REVISITING THE EXPORT-OUTPUT NEXUS FOR WESTERN AFRICA COUNTRIES: A MARKOV SWITCHING CAUSALITY APPROACH

AKA, Bédia F[1*]

Abstract

This paper examines the empirical relationships between exports growth and economic performance for western Africa countries using a non-linear Markov Switching VAR model in contrast with previous linear time series studies. We could not find causality from exports to GDP and vice versa in Benin, while causality is found only from GDP to exports in Senegal and Togo supporting the growth-driven exports (GDE) point of view, and from exports to GDP in Niger supporting the export-led growth (ELG) hypothesis. We find bi-directional regime-dependent causality between exports and GDP in Burkina Faso, Côte d'Ivoire and Mali where both hypotheses hold implying a virtuous circle of growth and exports.

JEL Classification: I20, C22, C51, O54.

Key words: Multivariate Markov Switching Model, Exports, Output Growth.

1. Introduction

The relationships between exports expansion and GDP growth have been considerably analyzed in the literature on development and growth. Although there is the case for no causal relationship between exports and economic growth (Yaghmainan, 1994), from the export-led growth (ELG) hypothesis exports promotion by stimulating total factor productivity growth through its positive impact on higher rates of capital formation will contribute positively to economic expansion (Pahlavani, 2005).

On the other hand the growth-driven exports (GDE) hypothesis, postulates a reverse relationship based on the idea that economic growth itself induces trade flows. But feedback relationships could be also expected between exports and growth (Helpman and Krugman, 1985; Bhagwati, 1988). Konya (2004) explored whether in the last decades the OECD countries experienced export-led-growth (ELG) or growth-driven-export (GDE) and he did so by studying Granger causality between the natural logarithms of real GDP and real exports, and reached that results where often ambiguous: in some countries ELG seems to hold, in another ones GDE, none of both in other cases, and controversial results in other countries.

Other studies, as Guisan (2005), for Europe and North America, and Guisan (2006) for Africa, Asia and Latin America, have insisted on the important bilateral and positive relationships between Foreign Trade and GDP: usually increases in industrial production lead to both higher levels of Exports and Imports, for similar conditions of other factors such as country size and other ones analyzed in Guisan and Cancelo (2002). At the same time those studies have shown that increase in Exports lead to higher levels of Imports, with several positive effects on manufacturing and non manufacturing production, as a

[1] Associate Professor of Economics, Department of Economics, University of Bouaké, Côte d'Ivoire. Email: akbdia@yahoo.fr

means to foster domestic production by the supply side, in order to provide raw materials, machinery and other production inputs from foreign origin which have a positive impact on domestic real value-added.

The empirical investigations of these hypotheses have used various methodologies as cross-country correlation, regression techniques (Fosu, 1990; Pahlavani, 2005) and other time series methods which fails at providing an uniform support to the these hypotheses (see Judith and Cara 2000, for a survey). To our knowledge a part from the study of Chien-Hui and Bwo-Nung (2002), which used a multivariate Threshold Autoregressive (TAR) model, none of previous studies has used non-linear models to analyse export-growth relationship, particularly for developing countries. In this paper we aim at filling this gap by extending the existing literature on this matter, with a special emphasis on a group of African countries' experiences mainly Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal and Togo, all economies based on exports of primary agricultural products, forest and mineral resources.

This study is an attempt to use an alternative methodology based on multivariate Markov switching model to test for causal link between export and GDP growth. Two reasons motivate the use of such a model: (i) the worldwide environment is fluctuating and thus one could expect the correlation coefficient between exports growth and economic growth to be varying across time span (see Michaely 1977, Michalopoulos and Jay 1973). Within time series framework, to overcome the variability of the relationship, estimations are often performed using subperiods after detecting structural breaks on the entire period (see Kanas, 2005), but this procedure supposes a prior knowledge of the break dates; (ii) splitting the sample impoverishes the data and doesn't allow to seizing the whole phenomenon. Moreover breaks are recurrent and require a non-linear model as Markov switching model.

