

Full Length Research Paper

Commodity prices, exchange rate and economic growth in West Africa: Case study of Cote d'Ivoire and Ghana

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Received 10 April, 2017; Accepted 11 August, 2017

Some West African countries have extensive access to natural resources and rely heavily on revenues from the export of these primary commodities. The heavy dependence of Ghana and Cote d'Ivoire on revenues from the exportation of cocoa raises the possibility that these economies are vulnerable to external commodity price fluctuations. This paper seeks to examine the relationship between cocoa prices, exchange rate and economic growth using time series data for the period 1980 to 2011. Using autoregressive distributed lag (ARDL) modelling approach, the study found intriguing results. The study revealed that higher cocoa price reduces long-run economic growth in Ghana but cannot be an important ingredient in short-run growth. In Cote d'Ivoire, it does not play any significant role in both long-run and short-run economic growth. Increases in cocoa exports rather enhance economic growth of the two countries. Appreciation of the Communauté Financière Africaine (CFA) franc enhances economic growth but that of the Ghana Cedi is only in the short-run. Higher rates of inflation reduce economic growth of Ghana but enhance that of Cote d'Ivoire. Improvements in life expectancy augment economic growth in Ghana but reduce that of Cote d'Ivoire.

Key words: Cocoa price, cocoa export, inflation, exchange rate, economic growth.

INTRODUCTION

In recent times, exchange rate movements have been unusually large and this has triggered debates on their likely effects on trade and economic growth of commodity exporting countries. For instance, the U.S. dollar has appreciated by more than 10% in real effective terms since mid-2014. The euro has depreciated by more than 10% since early 2014 and the yen by more than 30% since mid-2012. Such movements, although not

unprecedented, are well outside these currencies' normal fluctuation ranges. Even for emerging markets and developing economies, whose currencies typically fluctuate more than those of advanced economies, the recent movements have been unusually large. Krugman (2015) predicted strong impacts of these large exchange rate movements on trade, hence influencing economic activities.

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According to Issa et al. (2008), long-run economic growth of commodity-rich countries does not correlate with commodity prices but short-run economic growth does. One relevant question raised here is: What is the economic mechanism that drives the short-run movement between commodity prices and growth to varnish in the long-run? The neoclassical growth model is consistent with these two facts. Here, the long-run (steady-state) growth is determined by the pace of exogenous technical progress as such by construction independent of commodity prices. In addition, movements in commodity prices would affect short-run growth but only through transitional dynamics (Rebelo and King, 1993; Cogley and Nason, 1995).

There are different stories of how Ghana's "black gold" cocoa, was introduced to Ghana. It was an indigenous plant in the rain forests of Central and Southern America, and so rare and expensive that only the royalty of Inca or Aztecs were permitted to eat it. It was used to coat turkeys when they were roasted or baked. It was forbidden to cultivate the plant or export it. The Portuguese and Spanish both stole cocoa plants to grow elsewhere. When introduced to Europe, cocoa and the chocolate made from it, were very expensive, and a luxury only the wealthy could afford. The Swiss were interested in developing chocolate products as an expensive luxury food. The Swiss Missionaries who came to Gold Coast in the early nineteenth century wanted to convert the local people to cash cropping so as to monetize their economy. The Portuguese introduced it in Sao Palme also.

According to Ghanaian oral history, Tetteh Quarshie went to Fernando Po and stole some live beans to cultivate at Akropong Akwapem in Gold Coast. He sold the early harvest to local farmers and later in 1885 began exports to Europe. This spread to the neighbouring country, Cote d'Ivoire, which has the same vegetation as Ghana. In 1925, Ghana exported nearly 44% of the world's cocoa. In 1936 to 1937, British West Africa and French West Africa contributed 66% of total world exports in the following capacities; Ghana 42%, Nigeria 14%, Cote d'Ivoire 7%, and French Cameroons 3%. This rapid expansion of the cocoa industry made Ghana the most highly developed peasant export economy in Africa. This improved the developmental process of the country.

Economic growth of most developing countries is made up of exports. The exports of these countries especially in the Sub-Saharan African countries are commodities such as gold, metals, minerals, and agricultural products. Generally, commodity prices are popularly known for their volatility in world prices. These variations tend to induce a lot in the real national incomes hence a lot of challenges in the macroeconomic management of these countries.

