Export-Led Policy, Agricultural, Industrial, and Financial Sectors Growth in Cameroon

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Abstract

This paper investigates the relationship between export and sectoral growth in Cameroon. The study retrieves time series data from the World Bank database during 1970-2021 . It applies the unit roots test, the Johansen cointegration test, and vector error correction model to investigate the long-run relationship between export expansion and sectoral growth. The results indicate that the long-run relationship exists between export and agricultural, industrial, as well as financial sectors' growth in Cameroon. The impulse response function clearly shows that a unique shock to export would positively affect sectoral growth. In general, it suggests that the export-led policy will eventually enhance the economic growth and development in the agricultural, industrial, and financial sectors in Cameroon.

Keywords: Export-led, Agricultural, Industrial, Financial, Cameroon

JEF Classification Code: F1, Q1, L6, G2, Q5

1. Introduction

Cameroon is the largest and the most diversified economy in the Economic Community of Central Africa (CEMAC), but its private and public sectors' growth still depends steadily on agricultural resources. More income should be generated from its industrial sector and a well-developed financial system. For example, the International Monetary Fund (IMF) suggests that the Cameroon government should work with the IMF agents to strengthen its diverse economy, boost export growth, and improve sectoral development (IMF, 2022). In 1980, Cameroon shifted from import-substitution regulations to an export-substitution strategy to reverse the prolonged economic crisis, which was primarily caused by external shocks such as falling international commodity prices and a declining oil price. Cameroon has continued to serve as an engine that drives commerce in the entire CEMAC region; however, its agricultural, industrial, and financial sectors have witnessed uneven economic growth over years. As a major player in fostering regional economic growth, Cameroon contributes 80% of trade to Central Africa and Chad, even though others such as Gabon and Equatorial Guinea rely heavily on food supplies (IMF, 2022). Apparently, the pressure exerted on Cameroon's agricultural, industrial, and financial sectors by its neighboring countries is a major challenge, not only to Cameroonian but also to the global or regional economy. This study builds on the theoretical framework of Guo and Luo (2017) stating that an imperfect or poorly managed financial sector is exponentially inhibiting firms' export growth. Specifically, it assumes that implementing strategies that foster the quantity and quality of exports in Cameroon will enhance the growth and development of its agricultural sector, industrial sector, and financial sectors. Therefore, the domestic firms' productivity will eventually increase, leading to export expansion as well as alleviation of poverty within the country and the entire CEMAC region (Fondem and Luo, 2022).

Export has contributed substantially to economic growth in Cameroon according to the existing literature. Harold (2018) supports a positive long-run equilibrium relationship between exports and economic growth in Cameroon. However, the study fails to address how exports are related to the agricultural sector, manufacturing sector, and financial sectors. Some early studies in Sub-Sahara African countries also support a positive relationship between export and economic growth, such as those of Michaely (1977), Balassa (1985), Bleaney and Greenaway (2001), Edo et al. (2020), and Calderon et al. (2020), but they never attempt to investigate its relationship among agricultural sector, industrial sector, and financial sector growth. The export-orientation strategy has proven to be an important ingredient in fostering economic growth because it supports total factor productivity, reduces foreign exchange constraints, increases product varieties, and boosts individual choices, thus, setting downward pressure on prices. Nevertheless, this paper attempts to investigate the relationship among export and agricultural sector, industrial sector, and financial sector growth in Cameroon, which has important implication for specific policy implementation. Particularly, it will shed lights on economic growth, employment increase, and poverty reduction in Cameroon. The findings would be beneficial for Cameroonians to better evaluate their export-oriented strategies.

In 2021, the World Bank recognized Cameroon as a low-middle-income country, although Cameroon is endowed with plentiful natural resources that include oil, gas, minerals ores, and agricultural products such as cocoa, timber, banana, cotton, and coffee. Oil is among the major exporting products which have contributed 40% of total exports, according to the

World Factbook 2021. It is evident that the growth of oil exports and its rising prices should not cause the government to overemphasize and rely heavily on crude oil exportation alone but rather implement diversification in its export-oriented strategies. In fact, in the 1970s, when the government of Cameroon discovered oil, it focused mainly on oil exploration as its primary export and neglected industrial products and financial development. The results of its actions were catastrophic as this action dragged the country into a deep recession.

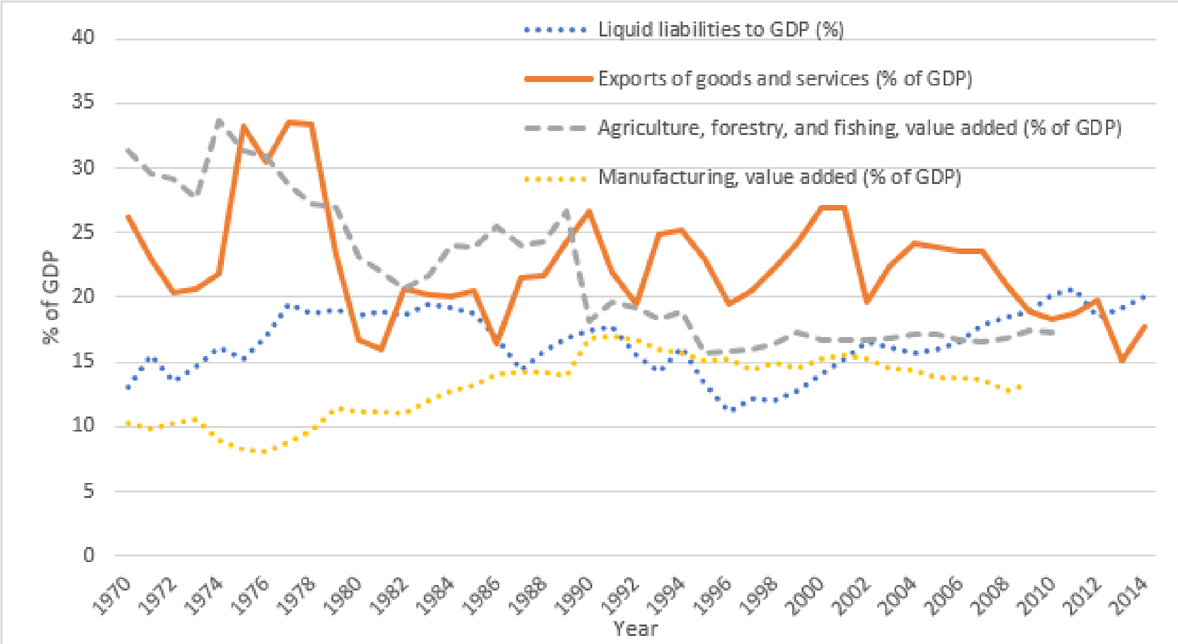

Figure 1. The Evolution of Export, Financial, Industrial, and Agricultural Sectors as a Percentage of GDP in Cameroon

