

**OPENNESS, GLOBALIZATION AND ECONOMIC
GROWTH: EMPIRICAL EVIDENCE FROM CÔTE
D'IVOIRE**
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Abstract:

The purpose of this paper is to examine the relationships between openness, globalization on economic growth in Côte d'Ivoire which adopted the openness of its economy as the basic way for development at the beginning of its economic history in 1960. Using a three-variable vector autoregressive (VAR) model, we find that the three variables are tied together in the long-run. Globalization does have a negative effect on economic growth, and although a positive effect of openness on growth is observed in the short-run, both increasing openness and globalisation do not have positively contributed to the long-run economic growth of this country, a finding that is in the opposite of the prediction of the new growth theory about the potential long-run effects of trade on growth.

JEL Classification: C32; F4;

Keywords: Openness, Globalization, Growth, Cointegration, Causality, Impulse response.

1. Introduction

This paper examines the effects of openness and globalization on Côte d'Ivoire's economic growth. At the beginning of its development process after independence in 1960, Côte d'Ivoire adopted openness of its economy as the main basic strategy for economic growth. Within this development strategy, the rest of the world (ROW) should play 3 important roles: (i) provide skilled labour; (ii) provide manufactured goods and capital; and (iii) buy raw

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material from the primary sector, mainly cocoa and coffee (representing 45% of Côte d'Ivoire's total exports in 1995), and forest products.

This growth strategy leads the country to rapid economic success spanning from 1960 to 1979; with the gross domestic product (GDP) per capita growing at an average rate of 5.7% during this period (see Figure 1). By the end of 1979, the growth process of the country slowed down due to the drop in the export prices of agricultural products, combined with the increase in oil prices and the deterioration of terms of trade. Côte d'Ivoire implemented a number of economic policies in an attempt to restore the competitiveness of its economy from 1980.

The initial option for openness has been recently amplified by globalization i.e. Côte d'Ivoire's participation in the new wave of trade liberalisation which officially began in the 1980's, including regional economic integration in western Africa (West African Economic and Monetary Union (WAEMU) launched in 1994) and multilateral trade system (MTS) agreements adopted by the country since 1st January 1995. Côte d'Ivoire's international trade (imports and exports) which represented 64% of GDP in 1969 reached 80% in 2001, indicating an increasing connection of this country to the world trade since the beginning of its economic history.

Although several studies including Fosu (1990a; 1990b), Awudu and Jacquet (2002) have shown the importance of exports for Côte d'Ivoire's economy, no empirical work has been dedicated specifically to openness and globalization for this country. It is therefore of importance to shed light on this question, especially for Côte d'Ivoire which has experienced rapid economic growth along with a high rate of openness and globalisation.

More importantly, since 1999, as a result of the growth strategy adopted at the early years, Côte d'Ivoire experienced political and social crisis leading to war from September 19, 2002 up to the present (The political and social situation are not peaceful yet).

It should be interesting to know in which direction openness and globalization have affected Côte d'Ivoire's economic growth. A quantitative assessment of the effects of these variables on economic growth in Côte d'Ivoire appears to be necessary in order to give few answers to these questions.

Various proxies of the two phenomena have been used in empirical works by several authors including Rodriguez and Rodrik (2001), and more recently Baldwin (2003) and Yanikkaya (2003) who have extensively surveyed the existing literature on openness. It appears frequently in these works that the share of import in GDP measures openness.

Globalization in connection with growth has been also surveyed recently by Stiglitz (2003) who point out to both positive and negative impact of globalization on growth. There have been recent attempts to quantify globalization in the form of indices (Randolph 2001). Throughout the existing measures of globalization international trade sum up about 50% of the indices² (see Zywiets 2003). It is clear that apart from trade intensity (import plus export as a share of GDP) most of developing countries including Côte d'Ivoire have just begun with other measures of globalization. In this paper we thus use trade intensity as the measure of globalization, which refers to integration of goods markets through international trade and not to capital market integration (see Subramanian and Tamisira, 2003).

