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ROLE OF TRADE IN NATURAL RUBBER AND PALM OIL IN THE COMPOSITION OF GDP IN IVORY COAST

Purpose. *This paper discusses the effect of natural rubber and palm oil exports on economic growth in Ivory Coast from 1980 to 2016 using World Bank data.*

Methodology / approach. *The analysis involved the use of Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests and the ARDL model.*

Results. *This paper discusses the effect of natural rubber and palm oil exports on economic growth in Ivory Coast from 1980 to 2016 using World Bank data. The analysis involved the use of Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests and the ARDL model. The results of the study show that there is a positive and non-significant relationship between natural rubber exports and short-term economic growth. On the other hand, in the long term, they have a positive and significant influence on economic development. However, in the short and long term, palm oil exports have a positive and significant impact on gross domestic product. Finally, labour, investment and market opening have a positive and significant effect on economic growth in the short and long term respectively. Therefore, the Ivorian government needs to promote good agricultural practices and agricultural financing in order to increase the competitiveness of the Hevea –Oil palm sector.*

Originality / scientific novelty. *Previous studies in natural rubber and palm oil focused mainly on its production, constraints to production and processing. However, very few studies on its effects on economic growth have been done so far. This study fills that gap. It expanded the existing literature and the subject of the causal relationship between natural rubber and palm oil exports and economic growth in Ivory Coast and shed light on required efforts to enhance the production and utilization of natural rubber and palm oil at larger scale to bring economic development in Ivory Coast. At last, the ARDL model is used to address this issue.*

Practical value / implications. *The generated information will be useful to a number of organizations including: research and development, marketers, producers, policy makers, government and non-governmental organizations to assess their activities and improve their mode of operations, to help better guide the design and implementation of policies and strategies. Finally, knowing the existing relationship between natural rubber and palm oil exports and economic growth, together with impediments faced by natural rubber and palm oil exports, the study provides the various ways to improve these exports by increasing exports capacity of local producers. Research on this issue is too important to inform policymakers regarding resource allocation in the natural rubber and palm oil sector to achieve economic growth.*

Key words: *exports, economic growth, natural rubber, palm oil, Ivory Coast.*

Introduction and review of literature. At the dawn of independence, African countries were less endowed in human capital and technology than those in the North. Thus, the fertility of their soils combined with good climatic conditions led them to turn naturally to the agricultural sector, which they saw as an engine of

economic development and a comparative advantage. Ivory Coast did not escape this situation by opting for an agrarian-type rentier system.

Agriculture contributes to the creation of more than 22.3 % of GDP and represents more than 47 % of the country's overall exports in 2013 (62 % excluding oil) according to Banque Mondiale [BM] (2016). This sector employs more than 46 % of Ivory Coast's working population and is a source of income for two-thirds of the Ivorian population, 50.3% of whom are rural (Institut National de la Statistique [INS], 2014).

However, Ivory Coast's dependence on world prices and the State's involvement in the productive economy plunged the country into a deep crisis from 1980 to 1993. This crisis was characterized by a sharp fall in economic growth, a significant drop in per capita income, and the aggravation of internal and external imbalances (deterioration of the balance of payments, growing public deficits).

In order to remedy this situation, the country embarked from 1994 on a process of liberalization of its economy under the aegis of the Bretton Woods institutions. Several structural adjustment programmes were adopted. These programmes consisted in the gradual disengagement of the State from the productive sphere through privatization reform. Furthermore, export diversification remains one of the watchwords of the government's strategy. Several agricultural export products were introduced to create wealth, namely oil palm and natural rubber in the southern and western half of the country (Zamblé, 2015).

Today, Ivory Coast ranks first (1st) in Africa and seventh (7th) in the world in the production of natural rubber. Natural rubber is also the third (3rd) export product in Ivory Coast and the second (2nd) non-oil, representing 6 % of the country's exports. As for palm oil, it is the fourth (4th) in the Ivorian economy and employs more than one million people. With 400,000 tons of crude palm oil produced per year, Ivory Coast ranks fifth (5th) in the world after Malaysia, Indonesia, Nigeria and Colombia. Moreover, it is the first (1st) African exporter and the second (2nd) African producer behind Nigeria (BM, 2016). Ivory Coast has 75,000 ha of industrial oil palm plantations and 155,000 ha of village plantations. The sector generates 220,000 direct jobs, feeds more than two million people and accounts for 1.5 % of GDP. The country holds 90 % of the West African Economic and Monetary Union (WAEMU) market, consumes 60 % of its production and exports 25 %. The turnover is 170 billion CFA francs for crude palm oil and 280 billion CFA francs for by-products such as soap (Maxime, 2020).

Therefore, the objective of this study is to assess the effect of the hevea and oil palm sector to economic growth in Ivory Coast. Specifically, it aims to determine the causal effect of natural rubber and palm oil exports on economic growth in Ivory Coast.

Several empirical studies focused fundamentally on the relationship between exports, trade and economic growth in several countries. For example, Tamaschke's (1979) econometric work on the states of Victoria and New South Wales showed that commodity exports contributed significantly to the GDP of both states. However,

according to the same author, the driving role was only evident if indirect effects such as linkage effects arising from transport and railways mainly were added.

In the same vein, making estimates on cross-sectional data to overcome the drawbacks of the Balassa methodology with a set of 55 developing countries over the period 1960–1977, Tyler (1981) confirmed the role played by exports in economic growth and argued that countries that neglect the export sector should expect a low rate of economic growth.

In addition, Rodrigue (1987), studying 19 OECD (Organization for Economic Cooperation and Development) countries (Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, Austria, the United Kingdom, the United States and the United Kingdom) from 1966 to 1983, using cross-sectional tests, stated that growth in OECD countries was stimulated significantly by both export and investment growth rates.

