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Agricultural Exports, Economic Growth and Households Consumption in Togo

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Abstract The role of exports in stimulating economic growth continue to be the subject of many investigations. In effect, despite theoretical foundations establishing the relationship between exports and economic growth, disagreements are persistent concerning the direction of causality and the magnitude of effects. In developing countries where agriculture is a growth sector, it is worth determining the role of agricultural exports in economic growth and households' welfare. In this paper, we have determined the relationships between agricultural exports and economic growth on the one hand and between agricultural exports and households' consumption on the other hand in Togo. In this respect, we have performed Granger causality tests and estimate error correction models. The results indicate that there exist a unidirectional causal relationships from the agricultural exports to economic growth and households' consumption. The results of estimation of error correction models revealed that, deviations from the long-run equilibrium in the relationship between agricultural exports and economic growth are resorbed at the rate of 44.9 percent per year whereas deviations from the long-run equilibrium in the relationship between agricultural exports and households consumption are resorbed at the rate of 28.4 percent per year. The results suggest that, policies towards agricultural exports promotion in Togo will not only stimulate economic growth but also improve households' consumption.

Keywords: *agricultural exports, economic growth, households' consumption, Togo*

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1. Introduction

The role of exports in stimulating economic growth continue to be the subject of many investigations. In effect, despite theoretical foundations establishing the relationship between exports and economic growth, disagreements are persistent concerning the direction of causality and the magnitude of effects [1]. Theoretically, for some authors, exports lead economic growth [2,3] while for others, economic growth drives exports expansion [4,5]. For some others more, there exist a bidirectional causal relationship between exports and economic growth [6,7]. Empirical investigations have found an effective relationship between exports and economic growth. Some authors have found that economic growth is driven by exports while some others have found that exports expansion is driven by economic growth, and in many cases, results have shown that there exist a bidirectional causal relationship between exports and economic growth [1,8,9].

Despite disagreements and controversial results concerning the direction of causality between exports and economic growth, with the success of Asian countries such as Hong Kong, the South Korea, Singapore and Taiwan, there has been a consensus at the early 1980 among development economists and multilateral organizations such as the World Bank and the International Monetary Fund that exports promotion is favourable to economic growth [10]. In effect, exports expansion can stimulate economic growth directly as a component of aggregate demand. Exports expansion can also affect economic growth indirectly through an improved resources allocation, a better exploitation of productive capacity, the exploitation of economies of scale and an improved technology due to the global market competition [11]. Moreover, exports expansion allows increasing foreign exchange holdings which could be used to increase intermediate goods imports which in turn will increase capital formation and so stimulate economic growth [2,12].

However, some arguments suggest that the positive externalities associated to exports expansion could not be effective in some developing countries such as those in Sub-Saharan African who are specialized in primary commodity exports which are often subject to prices fluctuations on the international market. In effect, the theory of unequal exchange developed by Emmanuel [13] postulate that, the exchange between developed and developing countries lead the latter to be specialized in primary commodity which in turn lead to undesirable

outcome such as overproduction affecting exports revenue, technological dependency and the degradation of terms of trade. So, beyond the issues of direction of causality and the magnitude of effects on the relationship between exports and economic growth, the issue of the existence of an effective relationship between exports and economic growth must be widely investigated in developing countries for an evidence-based policy implementation.

In Togo, exports being dominated by primary commodity, the country have experienced a significant decrease of its exports foreign exchange holdings in 70s during the petroleum choc. That situation coupled by macroeconomic disequilibria have led Togo to adopting structural adjustment policies in the latter 80s. Under structural adjustment program, the country has liberalized its productive and commercial sectors by releasing progressively production activities and setting up tariff and customs reforms to promote exports. Exports promotion has been effective by the adoption of two sectoral policies, one in favour of coffee, cocoa and cotton exports and the other in favour of manufacturing goods exports [14]. The first policy consisted of sustaining producer prices and the later consisted of removing exports licence, exportations taxes exemption on industrial products and the creation of industrial zone for exportation in 1990 (by setting up conditions for a better competitiveness).