Economic theory does not provide a clear answer as far as the link between openness and growth is concerned. In effect unlike neoclassical growth models which state that technological change is exogenous and unaffected by trade policy (Solow 1957), the new growth theory assumes that increasing openness is expected to have positive impact on economic growth by increasing imports of goods

² This includes trade intensity (import plus export in GDP); trade barrier; foreign direct investment; short-term capital flows; knowledge; movements of labour; number of internet host as a share of GDP; volume of international telephone traffic.

and services which are composed of technology (Grossman and Helpman 1992). Empirically, while some authors (Barro 1991, Edwards 1992, Levine and Renelt 1992, Harrison 1996) find that increasing openness may raise long-run growth, others (Batra 1992, Batra and Slottje 1993) conclude to the opposite. Recently, Jang (2000) uses time series approach to investigate the effect of openness on economic growth for rapidly growing economies in East Asia and finds that increasing openness does not affect the long-run growth of these countries.

Moreover, as also point out by Jang (2000), most of the effects of openness and globalisation on growth have been analysed in the literature using cross-section or panel data analysis. Jang (2000) noted that cross-section and panel data methods cannot identify country-specific differences nor study the causal links or the long-run relationships between the variables.

Furthermore it appears that the relationships between openness and growth depend on the level of development of a country and whether it is a small country or not (see Rodriguez and Rodrik, 2001; Edwards, 1998). It is thought of interest to examine the case of a small developing country like Côte d'Ivoire which economic success has been based on international trade of agricultural raw material. Unlike the methodology used in previous works, the aim of this paper is to investigate these relationships by using an econometric time series analysis (Jang, 2003) which relies on a vector autoregressive (VAR) model, where economic growth, openness and globalisation are considered simultaneously.

Our main findings in the case of Côte d'Ivoire are that the three variables evolve together in the long run. Specifically globalization has a negative effect on economic growth, and although a positive effect of openness on growth exists in short-run, both increasing openness and globalization has not positively contributed to the long run economic growth of this country, a finding that does not replicate the new growth theory.

The remainder of the paper is organized as follows. Section 2 presents the econometric methodology. Section 3 presents the data used and empirical results, and concluding remarks are given in section 4.

2. Econometric Methodology

A vector autoregressive model composed of 3 variables is considered $y: (lgdp, lglobal, lopen)'$. All variables are first symmetrically and endogenously considered in an unrestricted reduce form (URF) VAR representation as follows:

$$y = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + \dots + \alpha_s y_{t-s} + \varepsilon_t \quad (1)$$

where α_0 is a vector of constant and α_i are matrices of parameters, and $\varepsilon_t \sim IN(0, \Sigma)$.

2.1 Unit Root and Cointegration

The preliminary empirical step of the methodology is the degree of integration of each variable in the VAR system tested by Dickey and Fuller (1979, 1981) unit root procedure using the following equation:

$$\Delta Y_t = \alpha + \beta Y_{t-1} + \sum_{j=1}^p \delta_j \Delta Y_{t-j} + \varepsilon_t \quad (2)$$

where Y_t is the level of the variable under consideration, p is the lag length so that the residuals ε_t can be white noise. The presence of unit root is equivalent to $\beta = 0$.

Before analysing the relationships between the variables of the system, it is necessary to determine the optimal lag length on the VAR system. Next in order to examine the long-run relationships among the variables of the system we test for multivariate

cointegration by using Johansen's (1988) and Johansen and Juselius's (1990) technique computing maximal eigenvalue ($\hat{\zeta}_r$) and trace statistics ($\hat{\zeta}_r$):

$$\begin{aligned}\hat{\zeta}_r &= -T \ln(1 - \hat{\lambda}_{r+1}), \\ \hat{\eta}_r &= -T \sum_{i=r+1}^k \ln(1 - \hat{\lambda}_i), \quad r = 0, 1, \dots, k-1.\end{aligned}\tag{3}$$

2.2 Causality and Impulse Response

In causality analysis, in the absence of long-run relationship between the variables, the traditional VAR is applied. With cointegrated variables the inclusion of an error correction (EC) term in the stationary model is required in order to capture the short run deviations of the series from their long run equilibrium path (Granger 1969, Engle and Granger 1987).