Henneberry and Curry (2010) examined the relationship between agricultural exports and economic growth in Pakistan. Using three simultaneous equations representing GDP, agricultural exports, and imports, they found a favourable relationship between agricultural exports and economic growth in the country.

Along the same lines, Kpémoua (2016) in his study on the impact of exports on economic growth in Togo showed that there was a causal relationship between exports and economic growth by using a model based on a neoclassical production function.

Rakhmetullina et al. (2017) found an empirical relationship between agriculture and economic growth in Nigeria using autoregressive distributed lag model (ARDL) and vector error correction model (VECM).

Khan and Ansari (2018) studied the contribution of agriculture to economic growth in Uttar Pradesh, India. The study employed a long-run cointegrating analysis and found that agricultural development drives economic growth. Based on their findings, they suggested the public investment in irrigation, credit to farmers and the supports for micro and small agro-based industrialists as the strategic actions to achieve economic growth in India.

Faycal and Ali (2016) analyzed the impact of agricultural production on the economic growth in Algeria using the Autoregressive Distributed Lag (ARDL) model. The study revealed that the impact of agriculture on the economic growth was negative in the long-run when the governmental support was focused only on the production side of the agricultural sector. Otherwise, when the support is for the agricultural sector as a whole, the impact turns into positive.

Finally, Zahonogo (2017) used a dynamic growth model and employed the pooled mean group estimation technique and tested the empirical link between trade and economic growth for 42 sub-Saharan African countries. According to the results, the link between trade and economic growth was non-linear for these sub-Saharan African countries. Moreover, there is a threshold below which international trade is beneficial to economic growth.

From all the above, we note that in most cases, exports are a major determinant of economic growth.

The purpose of the article. This paper discusses the effect of natural rubber and palm oil exports on economic growth in Ivory Coast from 1980 to 2016 using World Bank data. Specifically, it aims to determine the causal effect of natural rubber and palm oil exports on economic growth.

Methodology. The data used in this study are the World Bank Development Indicators (WDI). They cover the quantity of natural rubber exported, the quantity of palm oil exported, trade openness, agricultural investment, labour force and GDP from 1980 to 2016. For processing, we used the software Eviews 10. The causal relationship between the export of natural rubber and palm oil and economic growth are studied using the ARDL model. The dependent variable is GDP. The explanatory variables are: the quantity of rubber produced as a proxy variable for the quantity of natural rubber exported; the quantity of oil palm produced as a proxy variable for the quantity of palm oil exported; trade openness; labour force and agricultural investment.

The ARDL model can be written as follows (Eq. 1):

$$GDP = F(HEV, PAL, LAB, TRA, INV) \quad (1)$$

The Long Term Equation can be written as follows (Eq. 2):

$$LnGDP_t = \alpha_0 + \varphi \sum_{i=1}^{p} LnGDP_{t-i} + \alpha_1 \sum_{i=0}^{q} LnHEV_{t-i} + \alpha_2 \sum_{i=0}^{q} LnPAL_{t-i} + \alpha_3 \sum_{i=0}^{q} LnINV_{t-i} + \alpha_4 \sum_{i=0}^{q} LnLAB_{t-i} + \alpha_5 \sum_{i=0}^{q} LnTRA_{t-i} + \mu_t \quad (2)$$

The cointegrating relationship equation is obtained from the error correction model (ECM) and is written as follows (Eq. 3):

$$\Delta LnGDP_t = \alpha_0 + \varphi_{1-j} \sum_{i=1}^{p} \Delta LnGDP_{t-i} + \alpha_1 \sum_{i=0}^{q} \Delta LnHEV_{t-i} + \alpha_2 \sum_{i=0}^{q} \Delta LnPAL_{t-i} + \alpha_3 \sum_{i=0}^{q} \Delta LnINV_{t-i} + \alpha_4 \sum_{i=0}^{q} \Delta LnLAB_{t-i} + \alpha_5 \sum_{i=0}^{q} \Delta LnTRA_{t-i} + \lambda EC_{t-i} + \mu_t \quad (3)$$

λEC_{t-i}, represents the error correction term.

Taking into account the short-term and long-term effects between the explanatory variables and the explained or dependent variable, the ARDL representation is as follows (Eq. 4):

$$\Delta GDP_t = \alpha_0 + \alpha_1 \sum_{i=1}^{p} \Delta GDP_{t-i} + \alpha_2 \sum_{i=0}^{q} \Delta HEV_{t-i} + \alpha_3 \sum_{i=0}^{q} \Delta PAL_{t-i} + \alpha_4 \sum_{i=0}^{q} \Delta INV_{t-i} + \alpha_5 \sum_{i=0}^{q} \Delta LAB_{t-i} + \alpha_6 \sum_{i=0}^{q} \Delta TRA_{t-i} + \lambda_1 LnGDP_{t-1} + \lambda_2 LnHEV_{t-1} + \lambda_3 PAL_{t-1} + \lambda_4 INV_{t-i} + +\lambda_5 LAB_{t-i} + \lambda_6 OC_{t-i} + \mu_t \quad (4)$$

With Δ: First Difference Operator;

α_0: a constant;

$\alpha_1, \ldots, \alpha_6$: the short-term coefficients;

$\lambda_1, \ldots, \lambda_6$: the long-term coefficients;

$\mu_t \sim iid\ (0; \sigma)$: the error term (white noise).

However, the expectations regarding the effects of the explanatory variables on the dependent variable are shown in Table 1. A plus sign (+) indicates a positive effect and a minus sign (-) shows a negative effect of the dependent variable on GDP.

Table 1

Used variables

Variables	Description	Expected effects
GDP	Gross Domestic Product	
HEV	Natural Rubber Export	+
PAL	Palm oil exports	+
INV	Agricultural investment	+
LAB	Labor force	+
TRA	Trade opening	+

Source: author's research on the basis of the theory.