The objective of these exports promotion policies has been to stimulate economic growth, restore macroeconomic equilibrium and to resorb unemployment. However, the agricultural and industrial production and manufacturing have experienced a decline during the first stage of structural adjustment program in Togo as for most of countries in the West Africa [15]. During the stages II and III of structural adjustment program, liberalization policies have led to a greater increase of imports than exports and so to a persistent deficit of the current account [16]. The economic growth in real terms has been so modest with an average growth rate of 1.1 percent between 1999 and 2003, the real gross domestic product (GDP) decreased and poverty has increased [17] and exports have started decreasing in 2000 [18].

Given that context, Johnson [14] has determined the direction of causality between exports and economic growth in Togo on the period 1965-2002 and did not find a long-run relationship between exports and economic growth. But recently, Adeve [18]; Kpemoua [19] and Karabou [20] have investigated the impact of exports of goods and services on economic growth and found that there exist a long-run relationship between exports and economic growth. Adeve [18] on the period 1970-2010 and Karabou [20] on the period 1961-2014 have found that exports have a positive and significant impact on economic growth in the long-run and short-run. Especially, Kpemoua [19] on the period 1960-2014 has found that there exist a unidirectional Toda and Yamamoto causality from exports to economic growth in Togo.

Despite the importance of agriculture in the Togolese economy, no study has investigated the role of agricultural exports in economic growth in Togo. Thus, even though it is recognized through different sectoral policies that given the fact that the major part of Togolese households are dependent on agriculture for their livelihood and so the emphasis must be put on agriculture for an effective poverty reduction, these policies seem to ignore the importance of agricultural exports in economic growth and households welfare. So, the purpose of this paper is to investigate the relationships between agricultural exports and economic growth on the one hand, and between agricultural exports and households consumption in Togo on the other hand. The results of Johansen cointegration indicate that there exist a stable long-run relationship between agricultural exports and economic growth on the one hand and between agricultural exports and households consumption on the other hand. Granger causality tests reveal the existence of a unidirectional causality from agricultural exports to economic growth and households' consumption. The results of estimation of error correction models revealed that, deviations from the long-run equilibrium in the relationship between agricultural exports and economic growth are resorbed at the rate of 44.9 percent per year whereas deviations from the long-run equilibrium in the relationship between agricultural exports and households consumption are resorbed at the rate of 28.4 percent per year.

The rest of the paper is organized as follows: in section 2, we present the material and methods, in section 3, the results of different estimations are presented and discussed and the last section concludes.

2. Material and Methods

2.1. Agricultural Exports and Economic Growth

In this study, we have made use of the Solow-Swan growth model based on neoclassical production function as our theoretical framework allowing to derive our growth model. The Solow-Swan growth model explains economic growth in the long-run by considering capital accumulation, labor and technical progress. Given the attractiveness of the Solow-Swan model, it is often considered as the departure point for different extensions [21]. Following the hypothesis of constant return of scales, the aggregate production function is given by:

$$Y_t = K_t^{\alpha} L_t^{\beta} B_t \quad (1)$$

Where Y, K, L and B represent respectively the GDP, the capital, labor and Hicks productivity term. Agriculture being a driver of economic development, Hwa [22] has introduced in the Solow-Swan growth model, agricultural production to capture the contribution of agriculture to economic growth. Likewise, the variables such as exports and the inflation rate being identified as determinant in explaining total productivity growth [22]; Awokuse [21] has introduced these variables in the theoretical model of Solow-Swan. As our first objective is to determine the impact of agricultural exports on economic growth, our extension consist of including in the Solow-Swan model, agricultural and non-agricultural exports, the consumer price index and the real exchange rate. So the parameter B of equation (1) becomes a function of these variables as follows:

$$B = f\left(X_a, X_{na}, CPI, E\right) = X_{at}^{\delta} X_{nat}^{\phi} CPI_t^{\gamma} E_t^{\eta} \quad (2)$$

Where X_a represent the agricultural exports, X_{na} is non-agricultural exports, CPI is the consumer price index and E, the exchange rate. Replacing the parameter B by its expression in equation (1) gives:

$$Y_t = K_t^{\alpha} L_t^{\beta} X_{at}^{\delta} X_{nat}^{\phi} CPI_t^{\gamma} E_t^{\eta} \quad (3)$$

Taking the logarithm of equation (3), we obtain the following econometric model:

$$\ln Y_t = \lambda + \alpha \ln K_t + \beta \ln L_t + \delta \ln X_{at} + \phi \ln X_{nat} + \gamma \ln CPI_t + \eta \ln E_t + \varepsilon_t \quad (4)$$

Where ε_t is the error term, λ, α, β, δ, ϕ, γ and η are parameters to be estimated.