In fact, according to Granger representation theorem, with $I(1)$ series, an EC term is added in each equation of the first differentiated VAR model in order to be able to separate the long-run relationship between the variables from their short-run responses and thus capture the equilibrium relationships among the cointegrated variables in their dynamic behaviour. This procedure reintroduces in a statistical way the long-run information lost by differencing the variables. The corresponding vector error correction (VEC) of our model is as follows:

$$\begin{aligned}
 \Delta \lgdp_t &= \alpha_{10} + \sum_{s=1}^2 \alpha_{11}(s) \Delta \lgdp_{t-s} + \sum_{s=1}^2 \alpha_{12} \Delta \lglobal_{t-s} \\
 &\quad + \sum_{s=1}^2 \alpha_{13} \Delta \text{lopen}_{t-s} + \gamma_1 EC_{t-1} + \varepsilon_{1t} \\
 \Delta \lglobal_t &= \alpha_{20} + \sum_{s=1}^2 \alpha_{21}(s) \Delta \lgdp_{t-s} + \sum_{s=1}^2 \alpha_{22} \Delta \lglobal_{t-s} \\
 &\quad + \sum_{s=1}^2 \alpha_{23} \Delta \text{lopen}_{t-s} + \gamma_2 EC_{t-1} + \varepsilon_{2t} \\
 \Delta \text{lopen}_t &= \alpha_{30} + \sum_{s=1}^2 \alpha_{31}(s) \Delta \lgdp_{t-s} + \sum_{s=1}^2 \alpha_{32} \Delta \lglobal_{t-s} \\
 &\quad + \sum_{s=1}^2 \alpha_{33} \Delta \text{lopen}_{t-s} + \gamma_3 EC_{t-1} + \varepsilon_{3t}
 \end{aligned} \tag{4}$$

Having specified the ECM, assuming that the model is correctly specified, we focus on the temporal Granger non-causality testing. With an EC term in the model, Granger non-causality between variables implies both short-run and long-run causality (Engle and Granger, 1987). The sources of economic growth are finally examined in a last step through impulse response functions (IRFs), performed to give the response paths of each variable to shocks in others while the coefficient of the EC term provides information about the speed of adjustment parameters to short-run deviations.

3. Empirical results

The model is tested using Côte d'Ivoire annual data for the period 1969-2001 collected from IMF *Financial statistics*. Economic growth (*lgdp*) is computed as the natural logarithm of the gross domestic product (GDP) and as already exposed, instead of more sophisticated measures of openness and globalization, openness (*lopen*) is proxies by the logarithm of the share of imports (M) of goods and services in GDP (see Romer 1993, Harrison 1996 and

Yanikkaya 2003 for a survey), while globalization (*lglobal*) is measured by the natural logarithm of the share of international trade (imports and exports of goods and services) in GDP even if alternative measures of globalisation can be considered. The data are reported in Figure 1, and it seems that the series are non-stationary in level. Comparing the graphs in levels and in first difference provides support that the variables could be *I(1)*. Tests of integration, which provides formal support for this conclusion, are in the following of the paper.

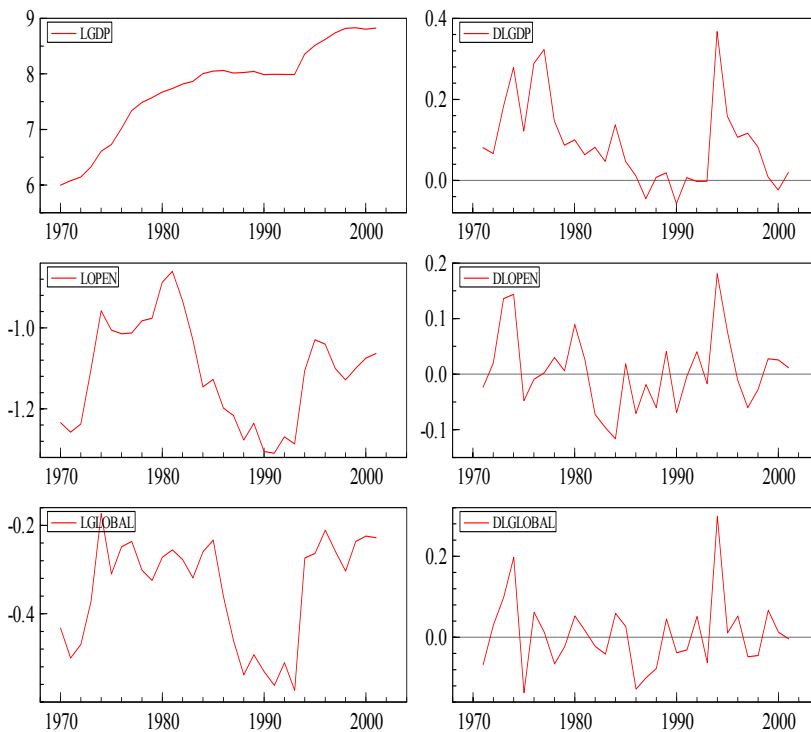
3.1 Unit Root Test and the Unrestricted Form VAR estimation. Before setting up the model, the order of integration of the variables has been tested for unit root checked by ADF tests. The results in Table 1 indicate that the 3 variables are integrated of order zero in first difference with a constant but without a time trend i.e. *I(1)* process, suggesting the use of first difference of logs of variables in the model. Setting the maximal to 6, an optimal lag of 1 was found for the VAR system in level using Schwarz criterion.