The main objective of the paper is to use the multivariate Markov switching model introduced by Krolzig (1997a; 1997b), Krolzig and Toro (1999) as a generalization of Hamilton (1989; 1990) univariate model to investigate the relationships between exports and growth. The Markov switching VAR (MS-VAR) approach has the advantage not only to avoid splitting the sample period under study into subperiods but also the variability and structural change of the link between exports and growth over time is endogenously taken into account in the model.

Our major findings are as follows. We could not find causality in Benin from exports to GDP and vice versa. The direction of causality is found only from GDP to exports in Senegal and Togo supporting the growth-driven exports point of view, and from exports to GDP in Niger supporting the export-led growth hypothesis. On the other hand we find bivariate regime dependent causality between exports and GDP in Burkina Faso, Côte d'Ivoire and Mali, where both hypotheses hold.

The remainder of this paper is organized as follows. Section 2 presents the model used in the paper, Section 3 summarizes the econometric results, and Section 4 concludes.

2. The Model

Suppose we intend to analyse Granger causality between the bivariate series $\{x_t' = [x_{1,t} : x_{2t}]\}$. Granger causality analysis is based on the following MS-VAR model:

$$\Delta x_{1,t} = \mu_{x_1}(s_t) + \sum_{k=1}^{p} \phi_{x_1,x_1,k}(s_t)\Delta x_{1,t-1} + \sum_{k=1}^{p} \phi_{x_1,x_2,k}(s_t)\Delta x_{2,t-k} + Z(s_t)u_{x_{1,t}}$$

$$u_{x_{1,t}} \quad and \quad u_{x_{2,t}} \sim nid(0,1) \tag{1}$$

$$\Delta x_{2,t} = \mu_{x_2}(s_t) + \sum_{k=1}^{p} \phi_{x_2,x_1,k}(s_t)\Delta x_{1,t-1} + \sum_{k=1}^{p} \phi_{x_2,x_2,k}(s_t)\Delta x_{2,t-k} + Z(s_t)u_{x_{2,t}}$$

where s_t is an unobservable random variable indicating the state of regime at date t, and $Z(s_t)$ is a regime dependent matrix. The transition probabilities p_{ij} are assumed:

$$p_{ij} = P(s_{t+1} = j | s_t = i), \quad \sum_{j=1}^{2} p_{ij} = 1 \qquad \forall i, j \in \{1,2\} \tag{2}$$

To test for Granger causality from x_2 to x_1 in regime 1, the null hypothesis of non-causality is

$$H_0 : \phi_{x_1,x_2,1}(s_t = 1) = \cdots = \phi_{x_1,x_2,p}(s_t = 1) = 0 \tag{3}$$