Are continued fluctuations in commodity prices of developing countries affecting their economic growth? Or does the increases in these prices sow the seeds for the amelioration of inflation and exchange rate problem?

These natural resources serve as inputs in the production of many goods and services.

Many studies have concentrated on variables that influence economic development of West African states but one issue that remains unclear, but important is the extent of the relationship between commodity prices, exchange rate variability and economic growth. This study looks at how the fluctuations in cocoa commodity price as a leading agricultural export influence the real growth in the GDP of Ghana and Cote d'Ivoire. The study intends to investigate if a boom in the price of cocoa on the world market contributes to high economic growth of Ghana and Cote d'Ivoire in order to promote a better understanding of the impact of commodity price movements on growth and the opportunities for economic growth that commodity production presents. It examines the effects of excessive commodity price volatility and exchange rate on economic growth. Ghana and Cote d'Ivoire are selected as they are the major cocoa producing countries in the world and relies heavily on revenues from the exports of this commodity. The dependence of Ghana and Cote d'Ivoire on revenues from the exports of cocoa highlights the vulnerability of these economies to external commodity price fluctuations.

LITERATURE REVIEW

Economists have used both theories and empirical studies to explain the causes of economic growth. Pritchett (2000) and Hausmann et al. (2005) explained that growth process in many developing countries lacks persistence. They argued that even many of the poorest countries have experienced temporary periods of rapid growth, but the difficulty is how to sustain it. Easterly et al. (1993) have shown that economic growth instability in developing economies might possibly be as a result of external shocks, particularly where instability in the terms of trade plays an important role. Elbadawi and Ndulu (1996) buttressed the proposition that external shocks have an indirect growth impact by inducing policy changes that often further contribute to poor growth performance.

Bjornland (2009) presented a transmission channel of how oil prices affect macroeconomic behaviour of oil exporting countries. The researcher postulated that the economy is affected by higher oil prices in two ways; first, higher oil prices signify an instantaneous transfer of wealth from oil importing countries to oil exporting countries, and lastly, through negative trade effects at higher oil prices, oil importing economies will demand less export of traditional goods and services from the oil exporting economies which may have an indirect influence on the oil exporting economies.

Commodity price volatility can influence long-term growth. This maybe so because strongly fluctuating prices increase uncertainty and risk which discourage the level

of investment in the economy. Blattman et al. (2007) indicated that countries that specialize in commodities with substantial price volatility have more volatility in their terms of trade, enjoy less foreign direct investment, and experience lower growth rates than countries that specialize in commodities with more stable prices or countries that are industry leaders. Again, the researchers avowed that countries in the periphery with volatile commodity prices and undiversified economies fall behind in economic development.

Van der Ploeg and Poelhekke (2009) combined the natural resource literature with Ramey and Ramey (1995) to show that commodity price volatility drives the volatility of the share of natural resource exports in a country's GDP. The reason is that variability of the share of natural resources as part of GDP will, in turn, result in volatility of unanticipated output growth and depresses output per capita growth in countries that heavily depend on natural resources. Taken together, Van der Ploeg and Poelhekke (2009) showed that the share of natural resources in GDP has a positive effect on economic growth, while the volatility of this share has a negative growth effect.

Besides, the recent spikes in commodity prices have pushed up consumer prices in many countries, prompting calls for central banks to take pre-emptive action against an acceleration of inflation. Cecchetti and Moessner (2008) and Liu and Weidner (2011) stated that oil price shocks induce a rise in nominal wage rates. As such, high wage rates result in a further increase in consumer prices, as higher wage costs are passed on by employers to consumers. Krugman (2008) commented that the fear of inflation itself may possibly lead to policies that could worsen a bad economic situation.

As for the effect of oil prices on real exchange rate, Amano and Norden (1998), Huang and Guo (2007), Kutana and Wyzan (2005), Olomola and Adejumo (2006), Korhonen and Juurikkala (2009) and Narayan et al. (2008) have found that an increase in oil prices leads to an appreciation of the domestic currency. Policies adopted to counter inflationary pressure from rising commodity prices are also of crucial importance for the development of real exchange rates. To the extent that commodity price pressure translates into inflation, countries with a fixed nominal exchange rate will experience an appreciation of their real exchange rate with adverse consequences for the international competitiveness of their non-commodity sectors.