Table 1. Unit root ADF tests

	Levels		First differences	
	Critical Constant Values & trend	Constant	Constant & trend	Constant
<i>lgdp</i>	-2.289 (1)	-2.292 (1)	-2.990 (0)*	-2.812 (0)
<i>lglobal</i>	-2.203 (0)	-2.166 (0)	-5.776 (0)**	-3.834 (0)
<i>lopen</i>	-2.311 (1)	-2.529 (1)	-3.896 (0)**	-3.306 (0)
1%	-3.67	-4.29	-3.68	-4.31
5%	-2.96	-3.57	-2.97	-3.57
10%	-2.62	-3.22	-2.62	-3.22

Notes: Values in parentheses indicate lag. (*) and (**) denote significance at 5% and 1% level respectively.

Figure 1. Level and First difference of variables



We first estimate the unrestricted form (URF) of the VAR by OLS³. Estimation results (see Table 2) suggest that the trend is not significant confirming the ADF test results. Dropping the trend from the model and estimating it again the reduced form model appears to be acceptable on the overall F-test (not furnished here), and all retained variables become significant.

Table 2. The URF model

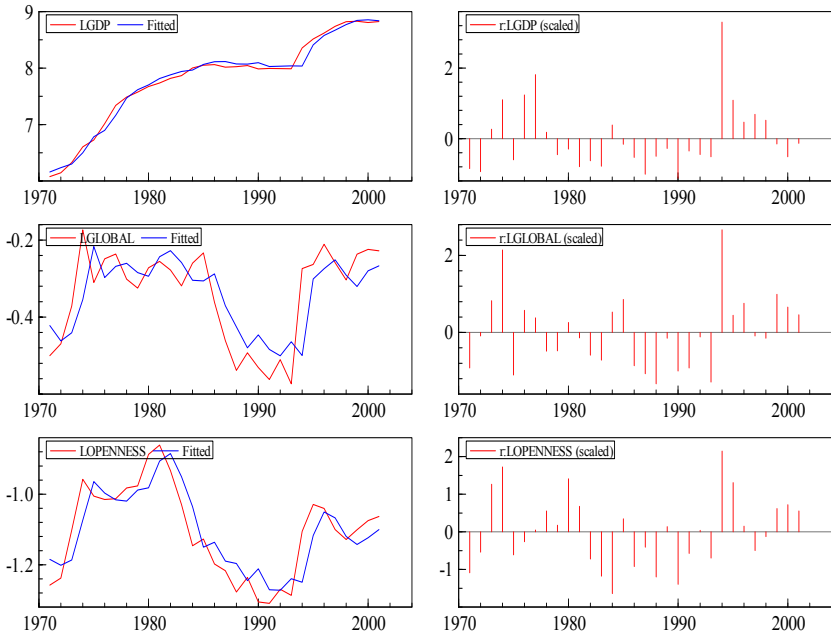
$lgdp_t =$	0.944* $lgdp_{t-1}$ (0.0228)	- 0.0497* $x_{2,t-1}$ (0.275)	+ 0.248* $x_{3,t-1}$ (0.234)	+ 0.758 (0.237)
$lglobal_t =$	0.0016* $lgdp_{t-1}$ (0.0179)	+ 0.507* $x_{2,t-1}$ (0.229)	+ 0.257* $x_{3,t-1}$ (0.204)	+ 0.108 (0.206)
$lopen_t =$	0.0162* $lgdp_{t-1}$ (0.0142)	- 0.085* $x_{2,t-1}$ (0.182)	+ 0.908* $x_{3,t-1}$ (0.162)	- 9.43e-005 (0.164)