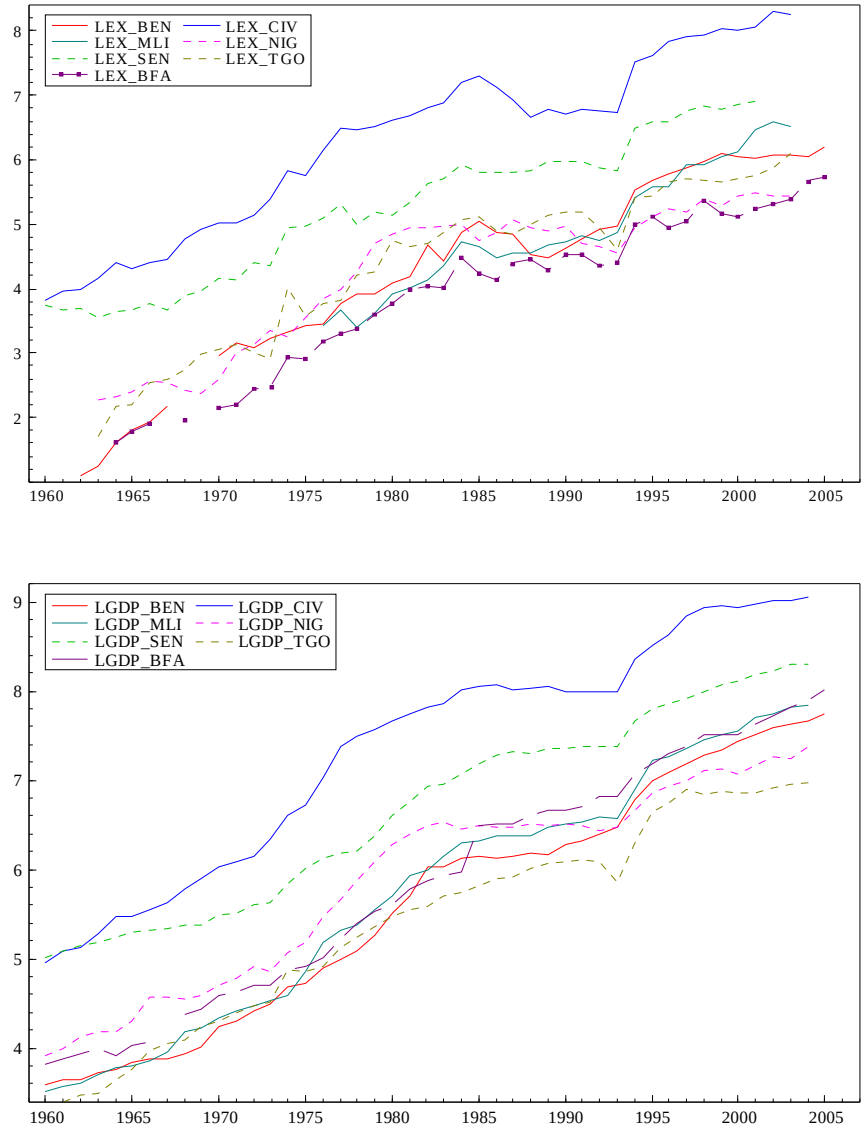
This null hypothesis test is conducted using the MS-VAR model by imposing restrictions on the values of the autoregressive parameters. In fact the significance of the regime dependent autoregressive parameter ϕ_{x_1,x_2} in equation 1 infers causality from x_2 to x_1 in regime 1 or 2. On the other hand the significance of ϕ_{x_2,x_1} infers causality from x_1 to x_2 in the concerned regime.

Although Granger´s test of causality is an interesting tool to analyze causality we should be aware of some limitations due to the fact that contemporaneous relationships between the two variables (unidirectional or bidirectional) do not hold into account in this test, as pointed out in Guisan (2003), and to the uncertainty that arises when there is a great degree of multicollinearity in the estimated VAR models. This author suggests a modified version of Granger´s test in order to diminish multicollinearity, and to compare the results of the Granger´s test with Hausman test and other estimations.

3. Export-output Causality Results

The yearly data are from International Financial Statistics (IFS) and cover the period 1960–2005. We can see on Figure 1 that the log level of exports and GDP in Côte d'Ivoire and Senegal are higher than the other countries' GDP but the growth rates of exports (Figure 1) are quite similar among countries as well for GDP growth rate. Figure 2 compares the evolution of exports and GDP in each country (in level and growth rate).