Trade activities involve a huge sum of funds invested by highly leveraged financial institutions like hedge funds and banks. Although their activities may not be directly related to trade, they have become the single most important determinant of cross-border capital flows. For instance, a large movement of flows into a target country leads to an appreciation of the respective country's currency and a depreciation of the currency of the funding country. This movement reinforces the flows as it increases the profit margin of the investor, who, in

addition to interest rate differential, also expects a gain from the appreciation of the target currency. According to Aghion et al. (2009), real exchange rate volatility has a significant effect on the long-term rate of productivity growth, but the effect is subject to a country's level of financial development.

Chen and Rogoff (2003) analysed the relationship between commodity prices and exchange rates of three member economies of the Organisation for Economic and Co-operation and Development (OECD), namely Australia, Canada, and New Zealand. The authors found that commodity prices significantly drive the real exchange rates of Australia and New Zealand. The result was similar to the analysis of Cashin et al. (2004) who provided additional evidence for a larger set of developing-commodity exporting countries. Kutana and Wyzan (2005) incorporated oil price shocks into real exchange rate equation to determine the vulnerability of Kazakhstan to the Dutch disease. The findings revealed that changes in oil prices have a positive and significant effect on movements in the real exchange rate in Kazakhstan, as an increase in oil price results in an appreciation of the real exchange rate. Also, in Ghana, commodity prices such as cocoa and gold prices were found to be directly related to exchange rate. This is because Ghana is a net exporter of both cocoa and gold, and as a result when the prices of cocoa and gold increase, Ghana tends to reap greater revenues from its cocoa and gold exports. As the revenue from its cocoa and gold exportations increases, the value of the Ghanaian cedi improves, and hence the exchange rate appreciates as well (Buah, 2016).

Empirically analysing the relationship between the prices of minerals and the real value of the Rand of South Africa, Frankel (2007) reported that an index of mineral prices is one; which implies that mineral prices are important determinants of the real value of the Rand. This was particularly true in the times when the Rand was strongly appreciating in the real terms in-between the periods of 2003 and 2006. Mostly in developing countries, Ngandu (2005) validated the relationship between commodity prices and the real exchange rate of commodity exporting countries.

Rautava (2004) divulged that oil has played a significant role in movements of Russian GDP. Yet, the results obtained from the study indicated that a higher oil price does not lead to a stronger real exchange rate in Russia. In Norway, Bjornland (2004) alluded that an oil price shock stimulates the economy temporarily, however, it has no significant long-run impact. The study exhibited no evidence for the major part of real exchange rate appreciation in Norway being driven by oil price shocks.

Aghion and Banerjee (2005) explored the various causal linkages between economic growth and the volatility of commodity prices from empirical cross-country. It was found that commodity price volatility hurts

economic growth. Evidence attained by Jimenez-Rodriguez and Sanchez (2005), Korhonen and Mehrotra (2009), and Bjornland (2009) indicated a positive impact of higher oil prices on the growth rate of Norway, Russia, Kazakhstan, Iran, and Venezuela. Meanwhile, oil exporting countries like the United Kingdom and Canada showed declining growth rates as a result of higher oil prices, hence behaving more like oil importing countries. Mostly, countries with larger oil sector compared to the economy have oil price changes affecting the economic cycle only through their impact on fiscal policy (Tazhibayeva et al., 2008).

Upreti (2015) shared the idea that a high quantity of exports, copious resources, longer life expectancy all have positive impacts on the growth rate of GDP in developing countries. However, the researcher proposed further studies to be conducted so as to characterise the causes of growth in less developed countries since he employed cross-country data for 76 less developed countries. Besides, Barro (1996) who realised that the real GDP per capita was associated with maintenance of the rule of law, small government consumption, longer life expectancy, higher levels of investment and a lower inflation rate used a panel of 100 countries from 1960 to 1990.