Note: x_1 , x_2 and x_3 indicate GDP, globalization and openness respectively.

The steady-state long-run coefficients estimates indicate that one period lag level of growth is almost fully reflected in the current level of growth (0.94), while globalization has a weak negative impact on growth (-0.06) and openness a positive impact (0.24) on growth.

³ All estimations have been done using PcGive 10 (Doornik and Hendry, 2001).

Figure 2. Steady-state model fitted and scaled residuals (URF)



3.2 Cointegration Tests and the Dynamic estimation. The outcomes of the cointegration test indicates one cointegrating relation between the 3 variables (see Table 3), meaning that openness, globalization and economic growth have moved in the same direction in the long-run. Despite the fact that the 3 variables are cointegrated it doesn't indicate the direction of causality (see Engle and Granger, 1987; Johansen, 1988, Hendry, 1997). For this purpose we introduce an Error Correction term in the obtained parsimonious VAR model (PVAR) to map the data to the $I(0)$ space, which is equivalent to a rank restriction on the P_0 matrix.

Table 3. Johansen Cointegration Test with Constant in the Data

Ho	L-Max		Trace test
rank<=	Test	95%	Test
95%	Statistic	CV	Statistic
CV			
0	21.48	20.97	31.63
29.68			
1	5.84	14.07	10.14
15.41			
2	4.29	3.76	4.29
3.76			

The final dynamic $I(0)$ PVAR model results estimated by full information maximum likelihood (FIML) are in Table 4. From the estimation we notice that increasing past globalization ($\Delta\text{lglobal}_{t-1}$) has a negative impact on (Δlgdp_t) current GDP growth rate (-0.41); while past increasing openness (Δlopen_{t-1}) has a positive effect on (Δlgdp_t) the current GDP growth rate (0.174). The speed of adjustment of GDP to disequilibrium given by the coefficient of CI_1 is very slow (0.0062). Figure 3 shows the fitted and actual values and their scaled residuals.

