



INVESTIGATING THE FACTORS AFFECTING THE CAMEROONIAN
AGRICULTURAL EXPORT

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ABSTRACT

The study aimed at investigating the factors affecting the Cameroonian agricultural export such as GDP, population, cereal production, and arable land. Time series data from 1980 to 2021 was used. The data was collected from the Food and Agricultural Organization and the World Development Indicators. The autoregressive distribution lag model (ARDL) was used to test the relationship between the given variables. Results show that variables were stationary at the level of the first difference. The bound testing results also indicated that there is co-integration between the agricultural exports and other possible variables. The results from the ARDL model indicated that an increase in cereal production of 1% will lead to an increase in agricultural exports of 1.83% in the long run. Surprisingly, arable land reduces agricultural exports by 11.49% in the long run. In the short run, population and arable land enhance agrarian exports. The Granger causality test estimation, on its part, proved the evidence of unidirectional causality running from GDP and population towards agricultural exports. **Policymakers should implement policies to increase cereal production and optimize the use of arable land to boost Cameroonian agricultural exports.**

Key words: Agricultural, Arable, Area, Cereal and production

INTRODUCTION

Cameroon is a country in Central Africa with a rich and diverse agricultural sector. Agriculture contributes to about 20% of the country's GDP and employs about 60% of the labor force (Ndjidda *et al.*, 2022; **WDI**, 2019). The main agricultural products in the country include cocoa, coffee, cotton, palm oil, bananas, plantains, cassava, corn, and millet. These products are both consumed domestically and exported to regional and international markets. In the majority of African countries, agriculture is a vital industry for economic expansion. Nevertheless, the region has not made full use of this sector's importance. Africa's exports are still dominated by primary commodities, and over the past 40 years, agriculture's percentage of Sub-Saharan Africa's (SSA) countries overall exports has drastically decreased (**WB**, 2007). Few SSA countries have succeeded in diversifying their exports to a considerable extent. Through domestic production and revenue from exports, the agricultural industry in Cameroon is accountable for producing foodstuffs for the country's rural and urban inhabitants. Agricultural policy in the country has remained unstable despite this significant economic contribution. Public spending in this area has been static, with an average of only 4.5% of the state budget going to this sector annually (MINEPAT, 2016).

Cameroon's agricultural output grew by 4.2% between 2010 and 2022 (World Bank, 2022), during a period when it was the country's dominant economic activity and its main source of non-oil foreign earnings. The country saw significant growth in production and in earnings from agricultural exports in the two decades immediately following independence (1960s and 1970s). Despite having a clear comparative advantage in producing coffee, cocoa, cotton, palm oil, bananas, fruits, rubber, tea, and timber, Cameroon has been importing large amounts of food items like rice, maize, onions, tomatoes, milk, and poultry products over the past 15 years (Ofeh *et al.*, 2019). The importation has been extremely concerning since it reduces the capacity for local production and drives marginal companies out of the supply chain

as a result of unfavorable competition. This has an impact on output that could meet demand and generate foreign exchange through exports. Globally, many nations' growth and development policies have included encouraging agricultural development and lowering crop losses after harvest (Tandason *et al.*, 2023). Thus, agriculture serves as the primary driver of economic growth in Cameroon. **Figure 1** shows the trend in Cameroon's agricultural exports from 1980 to 2021, revealing that agriculture has a great deal of potential in Cameroon.

Although there are few studies on Cameroon's agricultural trade (Ofeh *et al.*, 2019; Gbetnkon and Khan, 2002), to the best of our knowledge, there appears to be no study that uses time series analysis to empirically understand Cameroonian agricultural exports using ARDL between 1980 and 2021. Therefore, this study is designed to address this literature gap. The ARDL model is commonly used for time series data to examine long-term and short-term correlations between variables within a single equation framework. While using the ARDL model with time series data, some researchers have used exports of agricultural products as dependent variables and factors like foreign direct investment, area sown, credit to agriculture, employment in agriculture, and population as independent variables. For example, Khan *et al.* (2020) looked at Pakistan and used these factors. No researcher has explored this topic in the same study area or over the same time span in Cameroon. This study will contribute to the literature and assist other researchers in comprehending the short-term and long-term factors influencing agricultural product exports. Furthermore, this study will aid the government of Cameroon in enhancing agricultural product exports and the agricultural gross domestic product of the country.