STUDY METHODOLOGY

Model specification

Economic growth is influenced by macroeconomic factors such as cocoa price, cocoa export, exchange rate, inflation rate, and life expectancy. Economic growth using a linear function is specified as follows:

$$\ln GDPPC_t = \alpha_0 + \delta_1 \ln COP_t + \delta_2 \ln COEX_t + \delta_3 \ln EXR_t + \delta_4 \ln INFL_t + \delta_5 \ln LE_t + \varepsilon_t \quad (1)$$

where GDPPC represents gross domestic product per capita (GDPPC) which is a proxy for economic growth, COP is the cocoa price, COEX represents the cocoa export, EXR indicates the exchange rate, INFL denotes inflation, LE represents life expectancy. α_0 and ε_t represent the constant and error term respectively. δ_i represents the elasticity of the respective variables and \ln represents natural logarithm. The following are expected: $\delta_1 > 0, \delta_2 > 0, \delta_3 > 0$ or $< 0, \delta_4 < 0$, and $\delta_5 > 0$.

Data source

The study used annual time series data covering the period 1980 to 2011 obtained from published sources. Data on cocoa prices and exports were extracted from Food and Agricultural Organisation's Statistics database. Data on gross domestic product per capita which is a proxy for economic growth, inflation rate, and exchange rate were retrieved from the World Development Indicators (2015).

Estimation strategies

ARDL cointegration test

Cointegration mechanism, according to Stock and Watson (1988)

ensures that the information of non-stationary variables is captured without having to forfeit the statistical validity of the projected equation. To investigate the long-run relationship between cocoa price, exchange rate, economic growth and other controlled variables, this study did not pay attention to outdated cointegration techniques such as the two-steps Engle-Granger method and Johansen Maximum Likelihood Estimation. The study rather considered the newly advanced technique to test long-run relationship which may exist between the variables by using autoregressive distributed lag (ARDL) modelling technique developed by Pesaran and Shin (1998), and Pesaran et al. (2001) due to its several advantages relative to other single equation cointegration techniques. It is capable of computing the long-run and short-run parameters of the model concurrently in order to prevent the problems posed by time series data which are non-stationary. It does not require pre-testing of the order of integration among the concerned variables as compared to other techniques which dictate that the variables present the same order of integration. However, in this study, the Augmented Dickey-Fuller test for stationarity was used to ensure that none of the variables was integrated of order two $I(2)$. Again, the ARDL modelling technique is the more appropriate approach for examining the cointegration relationship in small samples.

Long-run and short-run relationships

A selected ARDL (m, n_1, n_2, n_3, n_4 and n_5) model was employed to determine the long-term relationship of the variables. The long-term ARDL model equilibrium relationship was expressed as:

$$\ln GDPPC_t = \gamma_0 + \sum_{i=1}^m \gamma_{1i} \ln GDPPC_{t-i} + \sum_{j=1}^{n_1} \gamma_{2j} \ln COP_{t-j} + \sum_{k=1}^{n_2} \gamma_{3k} \ln COEX_{t-k} + \sum_{d=1}^{n_3} \gamma_{4d} \ln INFL_{t-d} + \sum_{e=1}^{n_4} \gamma_{5e} \ln EXR_{t-e} + \sum_{f=1}^{n_5} \gamma_{6f} \ln LE_{t-f} + \varepsilon_t \quad (2)$$

In order to give more parsimonious model specification, the optimum lags were chosen based on the Schwarz Bayesian Criterion.

The error correction model captured the short run dynamics as follows:

$$\Delta \ln GDPPC_t = \gamma_0 + \sum_{i=1}^m \gamma_{1i} \Delta \ln GDPPC_{t-i} + \sum_{j=1}^{n_1} \gamma_{2j} \Delta \ln COP_{t-j} + \sum_{k=1}^{n_2} \gamma_{3k} \Delta \ln COEX_{t-k} + \sum_{d=1}^{n_3} \gamma_{4d} \Delta \ln INFL_{t-d} + \sum_{e=1}^{n_4} \gamma_{5e} \Delta \ln EXR_{t-e} + \sum_{f=1}^{n_5} \gamma_{6f} \Delta \ln LE_{t-f} + \varphi ECM_{t-1} + \varepsilon_t \quad (3)$$

where γ_i denotes the coefficient relative to short-run dynamics of the model's adjustment to equilibrium. ECM_{t-1} term is error correction factor and φ is interpreted as a speed of adjustment for the dependent variable to attain the equilibrium.