The above chart depicts the evolution of export and the sectoral growth from 1970 to 2021. It is shown that agro-industrial products have continuously experienced a dramatic decline since the 1977 when the falling international commodities market price started. However, with the implementation of macroeconomic reforms, Cameroon has made substantial progress in the manufacturing sectors, measured as the value added in mining, manufacturing, construction, electricity, water, and gas. After 1980, this variable peaked up when the country implemented comprehensive macroeconomic and structural reform programs. Comparing to the agricultural, forestry, and fishing sectors, which are characterized by the net output of the primary sectors, after adding all the output and subtracting intermediary products, their industrial sector is growing at a faster pace.

The chart shows that liquid liability as a percentage of gross domestic product (GDP) does not follow the similar trends as other variables. The liquid liability as a percentage of GDP, which depicts the financial development in Cameroon has a relatively weak performance. A well-developed financial sector is paramount to economic growth because it channels domestic savings to small and medium-sized enterprises (SMEs) which, in turn, strengthen their productive capacity and lead to economic growth. The level of liquid liability as a percentage of the GDP indicates the strength of the financial sectors in the Cameroonian economy. It depicts the total economic activities in the financial sector. From the above graphs, the financial sector development indicates an underdeveloped financial market. Though the country has made some progress in the total export of goods and services as a percentage of GDP, it continuously declined from 2010 and drastically dropped in 2020. This substantial decline in Cameroon's exports signals that the country is not only experiencing an imperfect financial market, but also suffering from advancements in technologies, research and development, and external shocks like the COVID-19 pandemic.

Investigating the relationship between export and sectoral growth in Cameroon will reveal insightful information about the association of exports and sectoral development in Cameroon. It will equally help the Cameroon government to develop a plan of action on how to manage export revenue and efficient resource allocation in all three sectors. The findings of this study will not only help fight poverty in Cameroon but also support the government's ongoing struggle for job creation in the country.

2. Literature Review

Previous studies on the export-led growth (ELG) hypothesis in both developing and developed countries have applied various econometric techniques and different model specifications to investigate the validity of ELG hypothesis. The empirical results of cross-sectional rank correlation, cross-sectional regression, and country-to-country time series studies have mixed findings in different regions. There is no unanimous conclusion on the relationship between exports and economic growth. Some researchers apply cross-sectional analysis while others focus on country-to-country specific characteristics in examining the ELG hypothesis. This study is quite different from previous studies because it examines the relationship between exports and sectoral growth in Cameroon. specifically, we examine how export expansion has influenced the agricultural sector, industrial sector, and financial sector growth. While previous studies investigate the relationship between exports and growth using cross-sectional and linear regression approaches, this study applies the Johansen cointegration method to investigate the long-run relationship between export and sectoral growth.

Few cross-sectional literature argues that ELG hypothesis is valid to some specific countries while may not be valid to others. For example, Tingvall and Ljungwall (2012) use the ordinary least square technique with panel data for 68 countries to determine if the ELG hypothesis has been more beneficiary to China. Using a multiple linear regression model, they found that ELG hypothesis has been an instrument igniting the economic transformation in China. The study using regression model only examines the effects of exports on economic growth in 68 Chinese counties, and it does not establish the long-run relationship between export and sectoral growth. Comparably to the work of Tingvall and Ljungwall (2012), scholars such as Findlay (1984) and Bahmani-Oskooee et al. (2005) who apply the rank correlation test to investigate the causal link between export and economic growth in 61 developing countries from 1960 to 1999 by using panel cointegration tests, the authors found that there exists strong evidence of cointegration between export and economic growth.

Though the authors integrate cointegration testing, the model specification mainly focuses on a causal relationship between exports and economic growth. According to these results, export-oriented strategies should potentially cause economic growth in the long run. Though these scholars have shown how an increase in productivity is caused by export expansion can enhance economic growth, their findings are limited because they failed to illustrate the relationship between exports and sectoral growth. It is imperative to examine how exports are associated with all three sectors of an economy. Most emerging economies depend on an effective capital market financing their agricultural sectors and manufacturing sectors.

In addition to the cross-sectional study that demonstrated a valid ELG hypothesis, Daoud and Basha (2015) investigate the ELG hypothesis for three Arabian countries: Jordan, Kuwait, and Egypt through the application of cointegration and Granger causality tests. The study used time series data from 1976 to 2013 and found strong evidence of a long-run relationship between exports and real output growth in all three countries. There was a bidirectional causality between export and real GDP for Jordan whereas unidirectional causality from export to real GDP for Kuwait and Egypt. The results of this study imply that Jordan, Kuwait, and Egypt can expand their domestic market by exporting products to other nations to enhance economic growth. Although these studies that have investigated the relationship between exports and economic growth, they have not examined the relationship between exports and sectoral growth (Love and Chandral,2005).

Different methodologies have also shown mixed results between exports and economic growth. Shirazi and Manap (2007) examine the ELG hypothesis for five South Asian countries using cointegration and multivariate Granger Causality test. The authors find strong support for cointegration among export, import, and real output in four countries except for Sri Lanka, while in Bangladesh, Nepal, and Pakistan, the study shows a unidirectional causality from export to economic growth. The findings provide evidence for policymakers to identify effective trade policies that might attract an inflow of capital and a gain from economies of scale. Moreover, Love and Chandral (2005) test the ELG hypothesis in South Asia countries with the application of cointegration and error correction model. Although India, Maldives, and Nepal exhibited evidence to support the ELG hypothesis, Bangladesh and Bhutan showed an invalid result of the ELG hypothesis. There was no proof of causality in either direction for Pakistan and Sri Lanka.