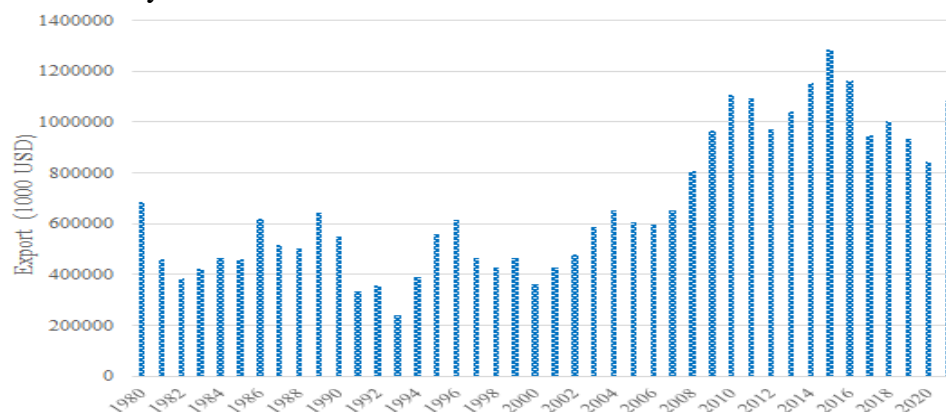


Figure 1: Showing the trends in Cameroon's exports from 1980 to 2021

Source: Authors own elaboration based on data from FAO 2023.

MATERIALS AND METHODS

Data Source

The annual data for the study were obtained from the World Development Indicators (WDI) and the Food and Agriculture Organization Database, covering the period from 1980 to 2021. Table 1 presents the details of the data used in the study and the sources from which the data were retrieved.

Table 1: Details of the variables and data source

Variable	Abbreviation	Unit	Data source
Agricultural export	AE	USD 1 000	FAOSTAT (2023)
Population total	PoP	actual figure	FAOSTAT (2023)
Cereal production	CP	metric tons	WDI (2023)
Arable Land Area	AL	1 000 ha	FAOSTAT (2023)
Gross Domestic Product	GDP	Current US\$	WDI (2023)

Source: Author's compilations.

Model specification

To examine the relationship between the dependent variable AE and the independent variables GDP, PoP, AL, and CP, a framework is established based on the ARDL model (Rehman *et al.*, 2020). Pesaran *et al.* (2001) introduced the ARDL bounding test method to examine the existence of cointegration and to confirm the short- and long-run equilibrium among the chosen time series data. This method is better than a simple cointegration method because it can look at variables at both the first difference level and even levels where variables are mutually co-integrated (Pesaran and Shin, 1998). Because the variables are not fixed. The ARDL method can be used to estimate the coefficients of one variable on another in the short and long run, as well as to estimate the effects of the endogenous explanatory variables (Pesaran and Shin, 1998; Pesaran *et al.*, 2001).

$$AE_t = f(GDP_t, PoP_t, AL_t, CP_t) \quad \dots(1)$$

Where: AE Agricultural Exports, GDP - Gross Domestic Product, PoP - Total Population, AL – Arable Land area, CP – Cereal Production, and t – The time Period.

After assuming the linear relationship between the study variables, the model is specified as Eq 2.

$$AE = \epsilon_0 + \epsilon_1 GDP + \epsilon_2 PoP + \epsilon_3 AL + \epsilon_4 CP + V_t \quad \dots(2)$$

By employing the logarithm to Eq. 2, the model follows a log linear form and can be expressed as follows in Eq 3:

$$\ln AE = \alpha_0 + \alpha_1 \ln GDP_t + \alpha_2 \ln PoP_t + \alpha_3 \ln AL_t + \alpha_4 \ln CP_t + \epsilon_t \quad \dots(3)$$

Where Ln denotes the logarithmic form, t acquires the time period and ϵ_t is the error term. Meanwhile, the coefficients α_i (Where $i = 1, 2, 3, 4$.) represent long-run elasticity.