Diagnostic and stability tests were conducted to examine the goodness of fit of the ARDL model. Serial correlation, normality, functional form, and heteroscedasticity were used for the diagnostic tests, whereas cumulative sum of recursive residuals and cumulative sum of squares of recursive residuals were employed for the stability tests.

EMPIRICAL RESULTS AND ANALYSES

Descriptive statistics

Table 1 shows the descriptive statistics of the series. There are 32 observations representing the yearly time series data from 1980 to 2011. The standard deviation of the variables indicates variation or deviation of the series

Table 1. Descriptive statistics.

Study area	Variable	Observation	Mean	Std. Dev.	Min.	Max.
Ghana	lnGDPPC	32	6.556	0.187	6.264	7.024
	lnCOP	32	12.239	2.865	7.090	16.029
	lnCOEX	32	13.122	0.509	12.397	14.604
	lnINFL	32	3.152	0.674	2.166	4.811
	lnLE	32	4.040	0.041	3.957	4.108
	lnEXR	32	-2.582	2.696	-8.199	0.413
Cote d'Ivoire	lnGDPPC	32	12.830	0.330	12.330	13.325
	lnCOP	32	12.826	0.396	12.206	13.798
	lnCOEX	32	13.916	0.463	12.970	14.924
	lnINFL	32	1.264	0.878	-0.353	3.261
	lnLE	32	3.911	0.044	3.842	3.969
	lnEXR	32	6.062	0.335	5.353	6.597

from their mean values. All the series showed little deviation from the mean values. This is because the extent of deviation from the mean value is not substantial for gross domestic product per capita, cocoa price, cocoa export, inflation, life expectancy, and exchange rate for Cote d'Ivoire. However, in the case of Ghana, only the standard deviations of cocoa price and exchange rate were substantial. Gross domestic product per capita averaged around 6.56% over the 1980 to 2011 period, while the cocoa price also averaged around 12.24% over the same period. The exchange rate recorded an average of -2.58% over the 1980 to 2011, period while the cocoa export averaged 0.89% over the same period. Moreover, the gross domestic product per capita indicated a maximum rate of 7.02% and a minimum of 6.26%. The minimum level of cocoa price over the study period was 7.09%, whilst the maximum was 16.03%. Additionally, the exchange rate showed a minimum of -8.20% over the period with a maximum of 0.41%. The cocoa export recorded a minimum of 12.40% and a maximum of 14.60% for Ghana. Similar analyses were conducted for all the series considered in the study for Cote d'Ivoire.

Stationarity test

The Augmented Dickey-Fuller test was deployed to examine the level of stationarity of the variables used in the study. The results are shown in Table 2.

From Table 2, the results indicated that inflation and life expectancy were stationary at their levels after the use of the Augmented Dickey-Fuller (ADF) test for both countries (Ghana and Cote d'Ivoire). Also, the results indicated that gross domestic product per capita (proxied for economic growth), cocoa price, cocoa export, and exchange rate became stationary at their first difference using the Augmented Dickey-Fuller test in the case of Ghana and Cote d'Ivoire respectively.

Cointegration test

In analysing the long-run relationship among the variables, the study deployed ARDL Bounds Test approach to cointegration. Table 3 presents the results of the cointegration test.

The study considered the lower and upper bounds of the bounds tests at 1 and 5% levels of statistical significance. The F-statistics of 10.77828 and 12.95791 from both models were found to be greater than their respective upper boundary at a 1% level of significance. Hence, there exists a long run relationship amongst the variables for both countries. There would have been no cointegration should the F-statistic fall below the lower boundary and undetermined should it have fallen in between the upper and lower boundaries.

Long-run relationship

The results for the long-run relationship are captured in Table 4. Focusing on the results, it was found that cocoa price has an inverse relationship with economic growth in the long run with an explanatory power of -0.011690 which alludes that a 1% rise in the cocoa price reduces economic growth by 0.01% in Ghana. In the situation of Cote d'Ivoire, though it was insignificant, an increase in the price of cocoa helped improve the growth rate of the economy in the long run.