Similar to the methodology adopted by Jim and Ramesh (2005), Dreger and Herzer (2013) argue that export does not directly influence economic growth. With the application of a panel co-integration technique for 45 developing countries, they found a positive short-run bidirectional causality between GDP and export. However, the long-run results showed a significantly negative relationship. It indicates that the heterogenous cross-sectional characteristics among these countries do not enhance the impact of exports on the non-export GDP. Therefore, the inconclusive results concerning the export-led hypothesis were envisaged in those developing countries.

The literature has also shown that the relationship between export and economic growth is either positive or negative in different countries. For example. Ofeh (2014) determines the impact of export revenue on growth and poverty level, while Ndzembanteh (2016) investigates whether exports, imports, exchange rates, and gross domestic investment are among the major determinants of economic growth in Cameroon. With the application of the Johansen cointegration test, Ndzembanteh (2016) finds that there is a positive long-run relationship between exports and economic growth in Cameroon. Both the exchange rate and domestic investment show a positive long-run relationship with economic growth except for negative imports. Similarly, Ofeh (2014) applies causality methodology to investigate the relationship between export, economic growth, and poverty in Cameroon and finds unidirectional causality from the human development to economic growth and export. In addition to the determination of export and economic growth in Cameron. In addition, Harold (2018) adopts dynamic approaches and find a positive relationship between export and economic growth in Cameroon. However, these studies did not investigate the relationship among exports, financial, agricultural, and industrial sectors. The three major sectors play a notable role in economic transformation and development in Cameroon.

Furthermore, country-level studies have applied different econometric methodologies to test ELG hypothesis. For example, Bahmani-Oskooee et al. (2005) apply the multiple regression method and the neo-classical production function with real GDP as the dependent variables while labor, gross fixed capital formation, real exchange rate, foreign direct investment, and trade openness as independent variables. Their results indicated a positive but insignificant relationship between exports and economic growth in some groups of developing countries. Apart from that, Shan and Sun (2010) investigate the ELG hypothesis with the use of an augmented neo-classical economic production function. Toda and Yamamoto (1995) investigate the nature of causality between export and real GDP growth using Granger causality test; they found a bidirectional causality link between export and economic growth in China. Unlike the previous study which built on a two-variable relationship, this study built a vector autoregression (VAR) model in the context of a production function. This allows for bias mitigation in the model specification. Moreover, Gokmenoglu and Taspinar (2015) investigate the ELG hypothesis for Costa Rica through the application of the Johansen cointegration and Granger causality tests. Their results indicated that a long-run relationship between exports and economic growth exists in Costa Rica.

Nevertheless, this study contributes to existing literature by investigating the relationship between exports and economic development in all three sectors such as agricultural, industrial, and financial sectors. In brief, the hypotheses are expressed as follows.

- H1: There is a positive long-run relationship between export and agricultural sector growth in Cameroon.
- H2: There is a positive long-run relationship between export and manufactural sector growth in Cameroon.
- H3: There is a positive long-run relationship between export and financial sector growth in Cameroon.

3. Data

This study uses time series data obtained from the World Bank database. The data are for the

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period from 1970 to 2021 because they capture the entire business cycle in Cameroon and yield beneficial results to policymakers for the decision-making process. To carry out this study, it selects the total exports of goods and services in the dollar value as key variable. The financial sector is proxied as liquid liabilities, also known as broad money or M3. It is the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), and plus travelers' checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents. It is a good indicator to proxy the development of the financial sector in Cameroon because it reflects the depth of money in the overall economy.

Industry sector (including construction) comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas. The value added is the net output of a sector after adding up all outputs and then subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets, or depletion and degradation of natural resources. The value added is determined by the international Standard Industrial Classification (SIC). Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, etc, in addition, net acquisitions of valuables are also considered capital formation. Gross domestic savings are calculated as GDP less final consumption expenditure (total consumption). All data are in current U.S. dollars. The missing data are obtained by using extrapolation and interpolation methods to account for validity of data analysis.

4. Methodology

4.1 Model Specification

The VAR model was used to analyze multivariate time series data obtained from the World Bank database from 1970 to 2021. As the variables are agricultural, industrial, and service growth. For other variables, it includes exports, gross domestic saving, gross fixed capital formation, and imports of goods and services. This study employs the multivariable VAR models specified below.

$$lnLLUS_t = \alpha + \sum\beta_i LnLLUS_{t-i} + \sum\theta_j LnEXUS_{t-j} + \sum\rho_m LnGDSUS_{t-m} + \sum\pi_n LnAFFUS_{t-n} + \sum\mu_p \Delta LnICVUS_{t-p} + \sum\sigma_v LnIMUS_{t-v} + \sum\tau_z LnGCFUS_{t-z} + \varepsilon_{1t} \quad (1)$$

$$LnAFFUS_t = \varphi + \sum\beta_i LnLLUS_{t-i} + \sum\theta_j LnEXUS_{t-j} + \sum\rho_m LnGDSUS_{t-m} + \sum\pi_n LnAFFUS_{t-n} + \sum\mu_p LnICVUS_{t-p} + \sum\sigma_v LnIMUS_{t-v} + \sum\tau_z LnGCFUS_{t-z} + \varepsilon_{1t} \quad (2)$$

$$LnICVUS_t = \gamma + \sum\beta_i LnLLUS_{t-i} + \sum\theta_j LnEXUS_{t-j} + \sum\rho_m LnGDSUS_{t-m} + \sum\pi_n LnAFFUS_{t-n} + \sum\mu_p LnICVUS_{t-p} + \sum\sigma_v LmIMUS_{t-v} + \sum\tau_z LnGCFUS_{t-z} + \varepsilon_{1t} \quad (3)$$

Where:

LnLLUS is the log transformation of liquid liabilities in millions, also known as broad money supply M3.

LnAFFUS is the log transformation of agricultural, forestry and fishing value added.

LnICVUS is the log transformation of manufacturing, mining, electricity, and gas.

LnIMUS is the log transformation of imports of goods and services.

LnEXPUS is the log transformation of exports of goods and services.