2.2. Agricultural Exports and Households Consumption

Following different theory of consumption [23,24,25,26] and the results of empirical studies on the determinants of households consumption [27,28], the consumption function can be expressed as follows:

$$C_t = f\left(Y_t^D, W_t, Z_t\right) \quad (5)$$

Where C_t representing households consumption is a function of their disposable income Y_t^D ; their wealth W_t and vector of other determinants Z_t which represent liquidity constraint, effects of substitution and uncertainty in the short-run (but that consumption function is fundamentally based on the hypotheses of permanent income and life cycle).

According to the empirical studies of Davidson and Hendry [29], Deaton and Blinder [30], Macklem [31], Tan and Voss [32], Goh and Downing [33], the long-run relationship between households' consumption, disposable income and households' wealth can be expressed as follows:

$$\ln C_t = \alpha_0 + \alpha_1 \ln Y_t^D + \alpha_2 \ln W_t + \varepsilon_t^r \quad (6)$$

Where ε_t^r is an error term. Our objective is to determine the impact of agricultural exports on households' consumption. But in the literature, while it is a common knowledge that external exchanges growth is positively correlated to households' consumption, there is no from our knowledge a theoretical or empirical model expressing the relationship between agricultural exports and households' consumption.

Agricultural exports constitute a component of aggregate demand and so can positively affect the GDP. As the disposable income is one of the determinants of households' consumption, agricultural exports can positively affect households' consumption through the income channel. So, the relationship between agricultural exports and households consumption can be modelized as follows:

$$\begin{cases} \ln C_t = \alpha_0 + \alpha_1 \ln\left(Y_t - T_t\right) + \alpha_2 \ln W_t + \xi_t \ (7a) \\ \text{with } Y_t = K_t^{\phi_0} L_t^{\phi_1} X_{at}^{\phi_2} X_{nat}^{\phi_3} CPI_t^{\phi_4} E_t^{\phi_5} \ (7b) \end{cases} \quad (7)$$

Where ξ_t is an error term and T_t is the level of taxes. By replacing (7b) in (7a) and approximating $\ln(Y_t - T_t)$ by $\ln Y_t$, we obtain the following equation :

$$\ln C_t = \delta_0 + \delta_1 \ln W_t + \delta_2 \ln K_t + \delta_3 \ln L_t + \delta_4 \ln X_{at} + \delta_5 \ln X_{nat} + \delta_6 \ln CPI_t + \delta_7 \ln E_t + \zeta_t \quad (8)$$

Where ζ_t is an error term.

2.3. Unit root tests

To avoid spurious regression, the estimation of the models of equations (4) and (8) necessitate that all of the series involved in these models must be stationary. So, we have analyzed the statistical properties of these series using Augmented Dikey-Fuller (ADF) tests. The ADF consist of estimating firstly for each variable of interest the following model:

$$\Delta x_t = \beta_0 + \beta_1 x_{t-1} + \beta_2 t + \sum_{j=1}^{T} \lambda_j \Delta x_{t-j} + \mu_t \quad (9)$$

Where x_t represent the variable of interest, t is a linear determinist trend, μ_t is a white noise disturbance term, β_j and λ_j are parameters to be estimated. Secondly, we have tested the significance of the coefficient β_1. If β_1 is not significant, then the series involved has a unit root and so is not stationary.

At this stage of the analysis, if a series is not stationary in level but stationary in first difference, that series is integrated of order one (I(1)). If two series are integrated of the same order (for example I(1)) and their linear combination is stationary, then theses series are cointegrated meaning that there exist a long-run stable relationship between these two series. For example if agricultural exports and GDP are not stationary in level but stationary in first difference and their linear combination is stationary, then there exist a stable long-run relationship between agricultural exports and the GDP.

