



Fiscal Policy, Monetary Policy and Economic Development in Selected Countries West Africa

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Abstract: The study examined the impact of Monetary and fiscal policy on Economic Development in some selected West African countries. Using Human Development Index to measure Economic Development, money supply to capture Monetary Policy, and Fiscal Policy was measured through government expenditure and government revenue. The data used were exacted from World Bank indicator and the data collected were analyzed using correlation analysis, unit root test, trend regression analyses. The results obtained revealed that there is a Positive significant relationship between Money supply and Economic Development. In addition, Fiscal policy measured by Government Expenditure showed a positive significant relationship with Economic Development., and Government Revenue revealed a positive relationship with Economic Development. The study recommended among other that government should increase his expenditures by increasing money supply to the economy and appropriate measure should be put in place to control inflation in the country.

Keywords: Fiscal policy, monetary policy, economic development

1. INTRODUCTION

Over the years' countries have been setting up different policies to boost the Development and growth performance of their economy, Rapid economic Development is very crucial as regarding growth of a country which requires using the country's Fiscal and monetary policies more efficiently and rationally and it improve/increase growth rate of the countries dual to use of Monetary and Fiscal policies

Fiscal policy means the use of the taxation and public expenditure by the government for the economy development. By fiscal policy we refer to government actions affecting its receipt and expenditure which are ordinarily taken as measured by the government receipts, its surplus or deficit (Culbertson 1968).

Monetary policy is the process by which monetary authority of countries controls the supply of the money that is the monetary stock often targeting a rate of interest for the purpose of promoting Economic stability. These measures the rely on the control of the monetary stocks, that is the supply of money in order to influence board

macro-economic objectives which includes price stability, high level of employment, balance of payment, and Economic growth. Monetary policy is concern with relationship of money to Economic activities and development of monetary theory and policy for influencing the level of economic activities and it encompasses the analysis of the effect of monetary policy on the economy and the interaction between money demand and money supply.

Monetary and Fiscal policy play a very vital role in the Economy especially in underdeveloped countries which use to regulate and control the activities of the countries and which Monetary policy use through the use of Money Supply in the Economy by Central government and while the Fiscal policy control the Economy activities through the use of Government Expenditure and Tax and use to control the inflation in the countries in other to balance the Economy activities, Government use Expenditure to reducing or fill the gap between the rich and poor.

2.0 LITERATURE REVIEW.

2.1 Keynesian View of Monetary Policy

Keynesian theory did not buy the notion that the relationship between money and price is direct and proportional. They share the view that it is indirect through the rate of interest. Also In addition, they reject the notion that the economy is always at or near the natural level of real GDP so that Y in the equation of exchange can be regarded as fixed. They also reject the proposition that the velocity of circulation of money is constant. Keynesians believe that expansionary monetary policy increases the supply of loanable funds available through banking system, causing interest rates to fall. With lower interest rate, aggregate expenditures on investment and interest-sensitive consumption goods usually increase, causing real GDP to rise. Hence, monetary policy can affect real GDP indirectly.

Keynesian economics focuses on demand-side solutions to recessionary periods. The intervention of government in economic processes is an important part of the Keynesian arsenal for battling unemployment, underemployment, and low economic demand. The emphasis on direct government intervention in the economy often places Keynesian theorists at odds with those who argue for limited government involvement in the markets. Keynesian theorists argue that economies do not stabilize themselves very quickly and require active intervention that boosts short-term demand in the economy. Wages and employment, they argue, are slower to respond to the needs of the market and require governmental intervention to stay on track. Furthermore, they argue, prices also do not react quickly, and only gradually change when monetary policy interventions are made, giving rise to a branch of Keynesian economics known as Monetarism.

Keynesians do not believe in the direct link between the supply of money and the price level that emerges from the classical quantity theory of money. They reject the notion that the economy is always at or near the natural level of real GDP so that Y in the equation of exchange can be regarded as fixed. They also reject the proposition that the velocity of circulation of money is constant and can cite evidence to support their case. Keynesians do believe in an indirect link between the money supply and real GDP. They believe that expansionary monetary policy increases the supply of loanable funds available through the banking system, causing interest rates to fall. With lower interest rates, aggregate expenditures on investment and interest sensitive consumption goods usually increase, causing real GDP to rise. Hence, monetary policy can affect real GDP indirectly.