Figure 1: Log level and growth rate of exports and GDP



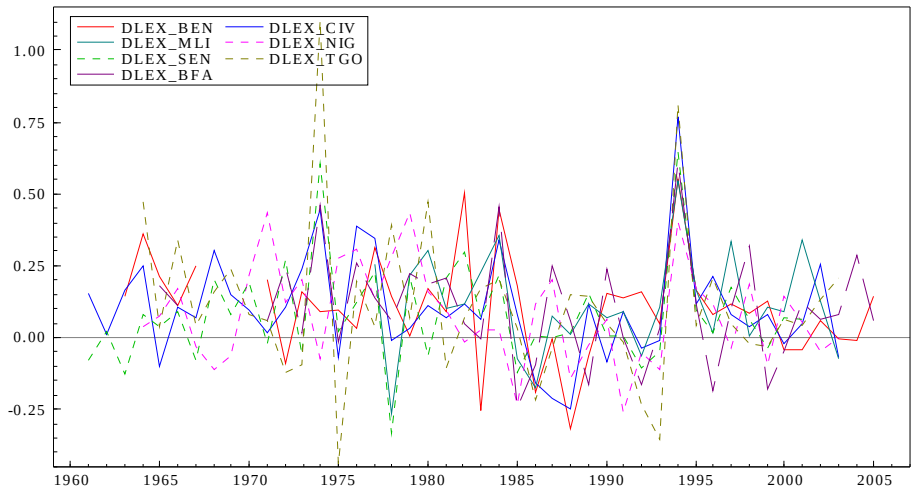
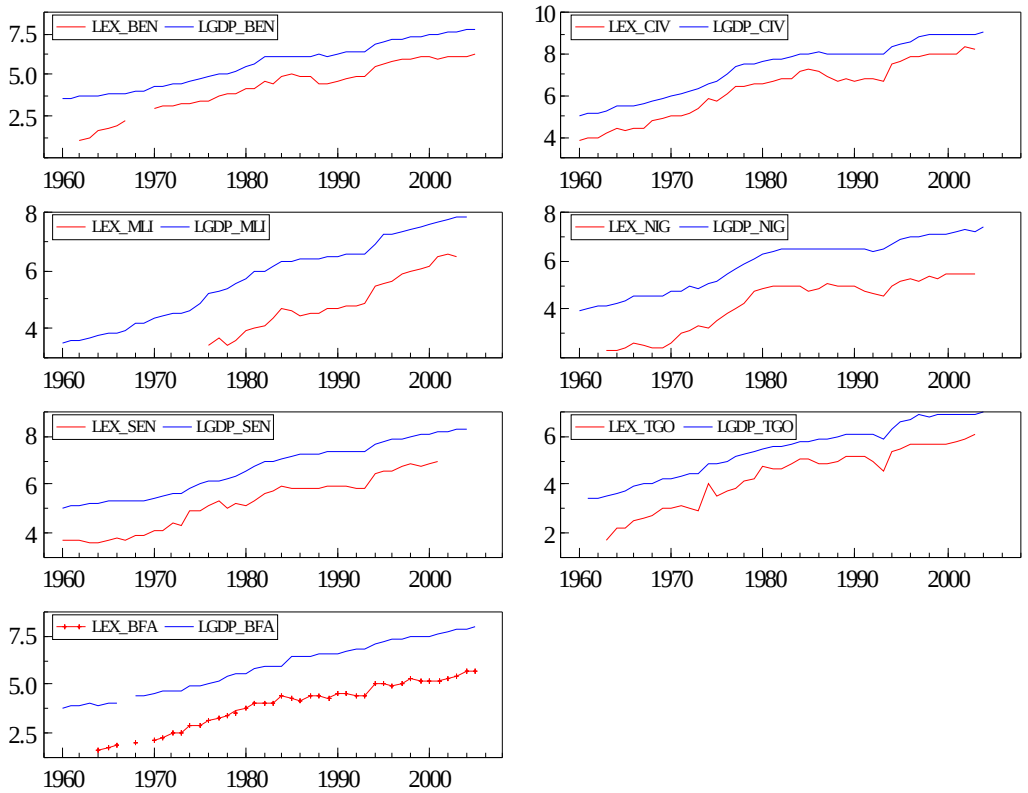


Figure 2: Log and growth rate of exports and GDP by country



The variable $x_t^{'} = \left[gdp_t = x_{1,t} : ex_t = x_{2,t} \right]$ and the estimations[2] results are provided in Table 1.

The Likelihood ratio (LR) test suggests that the null hypothesis of no regime switching or equivalently to linear VAR model against the alternative of regime switching is rejected for all countries.

The rejection is equivalent to the rejection of linear VAR in favor of the Markov switching VAR (MS-VAR) model. Moreover the Log-Likelihood (LL) indicates that a 2-Lag VAR (against 1-Lag) is suitable to the MS-VAR model in all countries except Benin (lag 1), which is confirmed by the computed Bayes Factor (BF)[3] of one model against another.

These results indicate that the bi-directional export-GDP relationship is characterized by volatility regime switching and subject to regime change.

In Benin we observe that the standard deviation of GDP and exports are both more volatile in regime 2 than in regime 1 (standard deviation are 0.39 for exports in regime 1 and 0.22 in regime 2, while standard deviation of GDP are 0.11 in regime 1 and only 0.14 in regime 2).

In Burkina Faso the standard deviation of variables across regime are very small 0.098 for exports and 0.053 for GDP in regime 1 while in regime 2, standard deviation are 0.029 for exports and 0.051 for GDP.