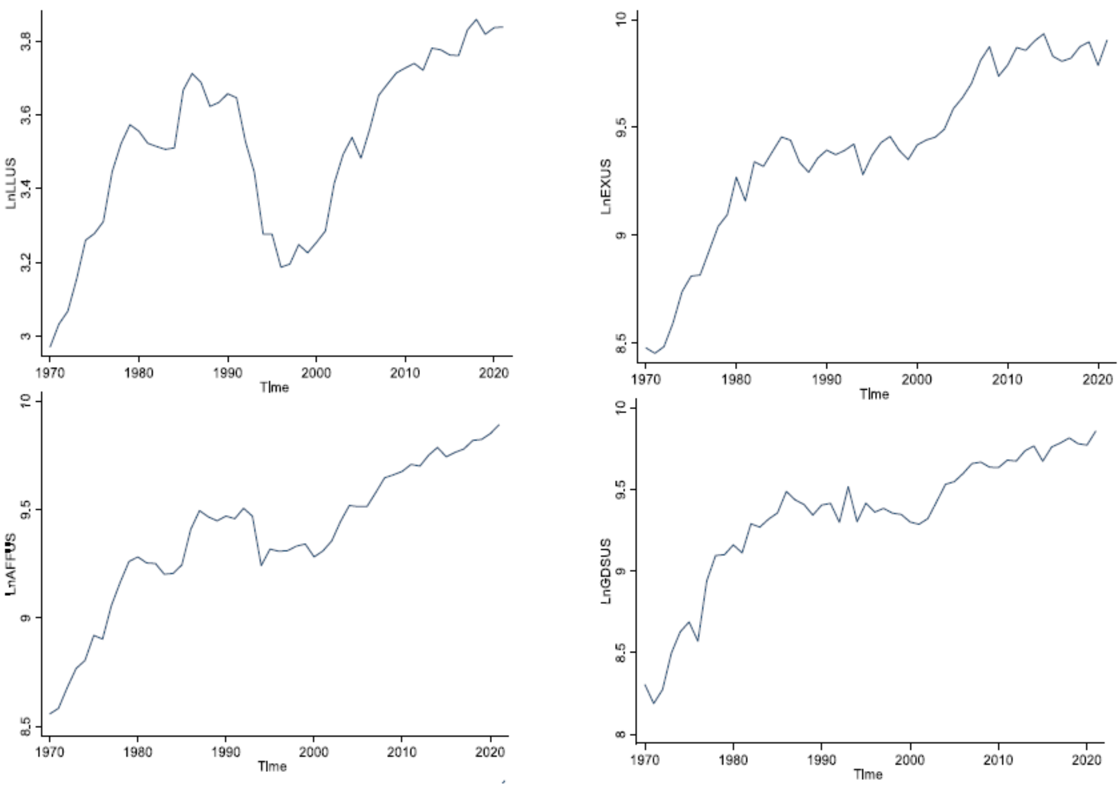
LnGDSUS is the log transformation of gross capital formation.

LnGCFUS is the log transformation of foreign direct investment.

All values are expressed in U.S. dollars. *K* is the total optimal lag length identified in the model. *t* denotes the time period. ε_{1t} is the error term.

4.2 Unit Root Tests

To investigate the relationship among export expansion, financial sector growth industrial growth, and agricultural growth in Cameroon, it performs the ADF (Dickey and Fuller,1981) and Philip Perron (PP) unit root tests because the presence of a unit root problem in a time series model would potentially affect the true economic interpretation of the results (Luo and Lan, 2018). Before conducting the ADF and Philip Perron unit roots tests, this study plots the time series in Figure 2. The graphs were performed to determine the series properties such as trends, drift, and constants.