Results and discussion. *Descriptive characteristics.* In terms of standard deviation (Table 2), the variable «LNHEV» is more volatile than all other variables. In fact, natural rubber appears to be more sensitive to the effects of price fluctuations on world markets, unlike the other variables.

Table 2

Descriptive analysis of variables

Indicators	LNGDP	LNPAL	LNHEV	LNINV	LNLAB	LNTRA
Mean	23.35179	18.00000	18.57972	21.27969	16.52384	21.97824
Median	23.18475	17.94426	18.14920	21.22226	16.58086	21.91284
Maximum	24.31714	19.42163	20.84696	22.74316	16.98081	22.75346
Minimum	22.64579	16.98771	16.88138	20.39769	15.93100	21.12628
Std. Dev.	0.492076	0.634972	1.150894	0.642336	0.304973	0.435864
Skewness	0.537840	0.659003	0.463906	0.867642	-0.353594	0.150999
Kurtosis	2.149303	2.680079	1.966746	3.004574	1.980881	2.343337
Jarque-Bera	2.899525	2.835882	2.973027	4.642314	2.372190	0.805380
Probability	0.234626	0.242212	0.226160	0.098160	0.305412	0.668519
Sum	864.0162	665.9999	687.4497	787.3484	611.3821	813.1950
Sum Sq. Dev.	8.717008	14.51482	47.68402	14.85343	3.348313	6.839172
Observations	37	37	37	37	37	37

Source: author's estimation using Eviews 10.

Gross Domestic Product (GDP) of Ivory Coast (USD). The evolution of GDP in Ivory Coast is undergoing three (3) major phases according to Fig. 1. The period from 1980 to 1985 is marked by a slowdown in economic growth due to the deterioration in the terms of trade linked to the economic crisis of the 1980s. Then, the period from 1985 to 2004 shows a slight improvement in the economic situation due to the measures of the structural adjustment programme adopted by the State. Finally, the period from 2005 to 2016 is characterised by continuous and sustained GDP growth.

Natural rubber exports to Ivory Coast in current USD. There are two (2) main trends in natural rubber exports according to Fig. 2. Firstly, from 1980 to 2011, there

was a gradual evolution of exports due to the agricultural diversification policy undertaken by the State of Ivory Coast after the crisis in the cocoa-coffee sector.

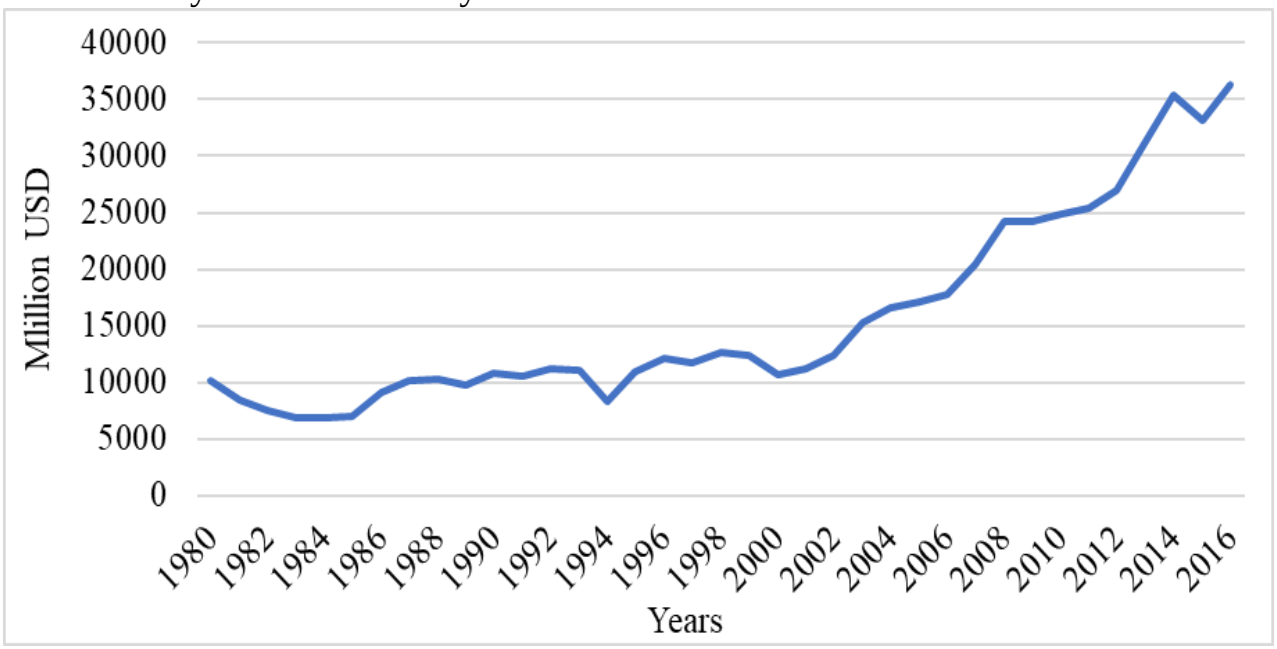


Fig. 1. Evolution of GDP from 1980 to 2016

Source: author's research on World Bank data.

Then, from 2011 to 2016, there was a drastic decline in the value of exports from over one billion to less than sixty million USD due to the fall in prices on the international market.