The standard deviation of variables across regime in Côte d'Ivoire are 0.125 for exports and 0.043 for GDP in regime 1 while in regime 2, standard deviation are 0.13 for exports and 0.057 for GDP. In Côte d'Ivoire GDP and exports are both more volatile in regime 2 than in regime 1.

In general regime 1 is a low volatility regime in Benin and in Côte d'Ivoire as well as in Mali, Togo and for GDP of Senegal. The regime 1 is a high volatility regime in Burkina Faso, and for exports in Niger. The transition probability from regime 1 to regime 1 is for example 0.90 and the transition probability from regime 2 to regime 2 is 0.71 in Côte d'Ivoire, which indicates that both regimes are persistent, but the regime 1 (low volatility regime) is very persistent compare to regime 2 (high volatility regime) in all countries.

---

[2] Estimations are realized using MS-VAR package from PcGive 10 (Hendry and Doornik 2001).

[3] The BF(1;2) interpretation (see Poirier 1995):
B12 > 1, evidence supports H1
10e-1/2 < B12 < 1, very slight evidence against H1
10e-1 < B12 < 10e-1/2, slight evidence against H1
10e-2 < B12 < 10e-1, strong to very strong evidence against H1
B12 < 10e-2, decisive evidence against H1

Table 1: MS-VAR Model Estimation

	Benin (1973-2005)		**Burkina (1973-2005)**		**Côte d'Ivoire (1963-2003)**		**Mali (1979-2003)**	
Parameters	MSIAH(2)-VAR(1) Regime 1	Regime 2	MSIAH(2)-VAR(2) Regime 1	Regime 2	MSIAH(2)-VAR(2) Regime 1	Regime 2	MSIAH(2)-VAR(2) Regime 1	Regime 2
μ_{ex}	-0.031	0.153	-0.033	0.658*	-0.036	0.470*	0.072	0.428*
	(-0.53)	(1.99)	(0.86)	(20.45)	(1.00)	(4.67)	(1.182)	(9.28)
$\phi_{ex,ex,1}$	0.072	-1.169*	-0.032	-1.808*	0.047	-1.437	-0.120	0.053
	(0.33)	(-2.94)	(-0.31)	(-23.44)	(0.20)	(-2.58)	(-0.74)	(0.32)
$\phi_{ex,ex,2}$			-0.427*	-0.488*	-0.086	0.415	-0.057	-0.211
			(-2.85)	(-6.97)	(0.34)	(0.88)	(-0.34)	(-1.29)
$\phi_{ex,gdp,1}$	0.006	-0.218	0.093	0.878*	-0.051	-0.572*	0.167*	0.293*
	(0.11)	(-0.76)	(1.64)	(6.45)	(-0.62)	(-2.41)	(3.20)	(2.25)
$\phi_{ex,gdp,2}$			0.013	-0.048	0.104	-0.321	0.188	0.107
			(0.16)	(-0.39)	(1.15)	(-1.62)	(3.49)	(0.83)
μ_{gdp}	0.0168	0.138*	0.075*	0.163*	0.022	0.231*	0.056*	0.244*
	(1.27)	(2.47)	(3.57)	(2.87)	(1.68)	(4.95)	(4.41)	(6.71)
$\phi_{gdp,ex,1}$	0.864	0.892	0.193	-0.885*	0.131	1.983	0.676	-0.864*
	(1.35)	(1.20)	(0.88)	(-4.97)	(0.26)	(1.69)	(1.31)	(-2.79)
$\phi_{gdp,ex,2}$			0.452*	-0.891*	-0.196	-2.259*	-0.968	-0.255
			(2.31)	(-3.34)	(-0.41)	(-2.02)	(-1.96)	(-1.03)
$\phi_{gdp,gdp,1}$	0.535*	0.269	-0.061	0.635*	0.299	0.924	-0.436	-0.519*
	(3.60)	(0.52)	(-0.51)	(-2.02)	(1.74)	(1.84)	(-2.61)	(-2.13)
$\phi_{gdp,gdp,2}$			-0.048	-0.162	-0.032	0.075	-0.340	-0.429*
			(-0.45)	(-0.34)	(-0.19)	(0.16)	(-2.12)	(-2.20)
σ_{ex}	0.1109	0.148	0.098	0.029	0.125	0.137	0.065	0.068
σ_{gdp}	0.0248	0.0918	0.053	0.051	0.043	0.057	0.021	0.054
Contemporaneous Correlation								
	0.007	0.733	0.565	0.989	0.765	0.944	-0.121	-0.125
p_{11}	0.700		0.722		0.904		0.835	
p_{22}	0.598		0.114		0.710		0.744	
log Like.	71.245 (58.24)		92.137 (45.24)		103.975 (81.34)		70.157 (47.83)	
LR	26.01		93.79		45.26		44.65	
AIC	-3.01 (-2.89)		-3.88 (-1.95)		-3.70 (-3.33)		-3.37 (-2.78)	
HQ	-2.71 (-2.75)		-3.45 (-1.75)		-3.27 (-3.13)		-2.99 (-2.61)	
Bayes Factor (BF)	BF(1;2)=77.02/71.24=1.08		BF(1;2)=67.26/92.14=0.72		BF(1;2)=93.38/103.97=0.89		BF(1;2) = 56.18 / 70.16 = 0.80	