Unit root Test

Stationarity is crucial for accurate regression analysis of time series data. Non-stationary variables can become stationary, but stationary variables remain eligible. Unit root testing procedures, such as Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) tests, are used to determine if variables are stationary. The PP test has a non-parametric nature and adjusts statistics for heteroscedasticity and autocorrelations. Fitting techniques are used to enable more data series to be stationary. However, the PP test is only effective with large sample sizes and weak small sample power (Maddala and Wu, 1999). The ADF and PP unit root tests were used in this study. Eq. (4) for the ADF unit root test is as follows:

$$\Delta Z_t = \phi_0 + \phi_1 Z_{t-1} + \sum_{j=k}^p \phi_j \Delta Z_{t-j} + P_t \quad \dots(4)$$

where: Z_t – the time series; Δ – first difference operator; ϕ_0 – constant; p – the dependent variable's optimum number of lags; P_t – pure white noise error term. The PP unit root Eq. (5) on the other hand can be expressed as follows:

$$\Delta Z_t = \phi + \rho * Z_{t-1} + P_t \quad \dots(5)$$

where: Z_t – time series; ϕ – noise for hypothesis; p – dependent variable's optimum number of lags; P_t – pure white noise error term. The ADF and the PP tests are simply based on the t-statistics.

ARDL bound testing method, short and long-run estimates

The ARDL model was introduced by Pesaran and Pesaran (1997); Pesaran and Shin (1998), and Pesaran *et al.* (2001) to analyze the long-run relationship between the time series variables AE, GDP, Pop, AL, and CP. The model is represented by Equation (6).

$$\begin{aligned} \Delta \ln AE_t = & \phi_0 + \phi_1 \sum_{i=1}^k \Delta \ln AE_{t-i} + \phi_2 \sum_{i=1}^k \Delta \ln GDP_{t-i} + \phi_3 \sum_{i=1}^k \Delta \ln Pop_{t-i} + \phi_4 \sum_{i=1}^k \Delta \ln Pop_{t-i} + \phi_5 \sum_{i=1}^k \Delta \ln Pop_{t-i} \\ & + \phi_6 \Delta \ln AE_{t-1} + \phi_7 \Delta \ln GDP_{t-1} + \phi_8 \Delta \ln Pop_{t-1} + \phi_9 \Delta \ln AL_{t-1} + \phi_{10} \Delta \ln CP_{t-1} + \epsilon_t \end{aligned} \quad \dots(6)$$

Where ε is depicts the white noise error term and Δ is the difference operator. The summation sign simply represents the error correction dynamics while Φ_0 depicts the constant. The second part of equation 6 simply represents the long run associations. When examining the long- run relationship among the study variables; if the value of F tests is more than the upper critical bonds, the results is inconclusive. Meanwhile, if the value of the F test is less than the lower critical bound, then the null hypothesis of no co integration among the variables will then be accepted. The Eq. (7) below depicts the long-run estimation model and can be stated as follows.

$$\Delta \text{LnAE}_t = \Phi_0 + \Phi_1 \sum_{i=1}^k \Delta \text{LnAE}_{t-1} + \Phi_2 \sum_{i=1}^k \Delta \text{LnGDP}_{t-1} + \Phi_3 \sum_{i=1}^k \Delta \text{LnPop}_{t-1} + \Phi_4 \sum_{i=1}^k \Delta \text{LnAL}_{t-1} + \Phi_5 \sum_{i=1}^k \Delta \text{LnCP}_{t-1} + \varepsilon_t \quad \dots(7)$$

If any evidence of the long-run association between the study variables is discovered then the short-run model will be projected. The short run model can be estimated as follows in Eq. (8).

$$\Delta \text{LnAE}_t = \lambda_0 + \lambda_1 \sum_{i=1}^k \Delta \text{LnAE}_{t-1} + \lambda_2 \sum_{i=1}^k \Delta \text{LnGDP}_{t-1} + \lambda_3 \sum_{i=1}^k \Delta \text{LnPop}_{t-1} + \lambda_4 \sum_{i=1}^k \Delta \text{LnAL}_{t-1} + \lambda_5 \sum_{i=1}^k \Delta \text{LnCP}_{t-1} + \mu \text{ECT}_{t-1} + \varepsilon_t \quad \dots (8)$$

The coefficient of the ECT is represented by μ in the estimated model

Granger Causality Test

Owing to the fact that the direction of causality cannot be estimated from the co-integration computation (Ang, 2007). This study used pair-wise granger causality to determine the causal directions within the variables.