Keynesians, however, remain skeptical about the effectiveness of monetary policy. They point out those expansionary monetary policies that increase the reserves of the banking system need not lead to a multiple expansion of the money supply because banks can simply refuse to lend out their excess reserves. Furthermore, the lower interest rates that result from an expansionary monetary policy need not induce an increase in aggregate investment and consumption expenditures because firms and households' demand for investment and consumption goods may not be sensitive to the lower interest rates. For these reasons, Keynesians tend to

place less emphasis on the effectiveness of monetary policy and more emphasis on the effectiveness of fiscal policy, which they regard as having a more direct effect on real GDP.

3.0 METHOD

Model Specification

This study adopted and modified the model of Olanipekun and Folorunsho (2015). The original model of Olanipekun and Folorunsho (2015) is stated as;

$$RGDP=f (MS, INTR, EXR, INF, GRV, GEXP)$$

Therefore, the equation can be further linearized for this study as;

$$HDI=f (MS, INTR, EXR, INF, GRV, GEXP)..... (1)$$

The linear expression of equation (1) is expressed as:

$$HDI= \beta_0 + \beta_1Ms + \beta_2Intr+\beta_3Exr +\beta_4Inf ++\beta_5Grv+ \beta_6Gexp+ \epsilon..... (2)$$

Where;

HDI= Human development index

MS= Money supply.

INTR = Interest rate.

EXR = Exchange rate.

INF= Inflation.

GRV= Government revenue.

GEXP= Government Expenditure.

ϵ represents error term.

β_0 is constant.

3.1 Sources of Data

The data used in this research study are secondary data sourced from three national institutions namely World Bank Indicator. The data are detailed records on Monetary and Fiscal Policies Measurement and Human development index of some five selected West Africa countries over a period of 30 years precisely, 1990-2020. Data available within this 30 years' period were sourced. More specifically, the sources of the data include CBN statistical bulletin (various volumes) and World Bank Data (factfish.com).

3.2 Scope of the Study

The study of Impact of Monetary and Fiscal policy on Economic development on some west African countries will focus on gaining an insight from the Economic development of some selected west African countries about the role of monetary and fiscal policy on overall picture of the economy and in the way it increases the process of Economic development in some selected west African Countries Economy. And the study mainly covers the period of (1990-2020). Evaluation of factors such as government spending (Government Expenditure), interest rate, Government Revenue, HDI (Human Development Index), Broad money, Exchange rate and inflation, they will be analyzed using advanced statistical techniques. The study utilized time series data from 1990-2020 for the selective West Africa countries (Nigeria, Senegal, Burkina Faso, Togo and Cote d'ivoire). The choice of the period is influenced by the availability of data at the period of this research. The necessary data for this analysis is secondary data and time series in nature which will be sourced from relevant and trustworthy sources of data such as the CBN, World Bank indicator. The scope is only academic in nature and all data are limited to five West African countries.

4.0 RESULT

4.1 Descriptive Analysis

Table 4.1 Descriptive Statistics of the Study Variables

	HDI	M2	EXH	INF	INT	GVE	REV
Mean	0.452241	25.41389	440.4895	6.023468	3.266054	1.57E+10	134.4575
Median	0.444000	23.92960	499.1480	2.333110	3.459180	6.00E+09	16.64480
Maximum	0.774000	57.92820	732.3980	72.83550	18.18000	1.03E+12	17987.00
Minimum	0.000000	0.000000	8.038290	-3.233400	-31.45300	0.000000	0.000000
Std. Dev.	0.168462	10.71554	191.9591	10.85727	5.705560	8.27E+10	1443.311
Skewness	-0.848043	0.757317	-0.799985	3.567044	-2.548081	12.00476	12.32781
Kurtosis	5.034018	4.073452	2.588383	17.97614	16.24009	147.6511	152.9856
Jarque-Bera	45.29833	22.25808	17.62692	1777.204	1299.874	138856.7	149210.6
Probability	0.000000	0.000015	0.000149	0.000000	0.000000	0.000000	0.000000
Sum	70.09740	3939.153	68275.87	933.6375	506.2384	2.43E+12	20840.91
Sum Sq. Dev.	4.370413	17682.71	5674637	18153.56	5013.226	1.05E+24	3.21E+08
Observations	155	155	155	155	155	155	155

Source: Researcher Computations (2021).