Notes: t-values in parentheses; * denotes significance at 0.05 level; BF(1;2) is Bayes factor 1-Lag model against 2-Lag model.

Table 1 (Continued)

	Niger (1966-2003)		**Senegal (1963-2001)**		**Togo (1966-2003)**	
Parameters	MSIAH(2)-VAR(2) Regime 1	Regime 2	MSIAH(2)-VAR(2) Regime 1	Regime 2	MSIAH(2)-VAR(2) Regime 1	Regime 2
μ_{ex}	-0.035	0.195*	0.031	0.276	0.030	0.227
	(-1.11)	(4.01)	(1.05)	(1.68)	(0.70)	(1.21)
$\phi_{ex,ex,1}$	-0.127	-0.243	0.208	-0.594	0.136	-0.615
	(-0.61)	(-1.05)	(1.14)	(-1.31)	(0.65)	(-0.91)
$\phi_{ex,ex,2}$	-0.166	-0.528*	0.022	-0.263	0.310	-0.878
	(-0.82)	(-2.75)	(0.15)	(-0.45)	(1.82)	(-1.06)
$\phi_{ex,gdp,1}$	0.270	-0.090	-0.005	-0.164	0.210*	-0.131
	(3.15)	(-0.62)	(-0.07)	(-1.92)	(2.38)	(-0.84)
$\phi_{ex,gdp,2}$	0.079	-0.334	0.068	-0.244*	0.053	-0.222
	(0.36)	(-2.76)	(1.39)	(-2.21)	(0.74)	(-1.18)
μ_{gdp}	0.023	0.151*	0.029*	0.207*	0.008	0.236*
	(1.72)	(4.54)	(2.75)	(6.69)	(0.45)	(5.49)
$\phi_{gdp,ex,1}$	0.606	1.074*	-0.595	-0.663	0.525	-0.353
	(1.57)	(3.10)	(-1.34)	(-0.47)	(1.20)	(-0.20)
$\phi_{gdp,ex,2}$	0.197	0.123	0.669	0.371	-0.368	-0.304
	(0.58)	(0.33)	(1.71)	(0.27)	(-1.05)	(-0.15)
$\phi_{gdp,gdp,1}$	0.057	0.142	0.168	0.117	-0.013	-0.300
	(0.36)	(0.64)	(1.09)	(0.44)	(-0.07)	(-0.76)
$\phi_{gdp,gdp,2}$	-0.147	0.553*	0.053	-0.271	0.021	-1.072*
	(-1.04)	(2.32)	(0.38)	(-1.05)	(1.44)	(-2.39)
σ_{ex}	0.112	0.094	0.092	0.260	0.144	0.323
σ_{gdp}	0.046	0.062	0.032	0.049	0.061	0.074
Contemporaneous Correlation						
	0.343	-0.575	0.606	0.993	0.794	0.995
p_{11}	0.892		0.866		0.839	
p_{22}	0.755		0.526		0.461	
log Like.	81.127 (66.24)		110.91 (77.28)		81.14 (47.43)	
LR	29.76		67.26		67.41	
AIC	-2.79 (-2.80)		-4.25 (-3.29)		-2.79 (-1.81)	
HQ	-2.36 (-2.60)		-3.82 (-3.09)		-2.36 (-1.61)	
Bayes Factor (BF)	BF(1;2)=73.05/81.13=0.90		BF(1;2)=94.79/110.91=0.85		BF(1;2)=63.54/81.14 = 0.78	