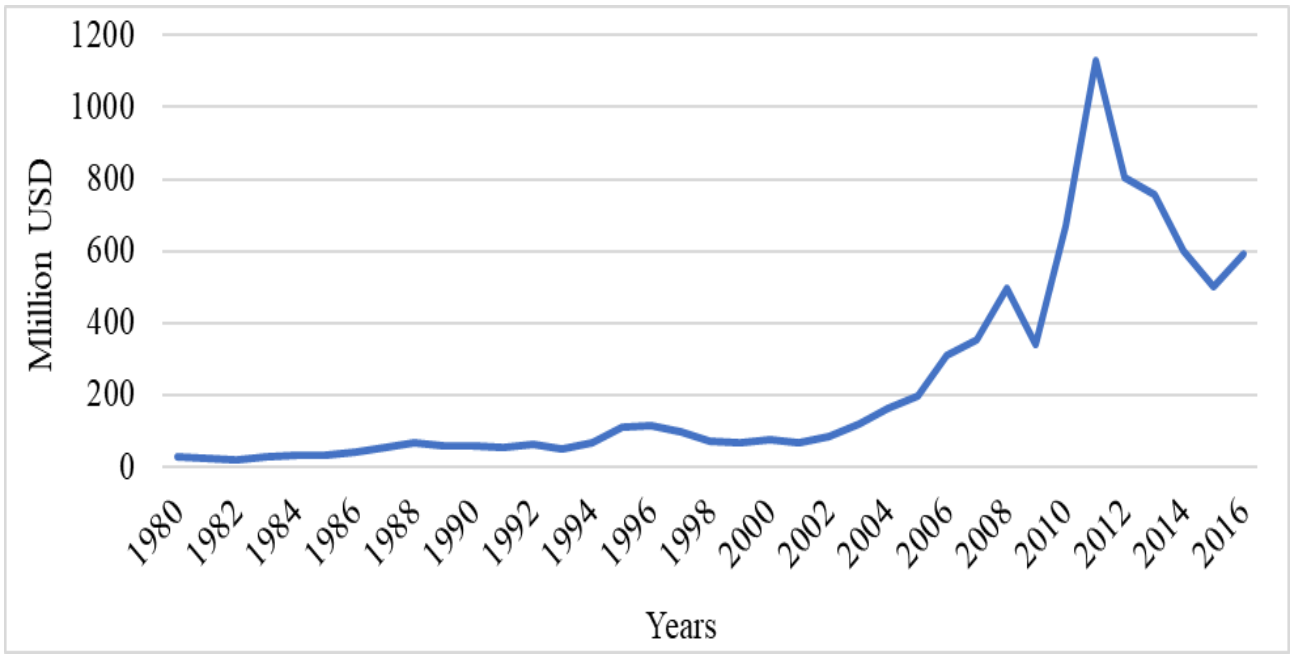


Fig. 2. Natural Rubber Export Trends from 1980 to 2016

Source: author's research based on World Bank data.

Palm oil exports. According to Fig. 3, the evolution of palm oil export shows five (5) periods. Indeed, the years 1980–1983 were marked by a fall in the level of exports due to the effects of the world economic crisis which caused deterioration in the prices of raw materials on the international market. In addition, from 1983 to

1999, a clear improvement in the value of palm oil exports was observed. However, from 1999 to 2002, a new phase of regression in exports due to the military-to-political crisis was noted. Moreover, the period 2002–2012 presented a phase of expansion of palm oil exports due to the incentives introduced by Ivory Coast. Finally, from 2012 to 2016, a drastic drop in the value of exports due to the fall in world prices was noted again.

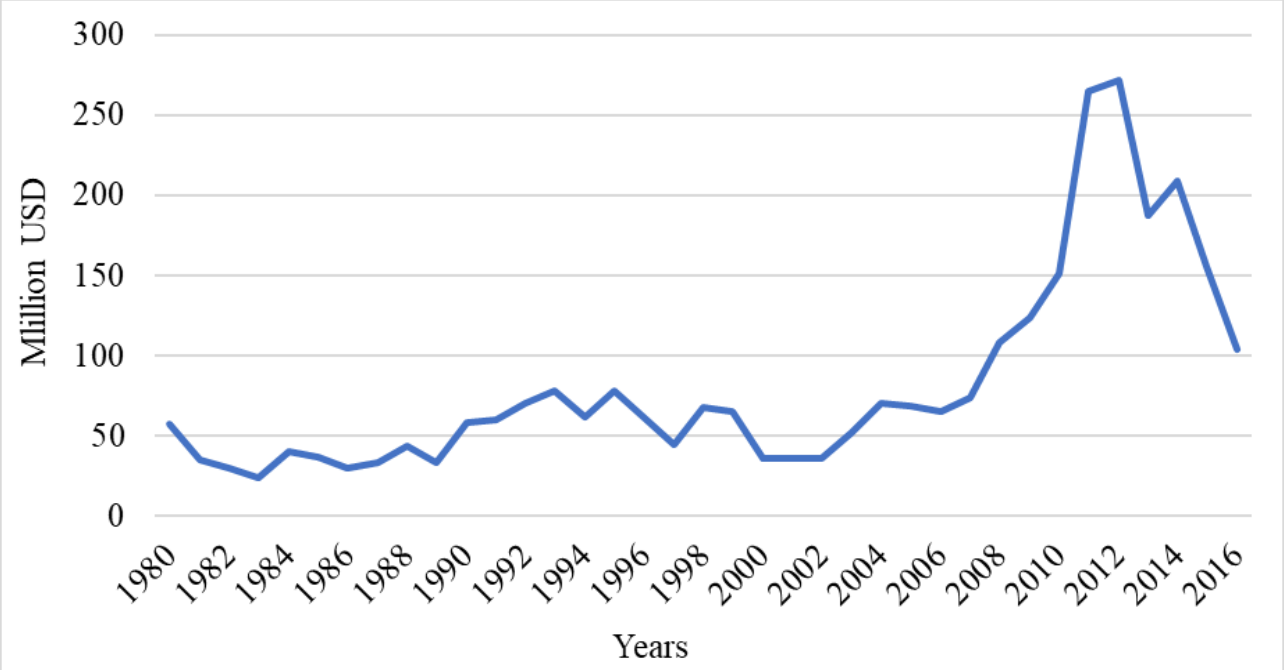


Fig. 3. Evolution of Palm exports from 1980 to 2016

Source: author's research based on World Bank data.