RESULTS AND DISCUSSION

Descriptive statistics of the selected variables

The Table 2 below shows the overview of the descriptive statistics of the variables used in this study. The descriptive statistics seeks to show the level of the Skewness, Kurtosis, Jarque –Bera and the probabilities of the variables used in the study.

Table 2: Descriptive statistics of the selected variables

	LNAE	LNGDP	LNPop	LNCP	LNAL
Mean	13.32496	23.50121	16.52796	14.28097	15.60947
Median	13.30258	23.24235	16.52965	14.12025	15.60058
Maximum	14.06532	24.43129	17.09232	15.15597	15.64006
Minimum	12.38651	22.61199	15.95791	13.39601	15.59216
Std. Dev.	0.410756	0.581532	0.337432	0.575102	0.018987
Skewness	0.067248	0.175968	-0.013150	0.270803	0.959915
Kurtosis	2.188426	1.721404	1.832637	1.591762	2.057094
Jarque-Bera	1.156100	3.004388	2.329191	3.888970	7.815309
Probability	0.560991	0.222641	0.312049	0.143061	0.020088
Observations	41	41	41	41	41

Source: Author analyzed by using the Eviews software (version 10.0)

Unit Root Test

The empirical results of Augmented Dickey Fuller (ADF) and Phillip- Person (PP) unit root tests are stated in Table 3. These tests were recognized by **Dickey and Fuller** (1979) for the first time to inspect the stationary properties of variables. According to the ADF and PP tests, outcomes represent that some of the study variables are stationary at the level I(0) and some of them are stationary at the first difference I(1). This confirms the application of the application of the model.

Table 3: The results of the unit root test

Variables	LevelIntercept	Trend & Intercept	1 st difference Intercept	Trend & Intercept	Outcome
Augmented Dickey Fuller					
LnAE	-1.328	-2.816	-6.201***	-6.134***	I (1)
LnGDP	-0.489	-4.110***	-7.771***	-7.670***	I(0)/I (1)
LnPoP	-0.352	-6.472***	-2.449	-2.423	I (0)
LnAL	-0.575	-2.017	-6.317***	-6.287***	I (I)
LnCP	-0.588	-1.824	-1.388	-0.524**	I (1)
Phillip-Perron					
LnAE	-1.335	-3.280*	-7.013***	-6.984***	I (0)/I(1)
LnGDP	-0.567	-2.374	-7.771***	-7.670***	I (1)
LnPoP	-0.786	-1.891	-5.166***	-5.079***	I (1)
LnAL	-0.564	-2.017	-6.319***	-6.295***	I (1)
LnCP	-0.084	-3.321*	-9.877***	-9.115**	I(0)/I (1)

Source: Author analyzed by using the Eviews software (version 10.0)

Bound Testing

The ARDL bound testing method is used to define the co-integration between LnAE and other variables (LnGDP, LnPoP, LnAL, LnCP). The values of the critical bounds for both the samples of the small and large sizes are presumed by Pesaran *et al.* (2001). According to the Pesaran critical value table, if the F-State value is below the lower bound, then the alternative hypothesis will be rejected and the null hypothesis will be accepted. The null hypothesis will be rejected when the F-state value surpasses the upper bound critical value, and if the f-state value is between the upper bound and lower bound, then there is bias in results. The results are expressed in Table 4 and indicate that the value of F-Statistics is more than the upper bound critical value, and it is significant at 1% level which provides evidence that there is cointegration between the AE, GDP, PoP, AL and CP in Cameroon.