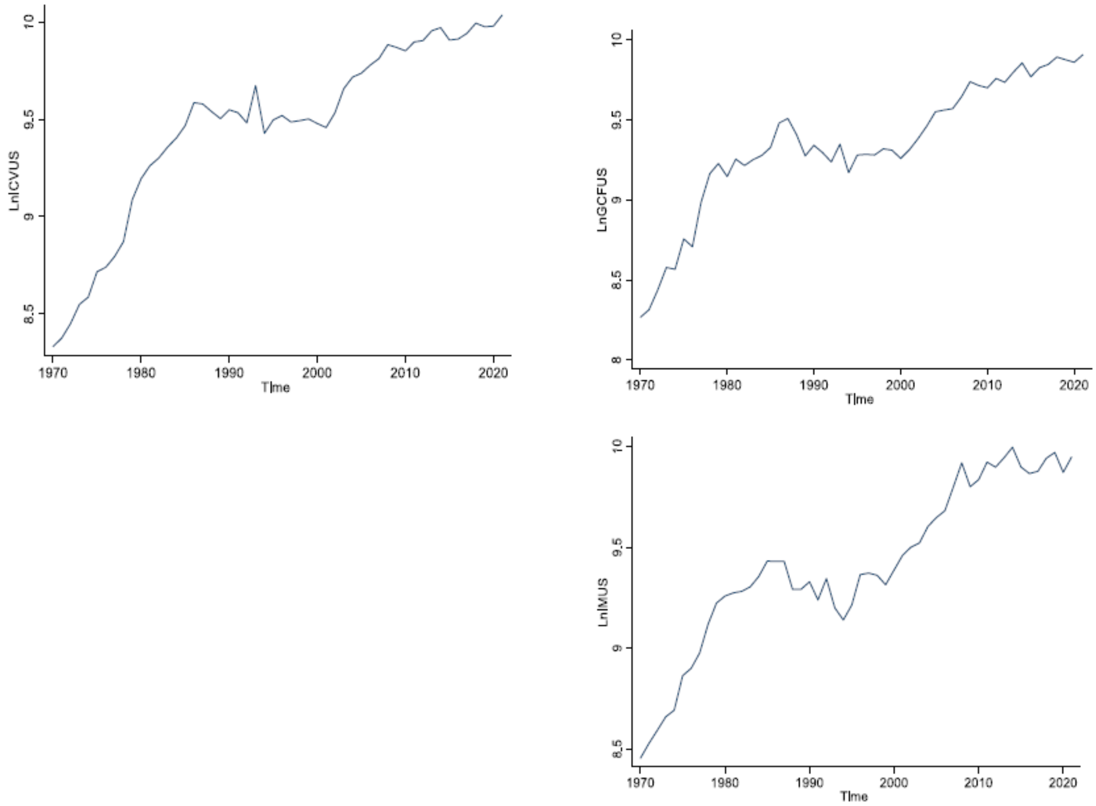


Figure 2. Time Series Graph of Selected Variables

The ADF test results are displayed in Table 1. It indicated that all the variables are non-stationary at level but stationary in first difference. As shown in Table 1, the t-values of the ADF unit root tests for the dependent variables such as LnAFFUS, LnLLUS, and LnICVUS are -2.971, -2.121, -2.462, respectively. The absolute values are less than the critical values of -4.150, -3.500, -3.180 at the 1%, 5%, and 10% significant levels, respectively. Also, the t-values of the ADF tests for the independent variables such as LnEXUS, LnIMUS, LnGDSUS, and LnGCFUS are -2.614, -2.412, -3.228, and -3.037, respectively. The absolute values are also less than the critical values at the 1%, 5%, and 10% significant values, respectively. Based on results, we failed to reject the null hypothesis and concluded the presence of unit root at level in the above variables.

Unlike the unit root tests at level, the first difference indicates stationarity in all the variables as shown in Table 1. The t-values of the ADF in the first difference for the dependent variables such as LnAFFUS, LnLLUS, and LnICVUS are -4.458, -3.562, and 4.765, respectively. The absolute values are more than the critical values of – 4.159, -3.504, -3.182 at the 1%, 5%, and 10% significant values respectively. Similarly, the t-values of the ADF tests in first difference for the independent variables such as LnEXUS, LnIMUS, LnGDSUS, and LnGCFUS are -5.562, -5.248, -5.777, and -4.687, respectively; the absolute values are greater than the critical values of -4.159, -3.504, and -3.182 at the 1%, 5%, and 10% significant levels, respectively. Hence, this study rejects the null hypothesis and concludes that all the series are stationary after performing the first difference of the ADF test. The similar test applied to PP unit root test.

Accordingly, this study conducted the PP unit root test. The PP test confirms the results from ADF test, for brevity, this study will not present the PP results, but they are available upon request. According to the ADF and PP unit roots test results, the agricultural, industrial, and financial sectors' performance, including macroeconomic variables such as import of goods and service, gross national savings, and gross capital accommodation are non-stationary at level but stationary after taking their first differences, which then provoke further investigation of the linear combination among the these variables.

Table 1. Augmented Dickey-Fuller Test

Dependent Variables					**Independent Variables**			
LnAFFUS		Statistic	*p*-value		LnEXUS		Statistic	*p*-value
	Level	-2.971	0.140			Level	-2.614	0.273
	1st diff	-4.458	0.002			1st diff	-5.562	0.001
LnLLAUS					LnIMUS			
	Level	-2.121	0.534			Level	-2.412	0.374
	1st diff	-3.562	0.007			1st diff	-5.248	0.001
LnICVUS					LnGDSUS			
	Level	-2.462	0.140			Level	-3.228	0.079
	1st diff	-4.765	0.001			1st diff	-5.777	0.001
					LnGCFUS			
						Level	-3.037	0.122
						1st diff	-4.687	0.001
Critical values		**1%**	**5%**	**10%**				
	Level	-4.15	-3.5	-3.18				
	1st diff	-4.159	-3.504	-3.182				

This table reports the results from Augmented Dickey-Fuller test. The null hypothesis is that the time series follow random walk with or without drift. The total number of observations is 50.

This study further performs the lag-order selected criteria for the structural VAR model in Table 2. Based on the LR, AIC, and HQIC tests, we select the optimal lag length of 4 for the multivariate VAR model.

Table 2. Lag-Order Selection Criteria

Lag	**LL**	**LR**	***df***	***p***	**AIC**	**HQIC**
0	415.361	960.17			-17.015	-16.9119
1	655.715	480.71	49	0	-24.9881	-24.1631
2	725.346	139.26	49	0	-25.8477	-24.3009
3	782.873	115.06	49	0	-26.2031	-23.9343
4	894.561	223.37*	49	0	-28.815*	-25.8245*

Sample period: 1974 through 2021. The total number of observations is 48. * indicates the optimal number of lags selected.

4.3 Johansen Cointegration Test

According to the Johansen cointegration test results in Table 3, at least one cointegration equation is bound to exist among the equations at the 5% significant level. The trace and engine value statistics show that the null hypothesis of no cointegration among the variables for the ranks of 0, 1, 2, 3, and 4, respectively. At rank 1, the trace statistics of 315.945 is greater than the critical value of 124.24 at the 5% significant level, which rejects the null hypothesis of no cointegration among the variable and concludes that there is a cointegration among the variables. Therefore, there are more than three cointegration equations in the VAR model. As shown in the Table, with the maximum rank of 5, the trace statistics is 25.44 and less than the critical value of 29.68 at a 5% significant level, which means we failed to reject the null hypothesis, and conclude that there are four cointegration equations in the Johansen test. Therefore, there is a long-run relationship among the variables in the VAR model. Hence, the agricultural, industrial, and financial sector growth are associated with export expansion in Cameroon. The evidence of long-run relationship between export and sectoral growth confirms the recommendation of IMF (2022) that Cameroon can strategically diversify its resources to export products and enhance sectoral growth in the country.

Table 3. Johansen Cointegration Test

Max rank	Params	LL	Eigenvalue	statistic	Critical Value at 5%
0	154	736.5896	.		
1	167	796.3452	0.91707	315.942	124.24
2	178	837.0255	0.8164	196.4308	94.15
3	187	870.0301	0.74721	115.0703	68.52
4	194	881.8397	0.38864	49.061	47.21
5	199	889.0498	0.25949	25.4417*	29.68
6	202	893.6352	0.17392	11.0217	15.41
7	203	894.5606	0.03782	1.8508	3.76

Sample period: 1974 through 2021. The total number of observations is 48. The optimal number of lags is selected based on eigenvalue statistic. * indicates rejection of the null hypothesis at the 5% critical value.

4.4 Vector Error Correction Model estimation

The Johansen cointegration suggests that there is a need to perform the Vector Error Correction Model (VECM) because the variables are integrated. According to the VECM results, it shows that export has a significantly positive impact on agricultural sector growth. While in the long-run, gross capital formation has a significantly negative impact on agricultural sector growth at the 1% significant level. Therefore, in the long run, the export of goods and services has significant power in predicting the movement of the agricultural sector growth in Cameroon.