2.4. Johansen' Cointegration Test

The fact that series are integrated of the same order is a necessary condition but not a sufficient condition for these series to be cointegrated. At multivariate level, the Johansen' cointegration test can be used to test the existence of cointegration relationship between variables. The Johansen' cointegration test is based on an error correction model specified as follows:

$$\Delta x_t = \pi_1 \Delta x_{t-1} + ... + \pi_{p-1} \Delta x_{t-p+1} + \pi_p x_{t-1} + \eta_t \quad (10)$$

Where x_t is a vector of n variables, η_t is the white noise disturbance term. The dimensions of the matrix π_i are $(n \times n)$. The objective is to test the existence of r vectors of cointegration among the n variables. Note that, all the terms of equation (10) are I (0) except for x_{t-p} which is I (1). So, there is a disequilibrium between the order of integration of the left hand side member and the right hand

side member. For these two member terms to be I (0), a necessary condition is that the term $\pi_p x_{t-1}$ must be I (0). For this purpose, the matrix π_p is decomposed as follows:

$$\pi_p = -\beta\alpha' \tag{11}$$

Where α' is a matrix of dimension $(r \times n)$ containing the r cointegration relationship and β the matrix of dimension $(n \times r)$ containing the weight associated to each cointegration vector. If there is r cointegration relationship, then the rank of the matrix π_p will be equal to *n.* The Johansen cointégration test is based on that condition. To be able to determine the number of cointegrating vectors *r*, Johansen has proposed two statistics: the trace statistic and the maximum eigenvalue statistic.

The trace statistic consist of calculating the following statistic:

$$TR = -n \sum_{i=q+1}^{n} \log\left(1 - \hat{\lambda}_i\right) \tag{12}$$

Where n is the number of observations. The null hypothesis tested is: $r \leq q$ meaning that there exist at most r cointegrating vectors.

The maximum eigenvalue statistic is given by:

$$VP_{\max} = -n \log\left(1 - \hat{\lambda}_{q+1}\right). \tag{13}$$

For the eigenvalue statistic, the null hypothesis tested is: $r = q$ with the alternative hypothesis $r = q + 1$.

According to the rank of the matrix π_p, three situations can be presented:

- If $rank\left(\pi_p\right) = 0$ it means that $r = 0$ and so there is no cointegration relationship. The vector x_t is integrated of order one but not cointegrated. Then, it is possible to estimate a vector autoregression (VAR) model using Δx_t.
- If $rank\left(\pi_p\right) = r$ and $0 \prec r \prec n$ then the vector x_t is cointegrated with r cointegration relationships and a vector error correction model can be estimated.
- If $rank\left(\pi_p\right) = n$, it means that $r = n$ and the vector x_t is stationary and there is no cointegration relationship; a VAR model can be estimated directly using x_t.

2.5. Granger Causality Tests

One of our objective being to determine the relationship between agricultural exports and economic growth, Granger causality tests are necessary. Granger causality tests are based on the precedence postulates that a variable x_t Granger cause another variable y_t if the lagged values of x_t allow to better predict the current values of y_t. The exogenous variables such as K, L, X_{na}, CPI, E and W are introduced in equations (4) and (8) for a better specification of these models but they do not intervene in Granger causality tests. Granger causality tests between agricultural exports and the GDP is performed using the following regressions:

$$\ln Y_t = \delta_0 + \sum_{i=1}^{p} \delta_{1i} \ln Y_{t-i} + \sum_{i=1}^{q} \delta_{2i} X_{at-i} + \varepsilon_{1t} \tag{14}$$

$$\ln X_{at} = \gamma_0 + \sum_{i=1}^{p} \gamma_{1i} \ln X_{at-i} + \sum_{i=1}^{q} \gamma_{2i} Y_{t-i} + \varepsilon_{2t}. \tag{15}$$

According to equations (14) and (15), agricultural exports expansion Granger cause economic growth if at least one of the parameters δ_{2i} is significant. Likewise, economic growth Granger cause agricultural exports if at least one of the parameters γ_{2i} is significant. For Granger causality tests between agricultural exports and households' consumption, the GDP in equations (14) and (15) is simply replaced by households' consumption in Togo.