Table 4: Results of bounding test for cointegration using ARDL

Test Statistics	Value	K
F-statistics	6.777	4
Critical Value bounds		
Significance	I(0) bound	I(1) bound
10%	2.200	3.090
5%	2.560	3.490
1%	3.290	4.370

Source: Author analyzed by using the EViews software (version 10.0)

Long-run and Short- run Analysis Based on the ARDL

Table 5 shows the outcome of the Long-term and short-term association between AE and (CP, AL, GDP and PoP). These outcomes provide evidence of the existence of long run and short run correlation among the study variables. The relationship between CP and AE is positive and significant at the 1% level, with a coefficient of 1.83. This means that a 1% increase in CP will result in a 1.83% increase in AE. On the other hand, the coefficient of AL is negative and has a significant impact on AE. This indicates that an increase in AL will lead to a decrease in AE by 11.49%. This situation arises when the available AL for crop cultivation is not fertile, resulting in low yields. To address this issue, technology and better farming methods can be employed, such as the use of organic manure and fertilizers to improve soil fertility. This, in turn, will increase output and subsequently lead to an increase in AE (Abdullahi *et al.*, 2021). In terms of short-term relationships, Lag 1, 2, and 3 of AE exhibit positive outcomes with different levels of significance ranging from 1% to 5%. The coefficient

values for these relationships range from 0.40 to 0.96. The POP variable shows a positive effect with a significance level of 1% and a coefficient value of 164.54. This implies that a 1% increase in POP will lead to a 165% increase in AE. The growth in population in exporting countries will result in increased production, supply, and improved export capacity. Additionally, countries with larger populations will have a greater demand for products and will be more inclined to increase their imports.

Table 5: Long run and short run analysis based on ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Long-run estimates				
LNGDP**	-0.107722	0.229573	-0.469227	0.6449
LNPop(-1)	-0.410528	0.773819	-0.530521	0.6026
LNCP(-1)	1.831621	0.481634	3.802930	0.0014***
LNAL(-1)	-11.49056	5.193480	-2.212497	0.0409**
C	180.9313	77.70861	2.328330	0.0325**
Short-run estimates				
ECT(-1)*	-1.726024	0.318201	-5.424320	0.0000***
D(LNAE(-1))	0.940881	0.219433	4.287779	0.0005***
D(LNAE(-2))	0.902803	0.249531	3.617999	0.0021***
D(LNAE(-3))	0.550355	0.196043	2.807316	0.0121**
D(LNPop)	164.5282	47.29503	3.478763	0.0029***
D(LNPop(-1))	-66.99455	30.95290	-2.164403	0.0450**
D(LNPop(-2))	68.76177	21.91151	3.138158	0.0060***
D(LNCP)	-0.203183	0.346707	-0.586036	0.5656
D(LNCP(-1))	-2.011932	0.531232	-3.787296	0.0015***
D(LNCP(-2))	-1.826409	0.404581	-4.514320	0.0003***
D(LNCP(-3))	-0.730007	0.295301	-2.472075	0.0243**
D(LNAL)	-4.487650	4.333385	-1.035599	0.3149
D(LNAL(-1))	6.333888	4.464286	1.418791	0.1740
D(LNAL(-2))	4.684771	4.167451	1.124134	0.2766
D(LNAL(-3))	7.066531	3.998469	1.767309	0.0951*
R-squared	0.806217	Mean dependent var		0.018827
Adjusted R-squared	0.589636	S.D. dependent var		0.201352
S.E. of regression	0.128985	Akaike info criterion		-0.954858
Sum squared resid	0.282833	Schwarz criterion		-0.084092
Log likelihood	37.66488	Hannan-Quinn criter.		-0.647872
F-statistic	3.722478	Durbin-Watson stat		2.384790
Prob(F-statistic)	0.004410			

Source: The Long run and short run estimates analyzed with the use Eviews 10

CP has a negative impact on AE at significance levels of 1% and 5%. The results indicate that an increase in CP will significantly decrease AE by approximately 1.52%. In the short term, an increase in CP may cause a decline in AE due to the use of low-yielding seed varieties. This means that without implementing scientific research approaches or strategies to develop high-yielding seeds, agricultural exports may not increase. However, conducting extensive research in the long term to produce high-yielding seed varieties can greatly enhance agricultural output and subsequently lead to an increase in AE. This finding is consistent with a study conducted by [Chandio et al. \(2023\)](#), which examined the impact of technological development (including fertilizer and pesticide consumption) and information and communication technology (ICT) on CP in four Asian countries (Indonesia, Malaysia, the Philippines, and Thailand). The study demonstrated that technological development and ICT play a vital role in boosting CP and ensuring food security in the selected Asian countries.