Table 4.1 above presents the characteristics of the variables used in the models of this study. Out of 155 observations, the mean value of Human development index (HDI), broad money supply (M2), exchange rate (EXH), inflation rate (INF), interest rate (INT), government expenditure (GVE), and government revenue (REV) in West African countries are 0.452241, 25.41389, 440.4894, 6.023465, 3.266053, 1.58E+10 and 134.4575 respectively.

The minimum and maximum value of Human development index (HDI) in some selected West African countries were 0.00000 and 0.774000 respectively. The maximum value of broad money supply (M2) in some selected west African countries was 57.92823 and its minimum value is 0.00000, the maximum value of exchange rate (EXH) was 732.3977 and its minimum value is 0.000000, the maximum value of inflation rate (INF) is 72.83550 and its minimum value is -3.233389, , the maximum value of interest rate (INT) is 18.18000 and its minimum value is -31.45257, the maximum value of government expenditure (GVE) is 1.03E+12 and its minimum value is 0.00000 while the maximum value of government revenue (REV) was 17987.00 and its minimum value is 0.00000.

The skewness statistics revealed that variables including M2, INF, GVE and REV are positively skewed meaning the series has a long right tail while variables such as HDI, EXH and INT are negatively skewed meaning the series has a long-left tails. Based on the result of skewness all the variables are found to be non-normally distributed since the value of their skewness different from zero.

The kurtosis statistics of variables including EXC is below three meaning the tails of this series is tiny while the kurtosis statistics for all the remaining variables such as HDI, M2, INF, INT, GVE and REV are above than three, meaning that the tails of these series are tick. Based on the result of the kurtosis, all the series are not normally distributed because their kurtosis statistics were not equal to three

Furthermore, it is clearly seen in the Table 4.1 that the Jarque-Bera probability for all variable under study are less than 0.05 significant level The rule states that the null hypothesis (series are normally distributed) will be rejected if the Jarque-Bera probability is less than 5 per cent and accepted if it is greater than 5 per cent. Thus, at 5 per cent significant level the null hypothesis that series are normally distributed are rejected for all

variables under consideration. This is deduced from the probability value for Jarque-Bera supported by Skewness and Kurtosis for the series.

4.2. Correlation Analysis

Table 4.2 Correlation Matrix

	HDI	M2	EXH	INF	INT	GVE	REV
HDI	1						
M2	0.212243	1					
EXH	0.098968	0.327131	1				
INF	-0.299082	-0.290711	-0.483625	1			
INT	0.263402	0.088700	0.096366	-0.454839	1		
GVE	-0.009316	0.062139	-0.020555	-0.091039	-0.052459	1	
REV	0.029746	0.229965	0.051503	-0.027262	0.006764	-0.016613	1

Source: Researcher Computations (2021)

Table 4.2 shows that the correlations coefficient between HDI and M2 was 0.212243, which implies that there exist weak positive correlations between Human development index and broad money supply of some selected West African countries. The correlations coefficient between HDI and EXH was 0.098968 which implies that there exists a weak positive correlation between Human development index and Exchange rate of some selected West African countries. The correlations coefficient between HDI and INF was -0.299082, meaning a weak negative correlation exist between HDI and INF of some selected West African countries. The correlations coefficient between HDI and INT was 0.263402, meaning weak positive correlations exist between HDI and INT of some selected West African countries. The correlations coefficient between HDI and GVE was -0.009316 which means that a weak negative correlation exists between HDI and GVE and the correlations coefficient between HDI and REV was 0.029746 which implies that there is a weak positive correlation between HDI and REV for the period reviewed. The table showed further the correlation coefficient between the independent variables in order to examine the presents of multicollinearity in the data set. It can be observed from the table above that the correlation coefficient between independent variables is relatively low, thus the independent variables are not highly correlated with each other which is evidence of absents of multicollinearity problem in the data set. Hence, the data series under consideration are suitable enough to be used to estimate regression model.