Level stationarity tests. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests show non-stationary series. They indicate the presence of unit root levels, hence the need to differentiate between them (Table 3).

Table 3

Level stationarity tests

Indicators	Methods	t-Statistic	Probability	Stationnarity
LnGDP	ADF	0.578796	0.9871	NO
	Phillips-Perron	0.829972	0.9932	NO
LnHEV	ADF	-1.271266	0.6322	NO
	Phillips-Perron	-0.947428	0.7611	NO
LnPAL	ADF	-1.309744	0.6144	NO
	Phillips-Perron	-1.384171	0.5791	NO
LnLAB	ADF	-1.695999	0.0847	NO
	Phillips-Perron	-1.671719	0.0889	NO
LnTRA	ADF	-0.354963	0.9064	NO
	Phillips-Perron	-0.458956	0.8878	NO
LnINV	ADF	-1.012251	0.7385	NO
	Phillips-Perron	-0.795064	0.8085	NO

Source: author's estimation using Eviews 10.

First difference stationarity tests. All variables are integrated as first differences (Table 4).

Table 4

First difference stationarity tests

Indicators	Methods	t-Statistic	Probability	Stationnarity
LnGDP	ADF	-5.640983	0.0000	YES
	Phillips-Perron	-5.946187	0.0000	YES
LnHEV	ADF	-7.285721	0.0000	YES
	Phillips-Perron	-17.93232	0.0001	YES
LnPAL	ADF	-5.913999	0.0000	YES
	Phillips-Perron	-5.945207	0.0001	YES
LnLAB	ADF	-2.471161	0.0150	YES
	Phillips-Perron	-2.452355	0.0157	YES
LnTRA	ADF	-5.159799	0.0002	YES
	Phillips-Perron	-5.195943	0.0001	YES
LnINV	ADF	-7.418006	0.0000	YES
	Phillips-Perron	-0.947428	0.0000	YES

Source: author's estimation using Eviews 10.

Optimal delay. According to Fig. 4, of the five (5) criteria, three (FPE, AIC, HQ) indicate that the optimal delay is 3. The other two (2) show that the optimal delay is 2. Then, the number of delays selected is 3.

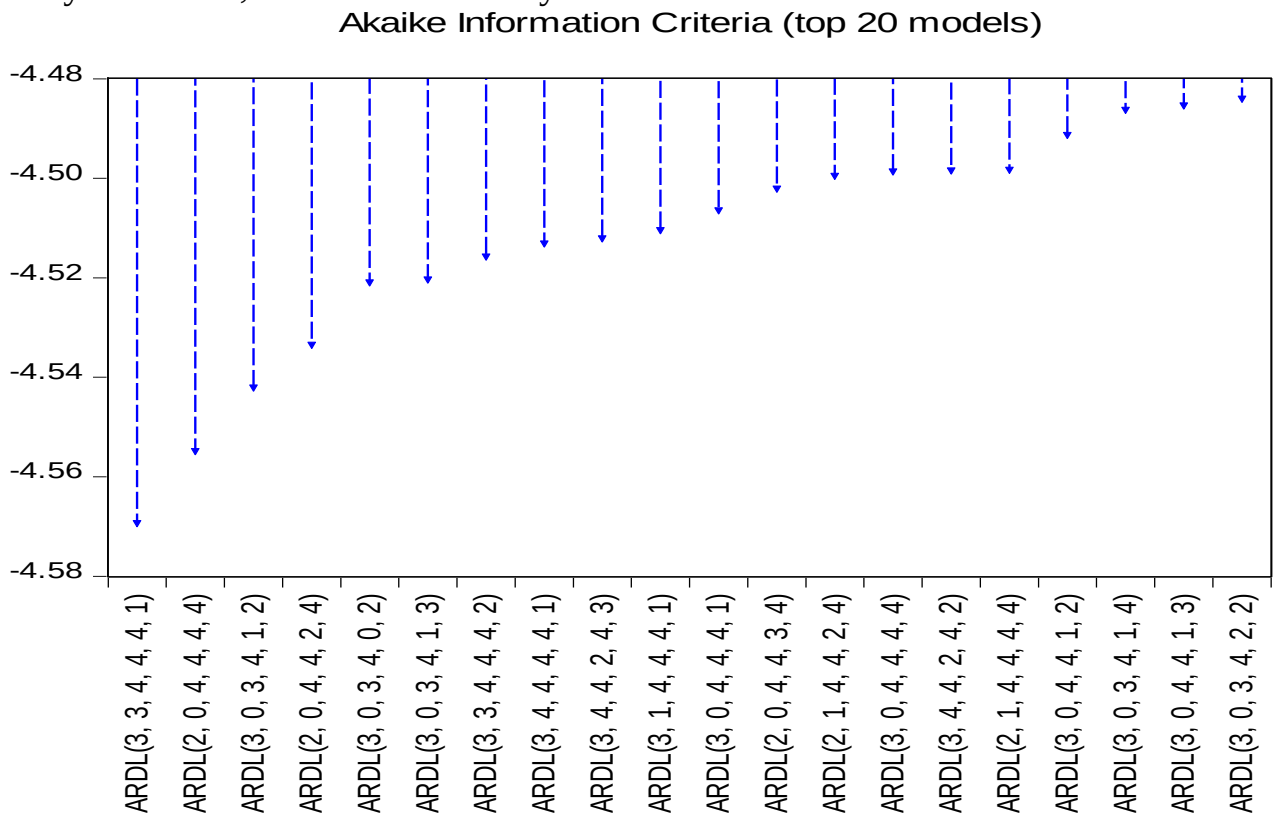


Fig. 4. AKAIKE Information Criteria

Source: author's estimation using Eviews 10.