Cocoa export was significant and positively related to economic growth for the two major cocoa exporting countries (Ghana and Cote d'Ivoire). This implies that a 1% increase in the value of cocoa export will enhance economic growth by increasing it by 0.08% and 0.16% for Ghana and Cote d'Ivoire, respectively in the long run. A similar result was obtained by Shashi and Marcella (2010). However, this result contradicts the study of Noula et al. (2013) which reported that there is a negative but insignificant relationship between cocoa export and

Table 2. Unit root test using ADF.

Variable	ADF		ADF		IO
	Level		First difference		
	No trend	Trend	No trend	Trend	
Ghana					
lnGDPPC	2.680	0.224	-4.658***	-5.821***	I(1)
lnCOP	-1.616	-1.078	-5.298***	-5.726***	I(1)
lnCOEX	0.425	-1.570	-6.651***	-7.258***	I(1)
lnINFL	-3.552**	-5.109**	-	-	I(0)
lnEXR	-3.175**	-1.119	-3.214**	-4.272***	I(1)
lnLE	0.893	-5.507***	-	-	I(0)
Cote d'Ivoire					
lnGDPPC	-1.010	-2.351	-3.385**	-3.306*	I(1)
lnCOP	-2.055	-2.606	-5.852***	-5.814***	I(1)
lnCOEX	-0.986	-3.265*	-5.891***	-5.895***	I(1)
lnINFL	-4.354	-4.519***	-	-	I(0)
lnEXR	-2.309	-1.932	-4.779***	-4.771***	I(1)
lnLE	-4.224***	-3.324*	-	-	I(0)

***, **, *Statistical significance at 1, 5, and 10% levels of statistical significance, respectively.

Table 3. Bounds test results for cointegration relationship.

Model	F-Statistic	Critical value			
		99% bound		95% bound	
		I(0)	I(1)	I(0)	I(1)
Ghana					
Fy(lngdppc, incop, incoex, inextr, lninfl, lnle)	10.778	3.41	4.68	2.62	3.79
Cote d'Ivoire					
Fy(lngdppc, incop, incoex, inextr, lninfl, lnle)	12.958	3.41	4.68	2.62	3.79

economic growth in Cameroon.

The study also found that exchange rate has a positive and significant effect on economic growth in Cote d'Ivoire in the long-run. This implies that an increase in exchange rate causes the Ivorian economy to rise by 0.94%. This is similar to the finding of Verter and Becvarova (2016). However, Ojide et al. (2014) found a negative relationship between exchange rate and economic growth in Nigeria. Although there was a negative relationship between exchange rate and economic growth in Ghana, it was found to be insignificant.

Apparently, the sign of inflation was consistent with economic theory in Ghana, as the relationship between inflation and economic growth was negative in the long-run. As a result, the growth rate of the Ghanaian economy will decline significantly by 0.03% for a 1% rise in the rate of inflation. However, inflation exhibited a significant positive influence on economic growth in Cote d'Ivoire. The study results contradict the findings of Noula et al. (2013).

Eventually, the study established a significant positive

long-run relationship between life expectancy and economic growth in Ghana. This implies that a year increase in life expectancy in Ghana will increase economic growth by 8.85%. However, unrelated outcome was observed in the case of Cote d'Ivoire; life expectancy was found to relate negatively to economic growth. It was statistically significant at 1% level and exerts a negative impact of about 7.78% on growth for a year increase in life expectancy. The finding for Ghana concurs with most outcomes in several empirical studies. Particularly, Barro (1996) and Upreti (2015) who unveiled that there is an evidence of a positive association between longer life expectancy and the growth rate of GDP per capita in developing countries.

Short-run relationship

The short run effects of independent variables on economic growth are shown in Table 5. The first variable which is cocoa price was positively and negatively related

Table 4. Estimated ARDL long-run coefficients.

Regressor	Dependent variable: lnGDPPC					
	Ghana			Cote d'Ivoire		
	Coefficient	T-statistic	P-Value	Coefficient	T-statistic	P-Value
lnCOP	-0.012	-2.012	0.063	0.087	1.285	0.215
lnCOEXP	0.084	4.230	0.001	0.163	2.067	0.053
lnEXR	-0.036	-1.146	0.270	0.945	4.386	0.000
lnINFL	-0.029	-2.518	0.024	0.124	2.743	0.013
lnLE	8.852	4.614	0.000	-7.784	-5.408	0.000
C	-30.195	-3.883	0.001	34.023	5.964	0.000

Table 5. Estimated ARDL short-run coefficients and the error correction estimate.