4.3 Stationary Test

Table 4.3 Unit Root Test

	Critical Level			ADF	Prob	Order of Integration
	1% level	5% level	10% level			
HDI	-3.47338	-2.88034	-2.57687	-3.72344	0.000	I(1)
REV	-2.88046	-2.57694	2.356436	-3.47367	0.000	I(1)
GVE	-3.4731	-2.88021	-2.57681	-10.3761	0.000	I(0)
M2	-3.47367	-2.88046	-2.57694	-12.5023	0.000	I(1)
INF	-3.4731	-2.88021	-2.57681	-5.24735	0.000	I(0)
INT	-3.4731	-2.88021	-2.57681	-8.31525	0.000	I(0)
EXC	-4.02040	-3.44006	-3.14447	-7.95993	0.000	I(1)

Source: Researcher Computations (2021)

Table 4.3 shows the result of unit root test for checking stationarity of the variables under consideration using Augmented Dickey Fuller test. From the table it can be visualized that variables like GVE, INF and INT are stationary at level while variable such as HDI, REV M2 and EXC are stationary at first difference. However, at 5 percent level of significant the data series under consideration are of order Zero and one.

Pairwise Granger Causality Tests

Date: 10/26/21 Time: 07:38

Sample: 1 155

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
M2 does not Granger Cause HDI	153	1.12314	0.3280
HDI does not Granger Cause M2		0.64842	0.5244
EXH does not Granger Cause HDI	153	0.88999	0.4128
HDI does not Granger Cause EXH		1.84265	0.1620
INF does not Granger Cause HDI	153	0.68704	0.5047
HDI does not Granger Cause INF		2.71761	0.0693
INT does not Granger Cause HDI	153	2.46157	0.0888
HDI does not Granger Cause INT		5.30190	0.0060
GVE does not Granger Cause HDI	153	0.12693	0.8809
HDI does not Granger Cause GVE		3.96894	0.0209
REV does not Granger Cause HDI	153	2.70797	0.0700
HDI does not Granger Cause REV		0.08408	0.9194

Source: Researcher Computations (2021)

The table above shows the evidence of variable that granger cause each other’s (the causality among the variables). The table shows that the null hypothesis that M2 does not granger cause the HDI at f-statistics of 1.12314 and p-value of 0.3280 was accepted, also at p-value of 0.5244 and f-statistic of 0.64442 the null hypothesis that the HDI does not granger cause M2 was accepted we therefore concluded that both M2 and HDI do not granger cause each other’s. Also, the null hypothesis the EXH does not granger cause HDI and that HDI does not granger cause EXH was accepted at f-statistic of 0.88999 and 1.84265, and p value of 0.4128 and 0.1620 respectively, we therefore concluded that neither EXH granger cause HDI nor HDI granger cause EXH. Furthermore, at f-statistic of 0.68704 and 2.71761, and p value of 0.5047 and 0.0693 respectively, the null hypothesis that INF does not granger cause HDI and that HDI does not granger cause INF was accepted we therefore concluded that neither INF granger cause HDI nor HDI granger cause INF. However, the null hypothesis the INT does not granger cause HDI was accepted at f-statistic of 2.46157 and p value of 0.0888, again, null hypothesis that HDI does not granger cause INT was rejected at f-statistic of 5.30190, and p-value of 0.0060, we therefore concluded that EXH does not granger cause HDI but HDI granger cause EXH. Also, At f-statistic of 0.12693 and p value of 0.8809 the null hypothesis that GVE does not granger cause HDI was accepted, also at f-statistic of 3.96894 and p value of 0.0209, the null hypothesis that HDI does not granger cause GEV was rejected and we therefore concluded that GEV does not granger cause HDI but HDI granger cause GEV. Lastly, at f-statistic of 2.70797 and 0.08408, and p value of 0.0700 and 0.9194 respectively, the null hypothesis that REV does not granger cause HDI and that HDI does not granger cause REV was accepted we therefore concluded that neither REV granger cause HDI nor HDI granger cause REV.