Diagnostic tests of the ARDL model (3,4,4,1). The null hypothesis is rejected for each model validation test because their probability is more than 5 %. Thus, there is an absence of autocorrelation of errors, an absence of heteroscedasticity of errors and a normality of errors (Table 5).

Table 5

ARDL Model Diagnostic Test Results (3, 4, 4, 1)

Tests	Hypothesis	F-Statistic	Probabilities	Decision
Breusch-Godfrey	Autocorrelation	4.87	0.11	No autocorrelation of errors
Harvey	Heteroscedasticity	1.15	0.46	No error heteroscedasticity
ARCH	Heteroscedasticity	1.42	0.25	No error heteroscedasticity
Jarque-Bera	Normality	3.55	0.17	Error normality
Ramsey (Fischer Stat)	Specification	3.31	0.16	Good specification

Source: author's estimation using Eviews 10.

CUSUM and CUSUM squared stability tests. The stability tests of CUSUM and CUSUM squared also reveal that the model is perfectly stable. The model is thus well specified, stable and validated. In addition, these figures indicate that there is an autocorrelation between the different variables (Fig. 5 and 6).

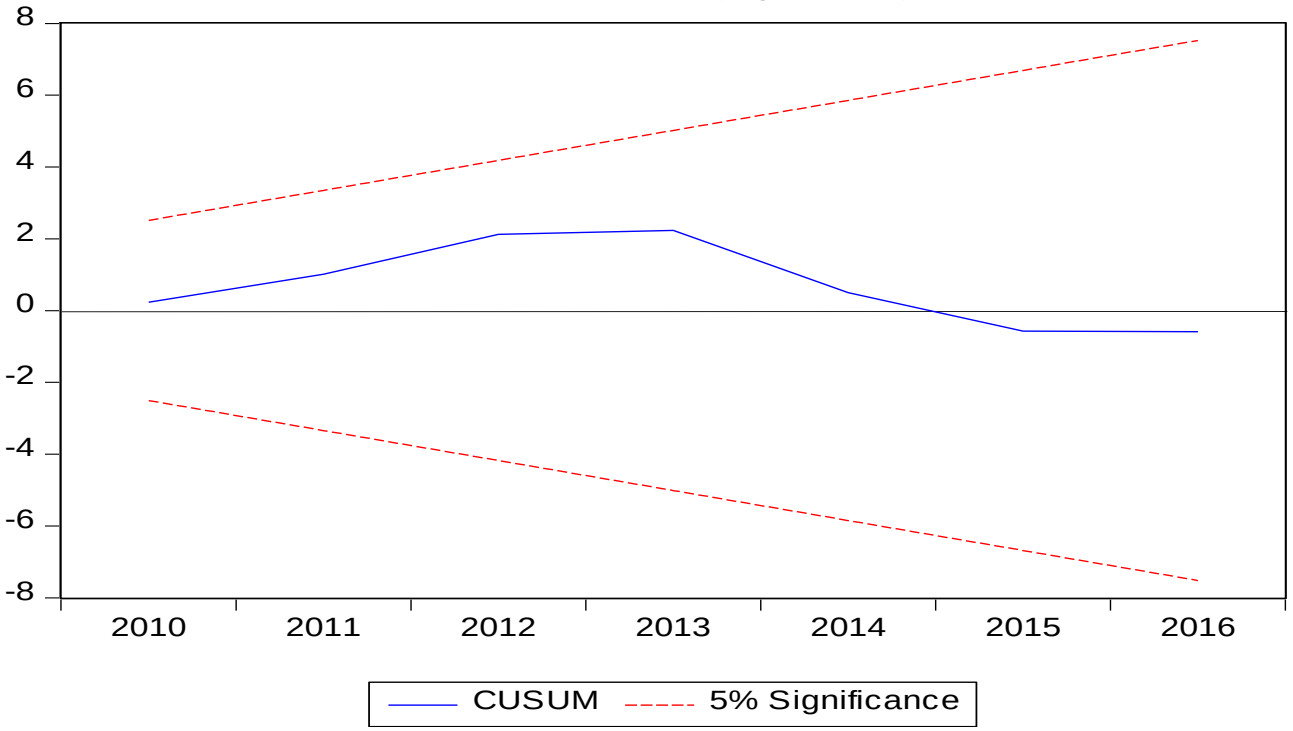
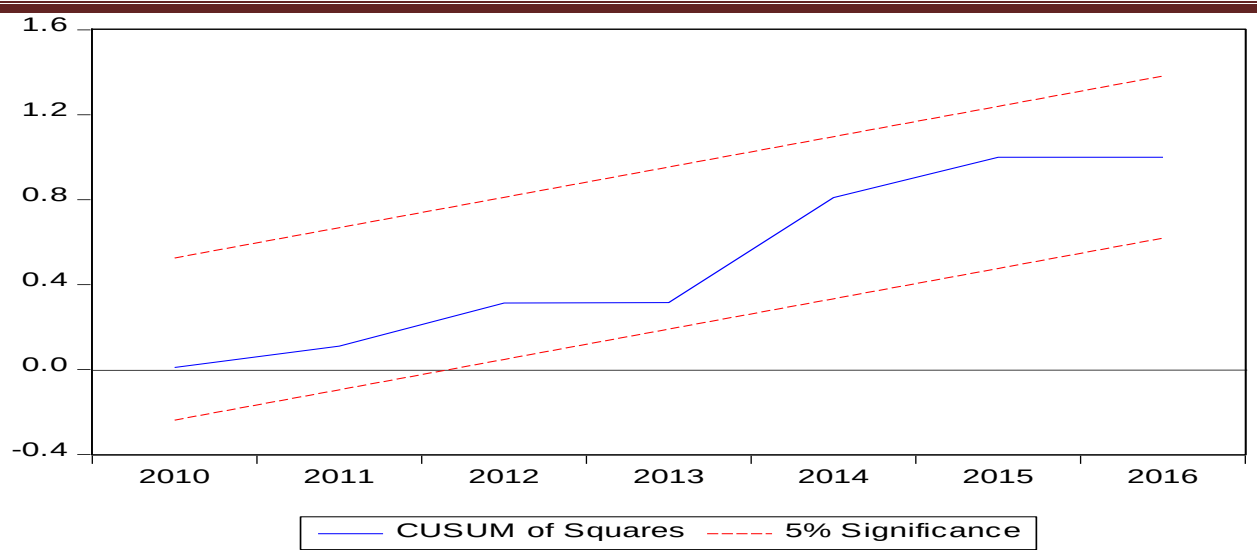


Fig. 5. CUSUM stability test

Source: author's estimation using Eviews 10.