2.6. Estimation of Error Correction Models

Granger representation theorem postulate that if two variables are cointegrated, then these variables can be represented by an error correction model to capture the short-run dynamics between these variables. In this paper, the vector error correction models are represented by the following equations:

$$\begin{aligned} \Delta \ln Y_t = \alpha_1 + \theta_1 \varepsilon_{1t-1} + \sum_{k=1}^{r} \lambda_{1i} \Delta \ln Y_{t-i} \\ + \sum_{k=1}^{s} \lambda_{2i} \Delta X_{at-1} + \psi_{1t} \end{aligned} \tag{16}$$

$$\begin{aligned} \Delta \ln C_t = \alpha_2 + \theta_2 \varepsilon_{2t-1} + \sum_{k=1}^{r} \mu_{1i} \Delta \ln C_{t-i} \\ + \sum_{k=1}^{s} \mu_{2i} \Delta X_{at-i} + \psi_{2t} \end{aligned} \tag{17}$$

Where ε_{1t-1} and ε_{2t-1} are respectively residuals from the long-run relationships between agricultural exports and economic growth and between agricultural exports and households consumption, ψ_{1t} and ψ_{2t} are white noise disturbance terms. Akaike information criterion is used in this paper to determine the optimal lag length in all specifications.

2.7. Data

Data used in this paper for empirical investigations cover the period 1980-2016 and most of these data come from the World Bank database (World Development Indicators). Data on agricultural exports and non-agricultural exports come from the Food and Agricultural Organization. Data on exchange rate come from the International Monetary Fund database and data on the broad money M3 come from the West African Central Bank database.

The variable capital represent the capital formation at the national level, labor is approximated by the total working population. The agricultural and non-agricultural exports represent the value of these exports on the period covered by this study. But data on households' wealth do not exist. So in empirical studies proxies such as prices shares [26] and the broad money M3 [34] have been used. In this paper, the broad money M3 is used as proxy for households' wealth.

3. Results of Estimations

3.1. Results of Unit Root Tests

As the results of unit root tests are sensitive to determinist regressors such as the constant and the trend [35], we have performed Augmented Dickey and Fuller (ADF) following two models: the model with constant included (ADF with drift) and the model constant and the trend included (ADF with trend). In order to avoid serial correlation, the appropriate lag length is selected using the Akaike information criterion.

The results of the tests reported in Table 1 indicate that all of the series are not stationary in level. However, all of these series are stationary in first difference. So, these series are integrated of order one. Since series can be integrated of the same order but not necessarily cointegrated, cointegration tests are performed.

3.2. Results of Cointegration Tests

All of the variable being integrated of the same order, the Johansen cointegration test is performed. Following Akaike information criterion, one lag is selected for the two models (equations 4 and 8). Results of Johansen cointegration tests applied to equation (4) presented in Table 2 indicate that, at 5 percent significance level, there exist four (4) cointegrating vectors according to the trace statistic and the maximum eigenvalue statistics. So, we reject the null hypothesis of the presence of zero cointegrating vector and conclude that the variables involved in the study of the relationship between agricultural exports and economic growth in Togo are cointegrated and there exist a long-run stable relationship between these variables.

For the results of Johansen cointegration tests applied to the equation (8) presented in Table 3, they indicate that at 5 percent significance level, there exist five (5) cointegrting vectors according to the trace statistic and the maximum eigenvalue statistic. So, we reject the null hypothesis of the presence of zero cointegrating vector and conclude that variables involved in the analysis of the relationship between agricultural exports and households' consumption in Togo are cointegrated and there exist a stable long-run relationship between these variables.