4.4 Result of Hausman Test

Table 4.4 Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	248.545135	6	0.0000

Source: Researcher Computations (2021)

Table 4.3 presents the result of Hausman test to choose the best panel least square model. The tables show the Hausman test result with the Chi-Sq of 248.545135 and p-value of 0.0000 which is less than the acceptable 0.05 level of significance. Thus, the null hypothesis that random effect is suitable for this model is rejected, indicating the model should be estimated using fixed effect, thus fixed effect was used the null hypothesis that random effect is appropriate is rejected and the accept the alternative hypothesis that fixed effect model is appropriate.

4.5 Panel Regression Analysis

Table 4.5. Panel Regression Result

Dependent Variable: HDI

Method: Panel Least Squares

Date: 10/21/21 Time: 11:30

Sample (adjusted): 1991 2020

Periods included: 30

Cross-sections included: 5

Total panel (balanced) observations: 150

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.085777	0.041232	2.080360	0.0393
HDI(-1)	0.765208	0.055517	13.78329	0.0000
M2	0.364126	0.000999	8.126479	0.0395
EXH	4.96E-05	7.50E-05	0.661703	0.5093
INF	-0.001975	0.001007	-1.961481	0.0518
INT	0.000216	0.001656	0.130225	0.8966
GVE	1.12E-12	1.07E-12	1.049054	0.0260
REV	2.50E-07	5.20E-06	0.048028	0.9618

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.735763	Mean dependent var	0.457129
Adjusted R-squared	0.714700	S.D. dependent var	0.166687
S.E. of regression	0.089033	Akaike info criterion	-1.923001
Sum squared resid	1.093909	Schwarz criterion	-1.682150
Log likelihood	156.2250	Hannan-Quinn criter.	-1.825151

F-statistic	34.93255	Durbin-Watson stat	1.969605
Prob(F-statistic)	0.000000		

Source: Researcher Computations (2021)

Table 4.4. Shows the result of panel least square analyses (fixed effect) for studying the impact of fiscal and monetary policies on economic development in some selected West African countries. A critical examination of the results as reported above shows that about 73.58% of the total variation in the independent variable can be explained by the explanatory variables. This is indicated by the coefficient of determination (R^2) value of 0.735763. This implies that INT, INF, GOV, M2, EXC and REV account for 73.58% of variation in Human development index of some selected west African countries. The remaining balance of 26.42% variation in the dependent variables Human development index can be explained by other factors outside the variables studied.

The Durbin Watson statistics of 1.969605 is significantly close to 2.00 and signifies the absence of autocorrelation. At significance level of 0.05 the F-statistics is 34.93255 while the p-value of the F-statistics is 0.000000, which is less than 0.05.

Furthermore, from the t-statistics result in the regression model shows that broad money supply M2 has a positive significant impact on HDI, indicating that holding other variables as constant; a unit increase in M2 will bring about an increase in HDI by 0.364126. Exchange rate EXH is positively and significantly influencing HDI, meaning that, holding other independent variables as constant, a unit increase in EXH will bring out about an increase in HDI by 4.96×10^{-5} . The result shows further that inflation rate has a negative significant impact on HDI, meaning that a unit increase in inflation rate will bring about -0.001975 reduction in HDI. Interest rate was also found to be negatively and significantly associated with HDI, meaning that a unit increase in interest rate will bring about -0.014869 decrease in HDI.

More so, the indicator of fiscal policy such as government expenditure and total revenue were positively related with HDI but Government expenditure is significant to the HDI while Government Revenue impact on HDI is insignificant in some selected Africa countries.