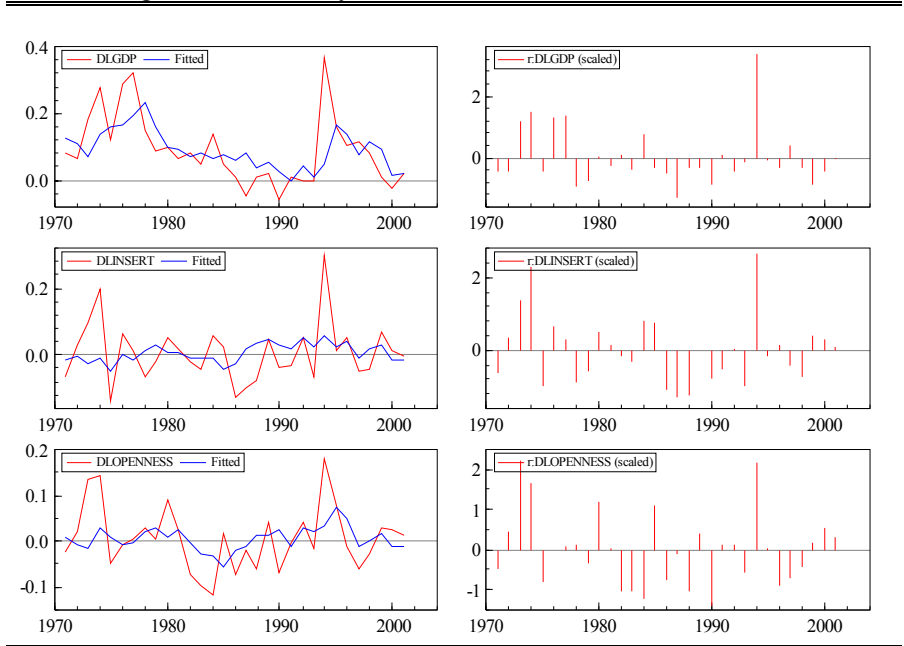
Table 4. The dynamic model

	X_1	X_2	X_3	X_4	intercept
	Δlgdp_{t-1}	$\Delta\text{lglobal}_{t-1}$	Δlopen_{t-1}	CI_1	
$\Delta\text{lgdp}_t =$	$0.607 * X_1$ (0.268)	$-0.414 * X_2$ (0.324)	$+0.174 * X_3$ (0.371)	$+0.0062 * X_4$ (0.024)	+0.088 (0.22)
$\Delta\text{lglobal}_t =$	$0.205 * X_1$ (0.253)	$+0.507 * X_2$ (0.306)	$+ 0.220 * X_3$ (0.35)	$+0.0062 * X_4$ (0.0227)	+0.088 (0.208)
$\Delta\text{lopen}_t =$	$0.202 * X_1$ (0.191)	$-0.182 * X_2$ (0.232)	$+0.385 * X_3$ (0.265)	$-0.0234 * X_4$ (0.0171)	-0.214 (0.157)

With (CI) the identified steady state cointegrating vector:

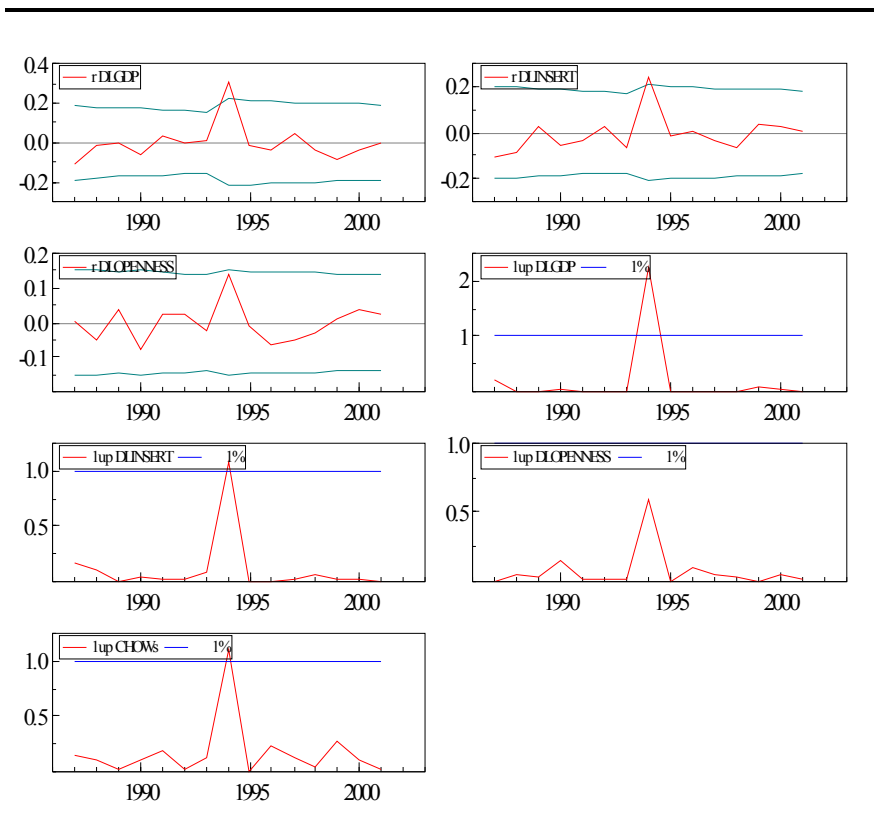
$$CI = -0.977*lgdp + 8.344*lglobal - 1.784*lopen$$

Figure 3. Fit of the dynamic model and scaled residuals



The recursive graphs of parameter consistency (see Figure 4) show that the majority of 1-step residuals lie within their anticipated 95% confidence intervals. The recursive forecast Chow-tests together with their 5% critical level indicate that the estimated parameters are stable over the sample period and that the model statistically replicates quite well the data.