Regressor	Dependent variable: $\Delta \ln \text{GDPPC}$					
	Ghana			Cote d'Ivoire		
	Coefficient	T-statistic	P-Value	Coefficient	T-statistic	P-Value
$\Delta \ln \text{COP}$	-0.002	-1.562	0.139	0.027	1.214	0.241
$\Delta \ln \text{CEX}$	0.038	4.484	0.000	0.051	1.866	0.078
$\Delta \ln \text{EXR}$	0.029	1.918	0.074	0.377	8.612	0.000
$\Delta \ln \text{INFL}$	-0.013	-3.003	0.009	0.021	3.107	0.006
$\Delta \ln \text{LE}$	29.094	2.436	0.028	-54.323	-6.023	0.000
CointEq (-1)	-0.450	-5.067	0.000	-0.315	-4.968	0.000
R-squared		0.865			0.921	
Adjusted R-squared		0.748			0.873	
Durbin-Watson		2.164			2.468	
F-statistic		7.379			19.141	
Prob.(F-statistic)		0.000			0.000	

to economic growth for Cote d'Ivoire and Ghana respectively and was insignificant in impacting on economic growth in the short run. The coefficients of cocoa price depict that a 1% rise in cocoa price will lead to an increase in economic growth by 0.03% in Cote d'Ivoire, but leads to a decline in economic growth in Ghana. Cocoa export as could be seen from Table 4 exhibited positive sign suggesting that it is positively related to economic growth in Ghana and Cote d'Ivoire in the short-run. Cocoa export was significant with the capacity to raise economic growth by 0.04 and 0.05% for each 1% increase in cocoa export in Ghana and Cote d'Ivoire respectively. This result is similar to the finding of Shashi and Marcella (2010), but it contrasts the outcome of Noula et al. (2013).

Inflation was once again in consonance with the a priori expectation and theory in the case of Ghana. Inflation was significant at 1% and demonstrated an inelastic effect. The coefficient of inflation -0.012965 shows that 1% increase in the rate of inflation will lead to a proportionate decrease in economic growth by 0.01% in the short run. But, in the short run, inflation was positive and significant in relation to economic growth in Cote d'Ivoire. The estimated coefficient was 0.021345 and it

was significant at 1% significance level. The implication is that an increase in inflation rate positively and significantly influences economic growth in Cote d'Ivoire.

The study also exhibited that, in the short run, exchange rate was found to have a significant positive impact on economic growth in the two major cocoa exporting countries (Cote d'Ivoire and Ghana). This is in line with the finding of Verter and Becvarova (2016).

Life expectancy has a negative and significant association with economic growth in Cote d'Ivoire, whilst in Ghana, it was found to augment economic growth at 5% significance level. An improvement in life expectancy by one year improves the level of economic growth by over 29% in the case of Ghana, meanwhile, a year upsurge in life expectancy causes economic growth to decline by 54% in the situation of Cote d'Ivoire. This makes human health the most significant variable in determining economic growth in Ghana.

Conclusion

Some West African countries have extensive access to natural resources and rely heavily on revenues from the

export of these primary commodities. The heavy dependence of Ghana and Cote d'Ivoire on revenues from the exportation of cocoa raises the possibility that these economies are vulnerable to external commodity price fluctuations. This paper sought to examine the relationship between cocoa price, real exchange rate and economic growth using time series data for the period 1980 to 2011.

The study established that cocoa export, exchange rate, and inflation had a positive influence in determining economic growth in Cote d'Ivoire. But, cocoa export and life expectancy were identified to have a positive long-run effect on economic growth in Ghana. It was also found that there is a negative long-run relationship between cocoa price and economic growth in Ghana.

With the exception of life expectancy, the study found that, in the short-run, cocoa export, exchange rate and inflation had a positive and significant impact on economic growth in Cote d'Ivoire. In the situation of Ghana, the short run error correction model emphasized that cocoa export, exchange rate, and life expectancy had positive effect whereas inflation impacted inversely on economic growth. Eventually, the results suggested that, in the short-run, cocoa price has an insignificant impact on the performance of Ghanaian and Ivorian economy respectively.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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