5.0 DISCUSSION

It is quite common in the field of economics to have models where some variables are not only explanatory variables for a given explained variable, but they are also explained by the variables that they are used to determine. This implies that when we are not confident and certain that a variable is really exogenous, we have to treat each variable symmetrically and this is what is applicable to the time series analysis. In this study, special attention is devoted to the time series component of the data series under consideration. When dealing with time series data, it is important to investigate whether the series are stationary or not. This is because the regression of non-stationary series on another may yield spurious regression results and such results will be misleading and inaccurate for policy makers. This is because the equations derived from time series components are not in reduced forms since any of the variables may have a contemporaneous impact on each other. According to Engle and Grange (1987), the parameter estimates from such regression may be biased and inconsistent.

This study studied the impact of Fiscal and monetary policies on economic Development in Some selected west African countries from 1990 to 2020. The data used were extracted from the World Bank indicator which were analyzed using ordinary least square. The analytical approach follows ordinary least square model. Having examined the research objectives using regression statistical analysis. The finding revealed that the variables M2, INT, INF, and EXC has significant impact on HDI of West African countries for the period study. The implication of this finding is that monetary policy and fiscal policy will adversely influence

economic development proxy by gross domestic product in West African countries for the period study. Again, variables such as government expenditure and total government revenue has positive but insignificant association with HDI in West African countries for the period study. The implication of this finding is that fiscal policy will not adversely affect economic growth proxy by gross domestic product in West African countries for the period study. although the effect of the Government revenue and Government expenditure are not significant on Economic growth(>0.05).The value of R-square is an indication that Money supply,Exchange rate,inflation, interest rate, Government revenue and Government Expenditure are great determinants of economic growth in West African countries such as Nigeria, Cote d'ivore, Burkina Faso, Togo, and Senegal.

6.0 CONCLUSION.

In conclusion, it is recognized that both fiscal policy and monetary policy can have a positive impact on economic development in selected West African countries. However, achieving successful implementation of sound fiscal and monetary policies requires the governments to fulfill certain conditions. Firstly, the government should ensure that the stock of money in circulation is increased in a moderate manner to avoid inflation. This can be achieved through careful management of monetary policy by the central bank, which includes controlling interest rates, managing the money supply, and regulating commercial banks. Secondly, the government should increase its expenditure, particularly in economic services, social and community services, and education. Investing in education is crucial, including providing compulsory basic education and improving its quality overall. By doing so, the government can enhance human capital, which is essential for long-term economic development. Furthermore, expanding the coverage of health services, such as through health insurance schemes, is important to improve the well-being of the population and promote economic productivity. Promoting agriculture through mechanization and increasing productivity is another key aspect. Agriculture is a vital sector in many West African countries, and enhancing its efficiency can contribute significantly to economic development. This can be achieved by providing farmers with access to modern farming techniques, technology, and adequate resources. Lastly, it is crucial for the government to invest in infrastructure development. Building and maintaining reliable transportation networks, power supply systems, and other essential infrastructure can increase productivity across all sectors of the economy.

In summary, for West African countries to achieve increased economic development and growth, it is necessary to implement sound fiscal and monetary policies. This involves managing the money supply to avoid inflation, increasing government expenditure in key sectors like education and healthcare, promoting agriculture through mechanization and productivity improvements, and investing in infrastructure development. By ensuring the appropriate utilization of funds directed towards these sectors, countries can enhance their chances of overall development and economic progress.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Data Availability

Data used for this research is available upon request from the corresponding author.

