domestic currency hinders exports. Conversely, GDP, export price, and inflation rate had positive impact on current year's export level of haricot bean both in the long- and short-run, but significant in the long-run only. This implies that these variables have positive and significant effect on current year's export level of haricot bean in the long-run.

In sum, GDP, export price, real exchange rate, and inflation rate are important factors influencing export of haricot beans, which had positive and significant (at 1% level) impact on the level of haricot bean export, although the variables portrayed mixed results at their lagged periods. In view of this, the following are recommended. First, the macroeconomic policy reforms aimed at improving the growth of GDP that enhances the total export supply of the countries to the rest of the world should be taken. Secondly, the significant relationship between the real exchange rate and export performance indicates the need to ensure a stable exchange rate policy in order to avoid the exchange rate risk.

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10. Data Availability

The data used for this study can be made available upon request provided there is going to be compliance with the owners' policy concerning sharing.

11. References

1. Abdulkadir HG. Opportunities and Challenges of Ethiopian Oilseeds and Pulses Export Performance.

International Journal of Scientific & Engineering Research. 2020;11(7):1501-1551.
2. Abele W, Tefera T. Factors Affecting Production and Market Supply of Haricot Bean in Southern Ethiopia, Journal of Economics and Sustainable Development. 2015;6(15):103-108.
3. Ajao MG. The Determinants of Real Exchange Rate Volatility in Nigeria. Ethiopian Journal of Economics. 2015;24(2):43-62.
4. Akter N, Hong SJ. Education and economic growth in Haryana (India): Application of cointegration analysis and vector error correction model on supply response of pulses in Bangladesh. South Asian Studies. 2011;17(1):277-295.
5. Ali WO, Bett HK, Kiprop SK, Korir H. Economic Analysis of Spatial Integration of Pulse Market in Ethiopia; A case of Selected Pulse Market in Ethiopia. European Journal of Business and Management. 2014;6(33):100-1008.
6. Asres ZM. Determinants of Ethiopian export: An evidence from five commodities using time series analysis, M.Sc. Thesis, Addis Ababa University, Ethiopia; c2019.
7. Bereket I. The determinates of Export in Ethiopia, an Auto Regressive Distributive Lag Bound Test Approach. Journal of World Economic Research. 2020;9(1):20-26.
8. Bonga WG. Trade Balance Analysis in Zimbabwe: Import and Export Examination Using Vector Auto-Regression Model; c2018. MPRA Paper No. 89002, https://mpra.ub.uni-muenchen.de/89002/.
9. CSA. Agricultural Sample Survey 2018/2019 Area and Production of Major Crops, Statistical Bulletin. Addis Ababa, Ethiopia; c2019.
10. Eshetu, Mehare. Determinants of Ethiopian Agricultural Exports: A Dynamic Panel Data Analysis, Review of Market Integration. 2020;12(1-2):70-94.
11. FAO. AQUASTAT Country Profile – Ethiopia, Food and Agriculture Organization of the United Nations (FAO). Rome, Italy; c2016.
12. Francom MG. Ethiopia: Pulse Crops Market Update, Gain Report, USDA Foreign Agricultural Service; c2018.
13. Ntavoua HS. Impact of agricultural exports on economic growth in Cameroon. International Journal of Agriculture Extension and Social Development. 2021;4(1):49-53.
14. Kassie T. Market Chain of Haricot Bean: The Case of Sayint District, South Wollo Zone, Amhara National Regional State, Ethiopia, Unpublished M.Sc. Thesis, Haramaya University, Ethiopia; c2018.
15. Ketema AM. Determinants of agricultural output in Ethiopia: ARDL approach to co-integration. International Journal of Business and Social Research. 2020;10(3):01-10.
16. Lemu ET. Review of Haricot bean Value Chain in Ethiopia. International Journal of African and Asian Studies. 2016;24:65-72. www.iiste.org.
17. Begna T, Asrat Z. Evaluation of improved common bean (*Phaseolus vulgaris* L.) Varieties for yield and yield components at West Hararghe, Eastern Ethiopia. International Journal of Research in Agronomy. 2021;4(2):50-54.
18. Nguse T, Oshora B, Fekete-Farkas M, Tangl A, Desalegn G. Does the exchange rate and its volatility matter for international trade in Ethiopia? Journal of Risk and Financial Management. 2021;14(12):1-18. https://doi.org/10.3390/jrfm14120591.
19. Pesaran M, Shin Y, Smith R. Bounds Testing Approaches to the Analysis of Level Relationships. Journal of Applied Econometrics. 2001;16(3):289-326. https://doi.org/10.1002/jae.616.
20. Sawore A. Determinants of Export Trade in Econometric Study with Special Reference to Ethiopia. International Journal of Science and Research. 2016;5(12);132-137.
21. United Nations Population Fund. World population dashboard Ethiopia; c2021. Retrieved from: https://www.unfpa.org/data/world-population/ET.
22. Zenebe A. Value Chain Analysis of Dry White Haricot Bean in the Case of Berehet Woreda, Amhara Region, Ethiopia, Unpublished M.Sc. Thesis, Jimma University, Ethiopia; c2016.
23. Fofanaf P. Impact of Real Exchange Rate Fluctuations on Aggregate Cocoa and Coffee Exports in Sierra Leone, Journal of Economics and Behavioral Studies. 2020;12(2):34-56.
24. Merga D. Evaluation of some haricot bean (*Phaseolus vulgaris* L.) cultivars for growth characters and dry matter production, Advanced Journal of Plant Biology. 2021;2(1):1-5.