Table 1. Results of unit root tests

Series	Series in level		Series in first difference	
	ADF (with drift)	ADF (with trend)	ADF (with drift)	ADF (with trend)
GDP	0.456 [1]	-2.686 [1]	-5.009*** [0]	-5.172*** [0]
Capital	-0.429 [1]	-1.622 [1]	-6.711*** [0]	-7.018*** [0]
Labor	-0.828 [4]	-1.625 [4]	-3.150** [2]	-3.194* [2]
Exchange rate	-2.277* [3]	-1.644 [3]	-3.818*** [2]	-4.169*** [2]
Consumer price index	-0.789 [1]	-2.343 [1]	-4.637*** [0]	-4.547*** [0]
Agricultural exports	-0.449 [2]	-1.656 [2]	-4.557*** [1]	-4.482*** [1]
Non-agricultural exports	0.141 [1]	-1.919 [1]	-6.120*** [0]	-6.403*** [0]
Households' consumption	-0.726 [1]	-2.553 [1]	-5.229*** [0]	-5.164*** [0]
Households' wealth	1.579 [3]	-0.587 [3]	-5.155*** [0]	-5.477*** [0]

Note: ADF: Augmented Dickey-Fuller. The critical values of the tests are -3.46; -2.88 and -2.57 for ADF test with drift and -3.99; -3.43 and -3.13 for ADF test with trend for respectively 1%; 5% and 10% significance level. Values in brackets are the sufficient lags included to avoid serial correlation. (***), (**) and (*) represent the significance at 1%; 5% and 10% levels.

Table 2. Results of Johansen cointegration tests (model of equation 4)

Hypotheses		Trace statistic		Maximum eigenvalue statistic	
Null	*Alternative*	*Value of the Statistic*	*Critical value (5%)*	*Value of the statistic*	*Critical value (5%)*
$r = 0$	$r = 1$	269.41*	147.27	85.66*	49.32
$r \leq 1$	$r = 2$	183.75*	115.85	64.29*	43.61
$r \leq 2$	$r = 3$	119.46*	87.17	53.65*	37.86
$r = 3$	$r = 4$	65.81*	63.00	34.15*	31.79
$r \leq 4$	$r = 5$	31.66	42.34	18.01	25.42
$r \leq 5$	$r = 6$	13.66	25.77	07.51	19.22
$r \leq 6$	$r = 7$	06.15	12.39	06.15	12.39

Note: r represents the number of cointegreting vector and (*), the 5% significance level.

Table 3. Results of Johansen cointegration tests (model of equation 8)

Hypotheses		Trace statistic		Maximum eigenvalue statistic	
Null	*Alternative*	*Value of the statistic*	*critical value (5%)*	*Value of the statistic*	*Critical value (5%)*
$r = 0$	$r = 1$	339.36*	182.99	101.85*	52.08
$r \leq 1$	$r = 2$	237.51*	147.27	79.45*	46.54
$r \leq 2$	$r = 3$	158.06*	115.85	52.87*	40.76
$r \leq 3$	$r = 4$	105.19*	87.17	39.52*	35.04
$r \leq 4$	$r = 5$	65.67*	63.00	29.39*	29.13
$r \leq 5$	$r = 6$	36.28	42.34	17.52	23.10
$r \leq 6$	$r = 7$	18.76	25.77	13.43	17.18
$r \leq 7$	$r = 8$	5.33	12.39	5.33	10.55

Note: r represents the number of cointegreting vector and (*), the 5% significance level.

When two variables are cointegrated, there exist at least one direction of causality between these variables [36]. So, Granger causality tests are performed to inform the direction of causality between agricultural exports and economic growth on the one hand and between agricultural exports and households' consumption on the other hand.

3.3. Results of Granger Causality Tests

The results of Granger causality tests between agricultural exports and economic growth are presented in Table 4. The first null hypothesis tested is that economic growth does not Granger cause agricultural exports expansion in Togo. The Fisher statistic of the test estimated to be 1.5839 is not significant at the conventional significance levels. So, we do not reject the null hypothesis and conclude that, economic growth in Togo does not Granger cause agricultural exports expansion.

Table 4. Results of Granger causality tests between agricultural exports and economic growth

Null hypothesis	Fisher Statistic	Probability
Economic growth does not Granger cause agricultural exports in Togo	1.5839	0.453
Agricultural exports does not Granger cause economic growth in Togo	15.934***	0.000

Note : (***) represents 1% significance level.

The second null hypothesis tested for the relationship between agricultural exports and economic growth is that agricultural exports expansion in Togo does not Granger cause economic growth. Table 4 indicate that the Fisher statistic estimated to be 15.934 is significant at one (1) percent significance level. So we reject the null hypothesis and conclude that, agricultural exports expansion in Togo Granger cause economic growth.