The VECM estimation from the output results is stipulated below.

$$\Delta LnAFFUS = -1.2251 + \Delta LAFFUS_{t-1} + 0.2514\Delta LnLLUS_{t-1} + 0.6394\Delta LnICVUS_{t-1}$$

$$- 6.8148LnIMUS_{t-1} + 6.9603\Delta LnEXUS_{t-1} + 5.7266\Delta LnGDSUS_{t-1} \text{-} 7.4965\Delta LnGCFUS_{t-1}$$

The error correction coefficient reveals that the adjustment speed is 6.96 and statistically significant at 1%. It indicates that historical years' errors, which account for the long-run deviation from the equilibrium are corrected in the current year at a convergence speed. In the short run, the import of goods and services has a significantly negative impact on agricultural sector growth at the 1% level in Cameroon. This results are consistent with Gilbert et al. (2013) that some agricultural products, such as cocoa and coffee, are not significantly contributing to economic growth in Cameroon, which implies that Cameroon should support research and development as well as increase productivity and value-added of these products.

Table 4. Vector Error Correction Model Estimation for LnAFFUS

Sample: 1972 - 2021	Number of	obs		=	50	
Log likelihood = 685.6641	AIC			=	-24.6666	
	HQIC			=	-23.6618	
	SBIC			=	-22.0279	
Equation	Parms	RMSE		R-sq	chi2	P>chi2
D_LnAFFUS	9	.037058		0.7447	119.6039	0.0000
D_LnICVUS	9	.054399		0.5852	57.85021	0.0000
D_LnLLUS	9	.054822		0.3865	25.8274	0.0022
D_LnIMUS	9	.070347		0.3669	23.75595	0.0047
D_LnEXUS	9	.06248		0.4559	34.35618	0.0001
D_LnGDSUS	9	.087313		0.3928	26.52473	0.0017
D_LnGCFUS	9	.067101		0.5361	47.38544	0.0000
Cointegrating equations						
Equation	Parms	chi2		P>chi2		
_ce1	6	1285.197		0.0000		
Johansen normalization restriction imposed						
Beta	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
_ce1						
LnAFFUS	1	.	.	.	.	.
LnICVUS	.6396	.17959	3.56	0.000	.28761	.9916
LnLLUS	.2514	.0808	3.11	0.002	.09292	.4098
LnIMUS	-6.8148	.9223	-7.39	0.000	-8.6226	5.0071
LnEXUS	6.9603	.9578	7.27	0.000	5.0829	8.8375
LnGDSUS	5.7266	.7825	7.32	0.000	4.1930	7.2602
LnGCFUS	-7.4965	.9302	-8.06	0.000	-9.3196	-5.6733
Constant	-1.2251	.	.	.	.	.

When LnLLUS is the target variable, the Johansen-normalization equation shows that export and capital formation have a significantly positive impact on the financial sector growth at the 1% significant level, while import and investment formation have a significantly negative impact on financial sector growth at the 1% significant level. The error correction coefficient reveals that the adjustment speed of export is 27.686 and statistically significant at 1%. which account for the long-run deviation from the equilibrium are corrected in the current year at a faster convergence speed than that in agricultural sector.

$$\Delta LnLLUS = -4.873 + \Delta LnLLUS_{t-1} + 3.9778\Delta LAFFUS_{t-1} + 2.5442\Delta LnICVUS_{t-1}$$
$$-27.108 LnIMUS_{t-1} + 27.686\Delta LnE \quad US_{t-1} + 22.779\Delta LnGDSUS_{t-1} - 29.819\Delta LnGCFUS_{t-1}$$

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Table 5. Vector Error Correction Model Estimation for LnLLUS

Sample: 1972 - 2021		Number of		obs	=	50
Log likelihood = 685.6641				AIC	=	-24.66656
				HQIC	=	-23.66177
				SBIC	=	-22.02797
Equation	Parms	RMSE		R-sq	chi2	P>chi2
D_LnLLUS	9	.054822		0.3865	25.8274	0.0022
D_LnAFFUS	9	.037058		0.7447	119.6039	0.0000
D_LnICVUS	9	.054399		0.5852	57.85021	0.0000
D_LnIMUS	9	.070347		0.3669	23.75595	0.0047
D_LnEXCUS	9	.06248		0.4559	34.35618	0.0001
D_LnGDSUS	9	.087313		0.3928	26.52473	0.0017
D_LnGCFUS	9	.067101		0.5361	47.38544	0.0000
Cointegrating equations						
Equation	Parms			chi2	P>chi2	
_ce1	6			91.62794	0.0000	
Johansen normalization restriction imposed						
Beta	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
_ce1						
LnLLUS	1					
LnAFFUS	3.9778	.7425	5.36	0.000	2.5225	5.433
LnICVUS	2.5442	.68101	3.74	0.000	1.2095	3.8789
LnIMUS	-27.108	3.79556	-7.14	0.000	-34.5472	-19.669
LnEXUS	27.686	3.9476	7.01	0.000	19.9493	35.4236
LnGDSUS	22.779	3.2557	7.00	0.000	16.3981	29.1602
LnGCFUS	-29.819	3.9389	-7.57	0.000	-37.5394	-22.0993
Constant	-4.873					

According to the Johansen-normalization test results, it show that, when LnICVUS is the target variable, in the long run, export and gross capital formation have a significantly positive impact on the industrial sector growth in Cameroon. The error correction coefficients are 10.8819 and 8.9532, respectively, which indicates that the long-run deviation from the equilibrium are corrected in the current year in industrial sector. According to the results from VECM, in the short run, the export of goods and service has a positive impact on industrial sector growth at the 1% significant level in Cameroon. In sum, export has a significantly positive short-run and long-run impact on the agricultural, industrial, and financial sector growth in Cameroon.

$$\Delta LnICVUS = -1.9154 + \Delta LnICVUS_{t-1} + 1.5634\Delta LAFFUS_{t-1} + .393\Delta LnLLUS_{t-1}$$
$$-10.655 LnIMUS_{t-1} + 10.8819\Delta LnEXUS_{t-1} + 8.9532\ \Delta LnGDSUS_{t-1} - 11.7203\Delta LnGCFUS_{t-1}$$