Terminal Cointegration Test. Table 6 confirms that there is a cointegration relationship between the variables in the series due to the fact that the value of the Fisher statistic (9.44) is above the upper bound at all thresholds (10 %; 5 %; 2.5 % and 1 %). It is therefore possible to estimate the long-term effects of the explanatory variables (ln HEV, ln PAL, ln LAB, ln TRA, ln INV) on the dependent variable (LnGDP).

ARDL model estimation. According to Table 7, the coefficients of determination (R2) and adjusted determination (A-R2) have values of 0.999438 and 0.997432 respectively. This means that the variation of the gross domestic product is taken into account by the explanatory variables of the model at 99.94 %. Moreover, the variation of the gross domestic product is explained by the explanatory variables retained at 99.74 %.



Source: author's estimation using Eviews 10.

Table 6

Result of the cointegration test of Pesaran et al (2001)

Statistics Test	Value	K
F-Statistic	9.44	5.00
Critical values of terminals		
Thresholds	Lower terminals I (0)	Upper terminals I (1)
10 %	2.75	3.79
5 %	3.12	4.25
2.5 %	3.49	4.67
1 %	3.93	5.23

Source: author's estimation using Eviews 10.

Table 7

ARDL model estimation

Dependent Variable: LNGDP				
Dynamic regressors (4 lags, automatic): LNHEV LNPAL LNLAB LNTRA				
Selected Model: ARDL(3, 3, 4, 4, 4, 1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNGDP(-1)	0.169422	0.106896	1.584915	0.1570
LNGDP(-2)	0.225469	0.067313	3.349564	0.0123
LNHEV	0.003404	0.017490	0.194605	0.8512
LNPAL	0.069497	0.016148	4.303690	0.0036
LNLAB	0.181067	0.046676	3.879238	0.0061
LNTRA	0.405936	0.034063	11.91736	0.0000
LNINV	0.198013	0.011449	17.29524	0.0000
R-squared	0.999438	Mean dependent var		23.41590
Adjusted R-squared	0.997432	S.D. dependent var		0.480092
S.E. of regression	0.024327	Akaike info criterion		-4.569318
Sum squared resid	0.004143	Schwarz criterion		-3.390252
Log likelihood	101.3937	Hannan-Quinn criter.		-4.172598
F-statistic	498.2488	Durbin-Watson stat		2.915180
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model selection.				

Source: author's estimation using Eviews 10.

Tests for correlation and causality between variables. The simple correlation matrix between the variables shows no relationship between the dependent variable (GDP) and the explanatory variables in the first column, as the degree of association is less than 0.50. The correlation matrix is based on a simple correlation between variables, and the dependent variable (GDP) and the explanatory variables in the second column are not related (Table 8).

Table 8

Simple correlation matrix between variables

Indicators	LNGDP	LNHEV	LNPAL	LNLAB	LNTRA	LNINV
LNGDP	1	0.95148	0.86392	0.77003	0.96261	0.80149
LNHEV	0.95148	1	0.87759	0.78785	0.91045	0.68669
LNPAL	0.86392	0.87759	1	0.54694	0.84635	0.64489
LNLAB	0.77003	0.78785	0.54694	1	0.71606	0.47732
LNTRA	0.96261	0.91045	0.84635	0.71606	1	0.67543
LNINV	0.80149	0.68669	0.64489	0.47732	0.67543	1

Source: author's estimation using Eviews 10.

Estimation of Short-term coefficients. The results reported in Table 9 indicate that labour (LAB) has a positive and significant effect on Gross Domestic Product (GDP) in the short term. Indeed, a 1 % increase in labour force stimulates the growth of the domestic product by 18.10 %. When it is delayed by one period, it always has a positive and significant effect on economic growth. Similar results were reported by Theodore et al. (2019), showing that labour force had significant positive effects on economic growth. According to this author, the labour has a multiplying power.

Moreover, agricultural investment (INV) has a positive and significant influence on short-term economic development. A 1 % change in agricultural investment leads to a 19.80 % increase in GDP. In addition, when it is delayed by one or two periods, it has the same positive and significant effect on GDP. The study by Khan and Kumar (1997) confirmed this result. According to these authors, public and private investment always has a significant impact on economic growth.

On the other hand, exports of natural rubber provide a positive but not significant boost to GDP in the short term. Thus, when the monetary value of natural rubber exports varies by 1 %, GDP grows by 0.34 %. However, when lagged one or two periods, natural rubber exports exert a positive and significant influence on economic growth of 4.10 % and 6.38 % respectively. These results show that rubber tree cultivation does not have an immediate effect in the short term. This cash crop is beneficial in the long term.

In addition, palm oil exports stimulate GDP positively and significantly in the short term. Therefore, when the monetary value of palm oil exports increases by 1 %, GDP grows by 6.94 %. Moreover, when palm oil exports are delayed by one and two periods, the 1 % increase in palm oil exports causes a 20.23 % and 19.22 % growth in Gross Domestic Product, respectively. These results show that palm oil exports have a favourable impact on economic growth in the short term. This is in agreement with Fakhre and Godwin (2016), who found out that GDP and palm oil exports have a short and long-run equilibrium relationship.