AL area has a positive effect on AE at a 10% significance level, with a coefficient of 7.07. This means that a 1% increase in AL area will lead to a 7.07% increase in AE. This result

is consistent with a study by Mirza *et al.* (2016) in Pakistan and Han and Chen (2018) in China. Mirza *et al.* (2016) analyzed Pakistan's cash crop export trends from 1980 to 2009 and concluded that increasing the area sown with cash crops significantly increases cash crop exports. This result is also similar to earlier studies by Tilman David (1999), who stipulated in his study that the doubling of agricultural food production during the past 35 years was associated with a 1.68-fold increase in the amount of irrigated cropland and a 1.1-fold increase in land cultivation. The result of the error correction term (ECT-1) supports the rejection of the null hypothesis and supports an alternative hypothesis with a negative coefficient and a 1% significance level.

The Granger causality tests

The granger causality test provides estimates to check the directional causal connections between the study variables. The results of the granger causality test are presented in table 6. Based on the table the following explanations can be deduced: First; the hypothesis that GDP does not Granger cause agricultural export and that agricultural export does not Granger cause GDP are rejected at 5%. This implies that there is a unidirectional relationship between the both of them. Thus, they both cause each other. Second; the hypothesis that *PoP* does not granger cause AE and that AE does not granger cause *PoP* are rejected at 10%. This implies that there is a unidirectional relationship between *PoP* and AE. That is, they both cause each other. Third; the hypothesis that CP does not granger cause Agric export is rejected at 5%. Fourth; the hypothesis that AE does not granger because AL is rejected at 5%. This shows a bidirectional relationship between AE and AL area. More so; the hypothesis that GDP does not granger cause *PoP* is rejected at 5%. This shows a bidirectional relationship between GDP and *PoP*.

Furthermore, the hypothesis that CP does not granger because GDP is rejected at 10% this shows a bidirectional relationship between CP and GDP. Moreover; the hypothesis that GDP does not granger because area is rejected at 5%. This shows a bidirectional relationship between GDP and AL area. The hypothesis that *PoP* does not granger because CP is rejected at 1%. This shows a bidirectional relationship between POP and CP. Lastly, the hypothesis that CP does not granger cause AL area is rejected at 5%. This shows a bidirectional relationship between CP and AL area.

Table 6: Granger causality tests

Null Hypothesis:	Obs.	F-Statistic	Prob.
LNGDP does not Granger Cause LNAE	40	4.11048	0.0249**
LNAE does not Granger Cause LNGDP		4.29140	0.0215**
LN <i>PoP</i> does not Granger Cause LNAE	40	2.73690	0.0786*
LNAE does not Granger Cause LN <i>PoP</i>		2.74849	0.0779*
LNCP does not Granger Cause LNAE	40	4.82847	0.0141**
LNAE does not Granger Cause LNCP		0.03937	0.9614
LNAL does not Granger Cause LNAE	39	0.75879	0.4760
LNAE does not Granger Cause LNAL		3.77961	0.0329**
LN <i>PoP</i> does not Granger Cause LNGDP	40	1.46024	0.2460
LNGDP does not Granger Cause LN <i>PoP</i>		4.79394	0.0145**
LNCP does not Granger Cause LNGDP	40	2.65459	0.0845*
LNGDP does not Granger Cause LNCP		1.10712	0.3418
LNAL does not Granger Cause LNGDP	39	0.14026	0.8696
LNGDP does not Granger Cause LNAL		4.61781	0.0168**
LNCP does not Granger Cause LN <i>PoP</i>	40	0.25540	0.7760
LN <i>PoP</i> does not Granger Cause LNCP		6.76281	0.0033***
LNAL does not Granger Cause LN <i>PoP</i>	39	0.22778	0.7975
LN <i>PoP</i> does not Granger Cause LNAL		2.32954	0.1127
LNAL does not Granger Cause LNCP	39	0.39643	0.6758
LNCP does not Granger Cause LNAL		3.86661	0.0307**

Note: *, **, & *** shows the rejection of acquired null hypothesis at 10%, 5% and 1% significance levels.