Notes: t-values in parentheses; * denotes significance at 0.05 level; BF(1;2) is Bayes factor 1-Lag model against 2-Lag model.

The value of the contemporaneous correlation reflects the contemporaneous link between the variables. During regime 2 (high volatility regime) the correlation is 0.94 and 0.76 in low volatility regime (regime 1) for Côte d'Ivoire. The contemporaneous correlations for all countries are positive in both regime and higher in regime 2 except in Mali and for regime 2 in Niger where the correlations are negative.

These results reveal a dynamic regime dependent link between exports and GDP in Benin, Burkina Faso, Côte d'Ivoire, Senegal and Togo but not in Mali and during regime 2 in Niger.

We notice that the regime dependent autoregressive parameter ($\phi_{ex,gdp,1}$) is statistically significant in regime 2 but not in regime 1 for Côte d'Ivoire. This finding suggests that GDP has cause exports only in regime 2 in Côte d'Ivoire. Similarly we can see that ($\phi_{gdp,ex,2}$) is statistically significant in regime 2, meaning that causality runs from exports to GDP in Côte d'Ivoire in regime 2. Thus there is a bi-directional causality between exports growth and GDP growth in Côte d'Ivoire in regime 2 (high volatility regime).

We could not find causality in Benin from exports to GDP and vice versa. On the other hand we find bi-directional causality from exports to GDP in Burkina Faso, Côte d'Ivoire and Mali, while causality is found only from GDP to exports in Senegal and Togo, and from exports to GDP in Niger.

To formally test for causality between exports and GDP we restrict the model and test the null of the autoregressive parameters being zero (the non causality hypothesis). The Likelihood Ratio of the unrestricted model was found always greater than the restricted one (except in Benin). The LR-test results (Table 2) confirm the findings for Burkina Faso, Côte d'Ivoire, Senegal and Togo but not in Benin, Mali and Niger where the results are conflicting.

Table 2: Causality Test: Non causal relationship

	Unrestricted	Restricted	LR-test	Result
Benin	71.24	77.02	-11.56 (9.48)	*Accept the null*
Burkina Faso	92.14	61.89	60.5 (15.5)	Reject the null
Côte d'Ivoire	103.97	93.38	21.18 (15.5)	Reject the null
Mali	70.16	63.90	12.52 (15.5)	*Accept the null*
Niger	81.13	77.11	8.04 (15.5)	*Accept the null*
Senegal	110.91	90.52	40.78 (15.5)	Reject the null
Togo	81.14	64.77	32.74 (15.5)	Reject the null

Note: LR (χ^2_4) for Benin, LR (χ^2_8) for all other countries.

The result for Côte d'Ivoire is in accordance with the findings by Awudu and Jacquet (2002) where the export-led growth hypothesis was found.

4. Conclusion

This paper has investigated the relationship between exports growth and GDP growth using a Markov switching multivariate regime dependent causality analysis in western African countries. We find bi-directional regime dependent causality from exports to GDP in Burkina Faso, Côte d'Ivoire and Mali, while causality is found only from GDP to exports in Senegal and Togo, and from export to GDP in Niger. We could not find any causality between the two variables in Benin. The formal test for causality confirms the findings for Burkina Faso, Côte d'Ivoire, Senegal and Togo but not in Benin, Mali and Niger where the results are conflicting.

It could be argued that export-led growth (ELG) hypothesis is supported in Senegal and Togo where causality is found from the growth of exports to the growth of GDP, while the growth-driven exports (GDE) point of view is supported in Niger where the causality runs from the growth of GDP to the expansion of exports. In Burkina Faso, Côte d'Ivoire and Mali both hypotheses hold.