Finally, the opening up of trade has a positive and significant influence on GDP in the short term. When its monetary value increases by 1 %, GDP grows by 40.59 %. Conversely, when it is delayed by one and two periods, its 1 % increase leads to a decrease in economic growth of 2.20 % and 0.46 % respectively. These results show that trade openness undeniably contributes to economic growth.

Table 9

Short-term coefficients

Indicators	Conditional Error Correction Regression			
Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	12.32243	2.666462	4.621266	0.0024
TREND	0.030963	0.009018	3.433635	0.0109
LNGDP(-1)*	1.213571	0.200422	6.055077	0.0005
LNHEV(-1)	0.081061	0.075169	1.078383	0.3166
LNPAL(-1)	0.272113	0.093670	2.905035	0.0228
LNLAB(-1)	0.102527	0.076925	1.332818	0.2243
LNTRA(-1)	0.580766	0.088983	6.526680	0.0003
LNINV(-1)	0.283822	0.051731	5.486515	0.0009
D(LNGDP(-1))	0.044150	0.116184	0.379996	0.7152
D(LNGDP(-2))	0.181320	0.112813	1.607253	0.1520
D(LNHEV)	0.003404	0.037975	0.089629	0.9311
D(LNHEV(-1))	0.041084	0.050115	0.819804	0.4393
D(LNHEV(-2))	0.063829	0.054383	1.173680	0.2789
D(LNPAL)	0.069497	0.035061	1.982134	0.0879
D(LNPAL(-1))	0.202302	0.081400	2.485274	0.0419
D(LNPAL(-2))	0.192215	0.057669	3.333068	0.0125
D(LNPAL(-3))	0.053152	0.044022	1.207412	0.2665
D(LNLAB)	0.181067	0.101345	1.786646	0.1172
D(LNLAB(-1))	0.150233	0.087711	1.712824	0.1305
D(LNLAB(-2))	0.047774	0.109458	0.436457	0.6757
D(LNLAB(-3))	0.173170	0.107575	1.609760	0.1515
D(LNTRA)	0.405936	0.073958	5.488735	0.0009
D(LNTRA(-1))	0.022057	0.091268	0.241671	0.8160
D(LNTRA(-2))	-0.004620	0.102082	-0.045257	0.9652
D(LNTRA(-3))	-0.126556	0.068758	-1.840603	0.1082
D(LNINV)	0.198013	0.024858	7.965601	0.0001

Note. *P-Value Incompatible With T-Bounds Distribution.

Source: author's estimation using Eviews 10.

Estimation of Long-term coefficients. The results of the long-term coefficients (Table 10) show that labour force (LAB) has a positive and significant effect on Gross Domestic Product (GDP). Indeed, when the population varies by 1 %, the Gross Domestic Product grows by 8.44 %. However, it can be seen that the labour multiplier effect declines in the long term. It means that in the long term, the labour force could have a negative impact on economic growth. Sandron (2002) confirmed these results. He started from the argument that the multiplier power of the labour force is infinitely greater than the power of the land to produce human subsistence.

Furthermore, agricultural investment (INV) has a positive and significant

influence on gross domestic product (GDP) in the long term. A 1 % increase in capital causes an increase in economic growth of 23.39 %. These results show that investment boosts long-term economic growth. The work carried out by Kouakou (2020) supported these assertions.

Also, natural rubber exports have a positive and significant effect on the gross domestic product in the long term. Indeed, when the monetary value of natural rubber exports increases by 1 %, GDP grows by 6.68 %. These results are consistent with those of N'Zué (2003), who in a study on Ivory Coast, analysed the Granger causal relationship between export expansion and economic growth and determined its implications for wealth creation.

Moreover, palm oil exports have a positive and significant impact on long-term economic growth. For example, when the monetary value of palm oil exports varies by 1 %, GDP increases by 22.42 %. These results are in line with those of Greenaway, Morgan and Wright (1999) who also showed that export growth drives economic growth. Similar results found by Sertoglu and al. (2017).

Finally, trade openness causes a positive and significant influence on long-term economic development. Therefore, when its monetary value increases by 1%, GDP grows by 47.85 %. These results show that trade openness inevitably influences economic growth.

Table 10

Long-term coefficients

Levels Equation				
Case 5: Unrestricted Constant And Unrestricted Trend				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
LNHEV	0.066796	0.026445	2.525836	0.0395
LNPAL	0.224225	0.037685	-5.949988	0.0006
LNLAB	0.084484	0.031360	2.693985	0.0309
LNTRA	0.478559	0.022320	21.44128	0.0000
LNINV	0.233874	0.018222	12.83454	0.0000
EC = LNGDP - 0.0668*LNHEV + 0.2242*LNPAL+ 0.0845*LNLAB + 0.4786*LNTRA + 0.2339*INV				

Source: author's estimation using Eviews 10.

Conclusions. In view of the results, it can be concluded that palm oil exports have a positive and significant effect on economic growth in the short and long term.

However, natural rubber exports have a positive, but not significant, influence on the gross domestic product in the short term. On the other hand, in the long term, they positively and significantly boost GDP. On the other hand, the labor force has a positive and significant influence on economic development in the short and long term. However, in the absence of better planning, it could have a negative impact on economic growth in the long term.

Agricultural investment, on the other hand, causes a positive and significant relationship on the gross domestic product in the short and long term. Finally, trade openness also promotes economic development in the short and long term.

From all of the above, it is clear that the natural rubber and the palm oil sectors

remain undeniably the mainstay of the Ivorian economy. Therefore, we recommend increasing the productivity of planters, through the modification of technical itineraries and the use of improved plant material; the training and sensitization of producers and their families to the problem of deforestation, particularly with regard to climate change, the distribution of improved seedlings, and finally, the financing of farms.

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