Table 6. Vector Error Correction Model Estimation for LnICVUS

Sample: 1972 - 2021			Number of	obs	=	50
Log likelihood = 685.6641			AIC		=	-24.66656
			HQIC		=	-23.66177
			SBIC		=	-22.02797
Equation	Parms		RMSE	R-sq	chi2	P>chi2
D_LnICVUS	9		.054399	0.5852	57.85021	0.0000
D_LnAFFUS	9		.037058	0.7447	119.6039	0.0000
D_LnLLUS	9		.054822	0.3865	25.8274	0.0022
D_LnIMUS	9		.070347	0.3669	23.75595	0.0047
D_LnEXUS	9		.06248	0.4559	34.35618	0.0001
D_LnGDSUS	9		.087313	0.3928	26.52473	0.0017
D_LnGCFUS	9		.067101	0.5361	47.38544	0.0000
Cointegrating equations						
Equation	Parms		chi2		P>chi2	
_ce1	6		1116.916		0.0000	
Johansen normalization restriction imposed						
Beta	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
_ce1						
LnICVUS	1	.	.	.	.	.
LnAFFUS	1.5634	.3048	5.13	0.000	.966	2.1609
LnLLUS	.3930	.1259	3.12	0.002	.14634	.63975
LnIMUS	-10.655	1.3729	-7.76	0.000	-13.345	-7.9638
LnEXUS	10.8819	1.4923	7.29	0.000	7.9571	13.8069
LnGDSUS	8.9532	1.2672	7.07	0.000	6.4695	11.4369
LnGCFUS	-11.7203	1.5232	-7.69	0.000	-14.706	-8.7349
Constant	-1.9154					

4.5 The Impulse Response Functions

We further expand our investigation by conducting the impulse response functions (IRFs), which clearly elucidate the subsequent impact of one standard deviation shock in the stochastic error terms on a target variable within a specified period of time. The graphical representations of these IRFs are presented in the Figures 3, 4, and 5, respectively.

The graphs illustrate how export-led policy shocks to agricultural, industrial, and financial sectoral growth. Considering the VAR model with LnAFFUS as the dependent variable, a response to one standard deviation shock to export, other regressing variables show subsequent dynamic movements on agricultural sector growth. Specifically, one standard deviation shocks to export and capital formation trigger a positive short-run and long-run movement in agricultural sector growth in Cameroon.

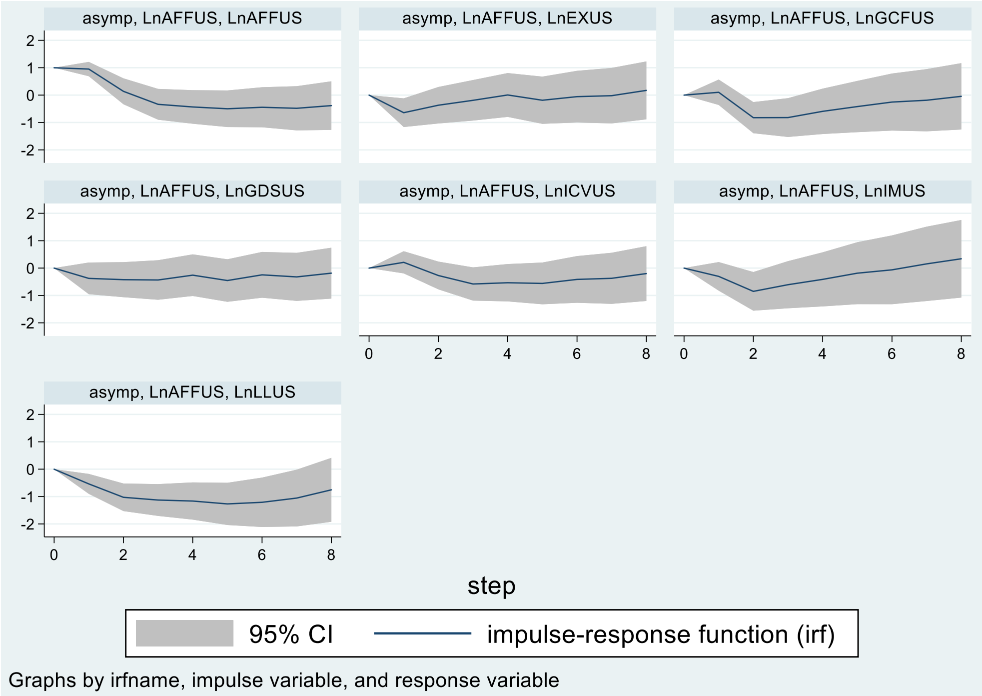

Figure 3. Impulse Response Functions of LnAFFUS

In our VAR framework with LnLLUS as the dependent variable, a one-standard-deviation shock to export and foreign direct investment triggers a positive short-run impact on financial sectoral growth. Apparently, regressors such as capital formation and export demonstrate a significantly positive long-run effect on financial sectoral growth.