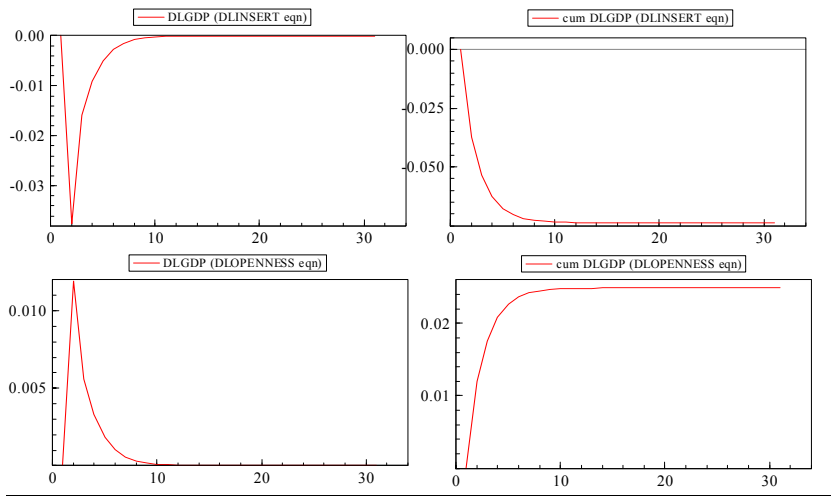
Figure 4. Recursive diagnostic



3.3 Long-run and Short-run Causality Analyses. Concerning the long-run causality, the cointegrating relation CI enters in the GDP equation with a coefficient of 0.0062 and a t-stat of 0.261, meaning that when the GDP exceeds its long-run relationship with respect to globalization and openness variables it adjust upwards. The change in GDP is function of the level of the disequilibrium in the cointegrating relationship.

Focusing next on the short-run causality, the coefficient of globalization (-0.41) is negative and insignificant (t-value=-1.28) suggesting that increase of globalisation has not caused economic growth. On the other hand, the openness coefficient (0.17) is positive but insignificant (t-value=0.47) indicating that increasing openness has not caused economic growth.

Figure 5. Impulse responses and accumulated responses (cum)



Impulse response functions (IRFs) are finally shown in a last step in Figure 5. As previously found, we observe a negative effect at the horizon of one period for globalisation to economic growth, followed by an increase up to the horizon of 10 periods but in the long-run the effect is close to zero. For openness, a positive effect is observed to economic growth at the one-year horizon followed by a decrease up to 10 periods but at longer horizons the effect becomes also quickly close to zero. Overall the IRFs indicate that the short-run effect of globalization dropped drastically and is negative, while openness effect raises sharply in short-run and decreases to zero in longer horizons.

4. Conclusion

Since its independence in 1960 Côte d'Ivoire's policy makers have opened the economy of the country to the Rest of the World as a way to achieve rapid economic development, with a certain success. In this paper, using specific economic data to measure openness and globalization we examine the long-run relationship and both the short and long-run effects of these variables on Côte d'Ivoire's economic growth, using an econometric time series approach.

The results from the steady state and the cointegration analysis show that GDP, openness and globalization move in the same direction in the long-run, and the dynamic analysis reveals that increasing globalization has negatively affected Côte d'Ivoire's economic growth either in the long-run or in the short-run. On the other hand increasing openness has a positive impact on Côte d'Ivoire's economic growth in the short but not in long-run.

Our major result to emerge from this analysis on Côte d'Ivoire's economy is consistent with the finding of Jang (2000) for the East Asia's fast growing countries about the relationship between openness and growth. In effect our results concerning Côte d'Ivoire's economy show that the relationships between openness and growth do not replicate assessments of the new growth theory where increasing openness affects the long-run growth of the economy through its effects on technological change. The results concerning the effects of globalization on Côte d'Ivoire's economic growth also contrast with the forecasts of the World Trade Organization (WTO) and the Multilateral Trade System (MTS) assessments about the expected benefits about increasing the dynamism of economic growth. These results could be due to the lack of basic requirements as transfer of technology, education and training necessary to impact the long-run behaviour of the growth process in this country.

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