Robustness Tests

In order to assess the validity and stability of the ARDL model test used in this study, the cumulative sum of squares (CUSUMSQ) and cumulative sum (CUSUM) tests, developed by *Brown et al. (1975)*, were employed. The figures indicate that the plot falls within the significance limit at the 5% level in both the CUSUM and CUSUMSQ tests, as shown in Figures 2 and 3. This provides strong evidence that all the parameters utilized in the model estimation remain stable throughout the sample period. Thus, the parameters and model employed in this research are deemed reliable and efficient.

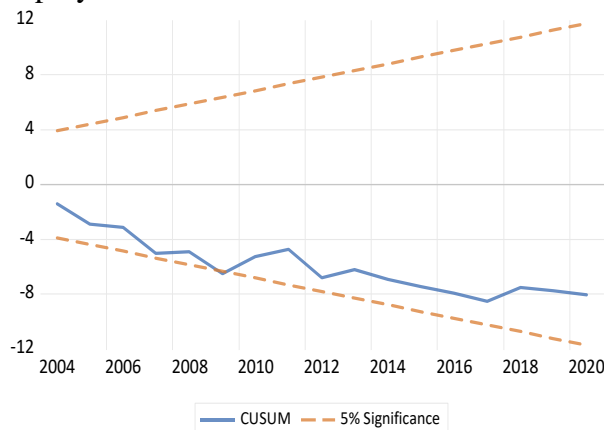


Figure 2: The CUSUM test

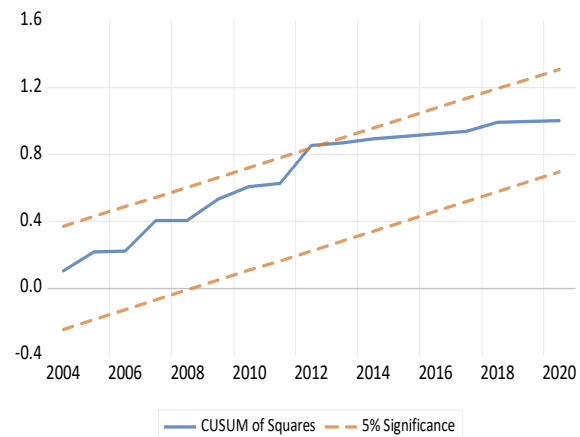


Figure 3: The CUSUM of squares outcome

Source: The robustness test results have been analyzed with the use Eviews 10

CONCLUSION AND POLICY IMPLICATIONS

The study examined the factors that affect agricultural exports in Cameroon using annual time series data from 1980 to 2021. The ARDL model was utilized. The results showed that some of the variables in the study were stationary at both the level and first difference. The bound testing results also indicated that the F-Statistics value exceeded the upper bound critical value and was significant at the 1% level, providing further evidence of cointegration between agricultural exports and other variables.

Furthermore, the results indicated that a 1% increase in cereal production would lead to a 1.83% increase in agricultural exports in the long run. Additionally, a 10% increase in arable land area would result in a 7.07% increase in agricultural exports, which would contribute significantly to reducing food insecurity in Cameroon. The Granger causality test confirmed the presence of unidirectional causality running from GDP and population towards agricultural exports. Moreover, the CUSUM and CUSUM Q tests demonstrated the stability and reliability of this particular model.

Based on the findings, several key policy implications emerge. First, the government of Cameroon should formulate policies and strategies to increase the availability of agricultural land for farmers. This would greatly enhance productivity and consequently boost exports. Second, it is crucial to provide farmers with a wider range of high-quality seed varieties. This would not only increase yields but also contribute to the growth of agricultural exports. Additionally, the government should focus on developing technological expertise for crop cultivation, as the country is projected to experience population growth and urbanization, potentially leading to food shortages. It is imperative to promote and implement new and eco-friendly farming methods, such as greenhouse cultivation and aquaculture. Moreover, the government should explore new export markets to enhance agricultural product exports. To



support farmers in increasing their output for both domestic consumption and exportation, the government should provide credit facilities. Lastly, adequate funding for research to develop high-yielding seed varieties is essential, as this will ultimately lead to increased exports and contribute to overall GDP growth. Therefore, one of the primary goals for developing countries should be to enhance yield per unit of land, thereby improving output, exports, and GDP.

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