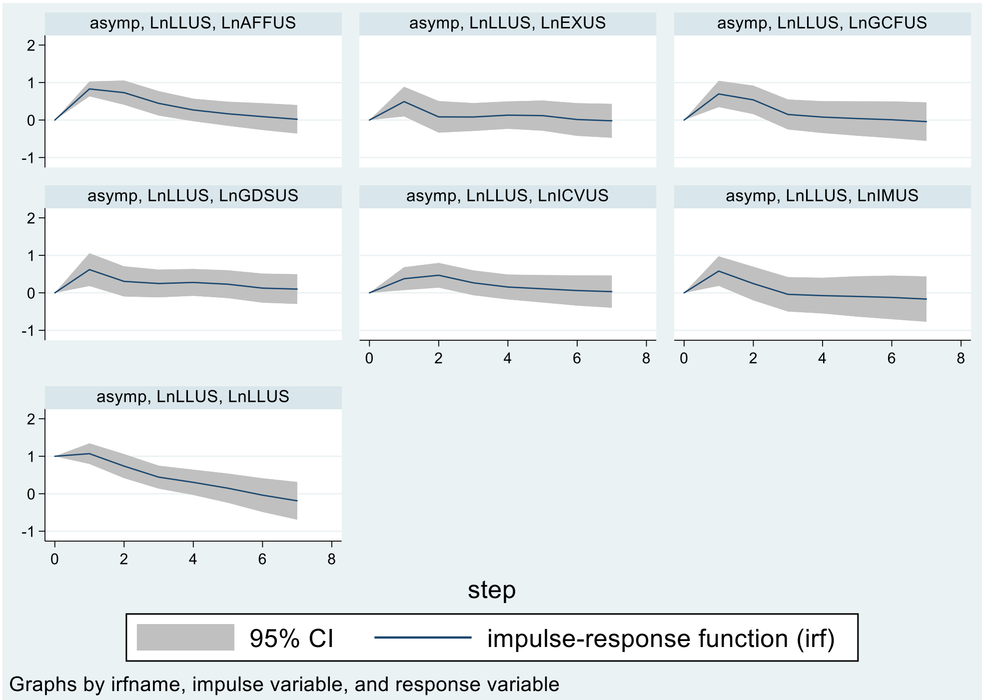

Figure 4. Impulse Response Functions of LnLLUS

In the VAR model with LnICVUS as the dependent variable, the analysis reveals that a one-standard-deviation shock to export is associated with a negative short-run impact but triggers a long-run positive effect on industrial sectoral growth. Furthermore, the findings indicate that one standard deviation responses of export and capital formation exhibit statistically significant positive impacts in both the short-run and long-run movement of industrial sectoral growth.

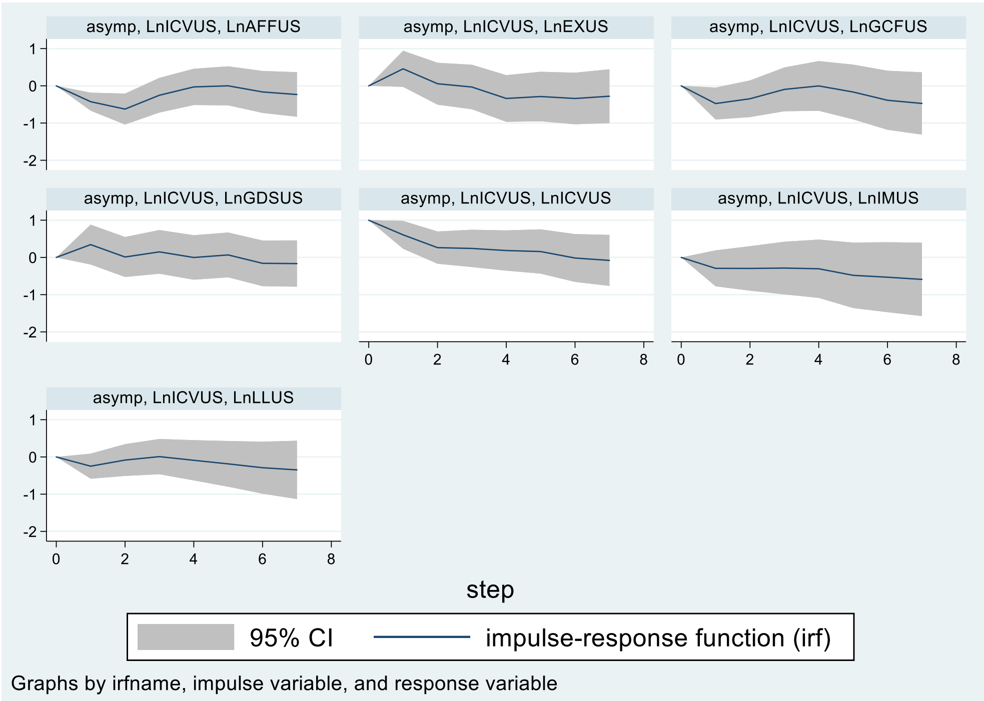

Figure 5. Impulse Response Functions of LnICVUS.

Generally, the IRF graphical analyses clearly show that there is a positive shock to the variable under investigation; export has a significantly positive short-run and long-run impact on the agricultural, industrial, and financial sector growth in Cameroon.

5. Concluding Remark

This paper investigates the long-run relationship between export and sectoral growth in Cameroon using time series data obtained from the World Bank database during 1970-2021. First, it employs the ADF and PP unit roots test to examine the nature of the time series data; the results indicate that all the variables are non-stationary at level but stationary after taking their first difference. Moreover, it conducts the Johansen cointegration test and VECM estimation. The Johansen cointegration confirms that there is a long run cointegration among exports, agricultural, and financial sector growth in Cameroon. Further, the VECM estimation illustrates that the long-run deviations from the equilibrium are corrected in the subsequent years at a convergence speed about 20%. Finally, the IRF graphs indicate that one standard deviation responses of export exhibit significantly positive impacts in both the short-run and long-run movement of agricultural, industrial, and financial sector growth in Cameroon.

There are several implications associated with these results. Firstly, it suggests that the Cameroon government should foster the growth and development of SMEs to boost export growth, which will eventually sustain the expansion of sectoral growth. Secondly, Cameroon should promote and expand an open trade policy to the rest of the world because import of capital equipment has a significant impact on the growth of the agricultural and industrial sectors. Thirdly, Cameroon should continue to implement its export oriented policy as it is an essential tool for job creation, unemployment reduction, and poverty reduction. Finally, the presence of a long-term relationship between export and all three sectors' growth suggests that Cameroon should diversify its resources to better enhance growth and sustainability.

The results are consistent with the findings of Gilbert et al.(2013), Ofeh (2014), and Harold (2018) that export-led growth is valid in Cameroon. These results imply that Cameroon should support research and development as well as increase in productivity and value-added products. The findings also corroborate the work of Guo and Luo (2017) that firms in an underdeveloped financial market would suffer from financial support, thus leading to export constraints. Thus, the government of Cameroon should adopt a diversified developmental strategy by investing in human capital development and technological progress, and effectively promoting the development of the financial markets. Therefore, the Cameroon government should foster research and development to enhance productivity and output in all three sectors. To conclude, this study reveals that Cameroon can boost its agricultural, industrial, and financial sectors' growth through increases in export of goods and services.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Macrothink Institute.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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