References

Awudu, Abdulai, and Phillipe Jacquet (2002) Exports and Economic Growth: Cointegration and Causality Evidence for Côte d'Ivoire, *African Development Review*, 14, 1, pp. 1-17.

Bhagawati, N. Jagdish (1988) Export-promoting Trade Strategies: Issues and Evidence, *The World Bank Research Observer* 3, no. 1:27-57.

Chien-Hui, Lee and Huang Bwo-Nung (2002) The Relationship between Exports and Economic Growth in East Asian Countries: A Multivariate Treshold Autoregressive Approach, *Journal of Economic Development*, 27, 2, pp. 45-68.

Fosu, Augustin Kwasi (1990) Exports and Economic Growth: The African Case, *World Development*, 18, 6, pp. 831-835.

Guisan, M.C.(2003) Causality Tests, Interdependence and Model Selection: Aplication to OECD countries 1960-97, Working paper of the series *Economic Development*, no. 63.

Guisan, M.C. (2006). Industry, Foreign Trade and Development: Econometric Models of Europe and North America, 1965-2003, *International Journal of Applied Econometrics and Quantitative Studies*, Vol. 3-1, pp.5-30, free on line.

Guisan, M.C. (2007). Industry, Foreign Trade and Development: Econometric Models of Africa, Asia and Latin America 1965-2003, *International Journal of Applied Econometrics and Quantitative Studies*, Vol. 4-1, pp.5-20, free on line.

Guisan, M.C. and Cancelo, M.T. (2002) Econometric Models of Foreign Trade in OECD Countries, *Applied Econometrics and International Development,* Vol. 2-2, pp.65-81.

Hamilton, James D. (1989) A new approach to the economic analysis of nonstationary time series and the business cycle, *Econometrica,* 57, pp. 357-84.

Hamilton, James D. (1990) Analysis of time series subject to changes in regime, *Journal of Econometrics,* 45, 1-2, pp. 39-70.

Helpman, Elhanan and Paul Krugman (1985) *Market Structure and International Trade,* MIT Press, Cambridge.

Judith, A. Giles and Williams L. Cara (2000) Export-led growth: a survey of the empirical literature and some non-causality results, *Journal of International Trade & Economic Development,* 9, 3, pp. 231-37.

Kanas, Angelos (2005) Modelling the US/UK Real Exchange Rate-Real Interest Rate Differential Relation: A Multivariate Regime Switching Approach, *The Manchester School,* 73, 2, pp. 123-140.

Konya, L. (2004) Export-Led Growth, Growth-Driven Export, Both or None? Granger Causality Analysis on OECD Countries, *Applied Econometrics and International Development,* Vol. 4-1, pp. 73-94.

Krolzig, Hans-Martin (1997a) Markov-switching models of the German business cycle, Mimeo, Institute of Economics and Statistics, University of Oxford.

Krolzig, Hans-Martin (1997b) *Markov switching vector autoregressions, Modelling, statistical inference and application to business cycle analysis,* Berlin: Springer.

Krolzig, Hans-Martin and Juan Toro (1999) A new approach to the analysis of shocks and the cycle in a model of output and employment, European University Institute, EUI Working Paper ECO 99/30.

Michaely, Michael (1977) Exports and Growth: An Empirical Investigation, *Journal of Development Economics,* 4, 1, pp. 49-53.

Michalopoulos, Constantine and Keith Jay (1973) Growth of Exports and Income in the Developing World: A Neoclassical View, A.I.D. Discussion Paper No. 28 (Washington, DC).

Pahlavani, Mosayeb (2005) Cointegration and Structural Change in the Exports-GDP Nexus: The Case of Iran, *International Journal of Applied Econometrics and Quantitative Studies,* Vol. 2-4, pp. 37-56.

Poirier, Dale J (1995) *Intermediate Statistics and Econometrics: A Comparative Approach,* The MIT Press, Cambridge, Massachusetts.

Yaghmaian, Behzad (1994) An Empirical Investigation of Exports, Development and Growth in Developing Countries: Challenging the Neo-classical Theory of Export-led, *World Development* 22, pp. 1977-95.