The results of Granger causality tests between agricultural exports and households' consumption are presented in Table 5. The first null hypothesis tested is that agricultural exports does not Granger cause households' consumption in Togo. The Fisher statistic of the test estimated to be 10.241 is significant at the one (1) percent significance level. So we reject the null hypothesis and conclude that, agricultural exports expansion Granger cause households' consumption in Togo.

Table 5. Results of Granger causality tests between agricultural exports and households' consumption

Null hypothesis	Fisher Statistic	Probability
Agricultural exports does not Granger cause households' consumption in Togo	10.241***	0.006
Households' consumption does not Granger cause agricultural exports in Togo	2.6298	0.268

Note: (***) represents the 1% significance level.

The second null hypothesis tested with the results presented in Table 5 is that, households' consumption in Togo does not Granger cause agricultural exports. The Fisher statistic of the test estimated to be 2.6298 is not significant at conventional significance level. So we do not reject the null hypothesis and conclude that, households 'consumption in Togo does not Granger cause agricultural exports.

In summary, the results of Granger causality tests show that there exist a unidirectional causal relationship between agricultural exports and economic growth on the one hand and between agricultural exports and households' consumption on the other hand. In effect, economic growth does not Granger cause agricultural exports in Togo. Likewise, households' consumption does not Granger cause agricultural exports in Togo. But agricultural exports Granger cause economic growth (validating the export-led growth hypothesis) and households' consumption in Togo. The results are consistent with the finding of Kpemoua [19] that there exist a unidirectional causal relationship between exports of goods and services and economic growth in Togo.

3.4. Results of the Estimation of Error Correction Models

The error correction models are estimated to capture the short-run dynamics of economic growth and households' consumption to variations in agricultural exports. The results of estimation presented in Table 6 indicate that, deviations from the long-run equilibrium between agricultural exports and economic growth are digested at the rate of 44.9 percent per year whereas deviations from the long-run equilibrium between agricultural exports and households' consumption are resorbed at the rate of 28.4% per year.

Table 6. Results of the estimation of error correction models

Parameters	Agricultural exports and economic growth	Agricultural exports and households' consumption
θ_1	-0.449***	
	(0.143)	
θ_2	-	-0.284*
	-	(0.154)
λ_{11}	0.299*	
	(0.178)	
λ_{21}	-250.788**	
	(128.381)	
μ_{11}	-	0.077
	-	(0.225)
μ_{21}	-	1.226*
	-	(0.715)

Note: Values in parentheses are standard errors; (***), (**) and (*) represent the 1%, 5% and 10% significance levels.

In effect, the speeds of adjustments estimated to be -0.449 (for the relationship between agricultural exports and economic growth) and -0.284 (for the relationship between agricultural exports and households' consumption) are negative (implying convergence towards the long-run equilibrium) and significant at the conventional significance levels.

4. Summary and Conclusion

In this paper, we have investigated the role of agricultural exports in economic growth and households' consumption in Togo. Especially we seek to know if there exist a causal relationship between agricultural exports and economic growth on the one hand and between agricultural exports and households' consumption on the other hand using time series data on these variables on the period 1980-2016. In this respect, we have firstly studied the statistical properties of these data and perform Johansen cointegration tests and Granger causality tests and estimate error correction models. Johansen cointegration tests show that series involved in each of the two models of equation (4) and (8) are cointegrated and so there exist a stable long-run relationship between these variables.

For Granger causality tests, results show that the relationship between agricultural exports and economic growth on the one hand and between agricultural exports and households' consumption on the other hand is unidirectional. In effect, economic growth does not Granger cause agricultural exports and households' consumption also does not Granger cause agricultural exports but agricultural exports Granger cause economic growth and households' consumption. Concerning the estimates of error correction models, they suggest that deviations from the long-run equilibrium are resorbed at the rate of 44.9 percent per year in the relationship between agricultural exports and economic growth whereas deviations from the long-run equilibrium in the relationship between agricultural exports and households' consumption are resorbed at the rate of 28.4 percent per year. These results suggest that, policies towards agricultural exports promotion in Togo will not only stimulate economic growth but also improve households' consumption.

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