Notes

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Appendix 1

Country	Code	YEAR	REV	INF	EXH	INT	M2	GVE	HDI
Nigeria	1	1990	41.88172	7.3644	8.038285	17.46624	11.63537	60.27	0
Nigeria	1	1991	44.19376	13.00697	9.909492	0.990847	13.39988	66.58	0
Nigeria	1	1992	43.68845	44.58884	17.29843	-14.9872	14.24738	92.80	0
Nigeria	1	1993	44.29949	57.16525	22.0654	-7.05247	15.78772	191.23	0
Nigeria	1	1994	42.36749	57.03171	21.996	-15.9202	15.09194	160.89	0
Nigeria	1	1995	39.08486	72.8355	21.89526	-31.4526	10.28191	248.77	0
Nigeria	1	1996	39.26268	29.26829	21.88443	-5.26078	9.063329	337.22	0
Nigeria	1	1997	38.14457	8.529874	21.88605	12.12661	9.725269	428.22	0
Nigeria	1	1998	37.42959	9.996378	21.886	11.48467	10.93903	487.11	0
Nigeria	1	1999	38.10766	6.618373	92.3381	6.047248	12.76339	947.69	0
Nigeria	1	2000	37.89875	6.933292	101.6973	-1.14089	14.66963	701.05	0.68
Nigeria	1	2001	37.09733	18.87365	111.2313	12.1387	15.90097	1,018.00	0.68
Nigeria	1	2002	36.26334	12.87658	120.5782	3.023542	13.527	1,018.18	0.69
Nigeria	1	2003	36.04746	14.03178	129.2224	9.935713	13.02659	1,225.99	0.69
Nigeria	1	2004	36.16211	14.99803	132.888	-2.60485	11.75879	1,426.20	0.70
Nigeria	1	2005	36.50231	17.86349	131.2743	-1.59368	11.30051	1,822.10	0.71
Nigeria	1	2006	37.96793	8.225222	128.6517	-5.62797	11.72897	1,938.00	0.72
Nigeria	1	2007	37.3395	5.388008	125.8081	9.187171	19.29109	2,450.90	0.721
Nigeria	1	2008	38.4978	11.58108	118.5667	6.684909	23.81187	3,240.82	0.737
Nigeria	1	2009	37.4834	12.55496	148.88	18.18	25.14416	3,452.99	0.739
Nigeria	1	2010	37.70227	13.7202	150.2975	1.067736	21.35585	4,194.58	0.743
Nigeria	1	2011	37.52297	10.84003	153.8625	5.68558	22.47905	4,712.06	0.447
Nigeria	1	2012	37.98314	12.21778	157.5	6.224809	24.92823	4,605.39	0.848
Nigeria	1	2013	38.79581	8.475827	157.3117	11.20162	25.44805	5,185.32	0.751
Nigeria	1	2014	38.82736	8.062486	158.5526	11.35621	22.68961	4,587.39	0.755
Nigeria	1	2015	37.80463	9.009387	192.4403	13.59615	22.36683	4,988.86	0.761
Nigeria	1	2016	38.88785	15.67534	253.492	6.686234	27.37879	5,858.56	0.765

Nigeria	1	2017	39.10554	16.52354	305.7901	5.790567	24.78142	6,456.70	0.767
Nigeria	1	2018	39.18683	12.09473	306.0837	6.055977	25.36246	7,813.74	0.77
Nigeria	1	2019	39.4123	11.39679	306.921	4.522188	23.92961	0.00	0.774
Nigeria	1	2020	0	0	358.8108	0	0	0.00	0.534
Cote D	2	1990	0	-0.80588	272.2648	0.527048	28.76195	1.03014E+12	0.404
Cote D	2	1991	0	1.683348	282.1069	2.364972	28.59368	10175160933	0.404
Cote D	2	1992	0	4.231384	264.6918	3.459181	28.33074	10901357893	0.405
Cote D	2	1993	0	2.164715	283.1626	3.652048	26.37549	10655139125	0.406
Cote D	2	1994	0	26.08157	555.2047	3.3375	26.23432	7380930226	0.407
Cote D	2	1995	20.09396	14.29507	499.1484	3.351483	26.04142	10195348656	0.409
Cote D	2	1996	16.0983	2.480807	511.5524	3.048446	23.92975	11085219611	0.412
Cote D	2	1997	17.0974	4.020833	583.6694	2.118362	23.49764	10872002199	0.415
Cote D	2	1998	17.98754	4.611448	589.9518	2.346469	22.90722	11650029714	0.414
Cote D	2	1999	15.87653	0.702376	615.4733	2.507556	21.99039	11667545072	0.419
Cote D	2	2000	15.87654	2.530775	710.208	2.809675	21.57544	10008782596	0.421
Cote D	2	2001	14.89585	4.361529	732.3977	3.104167	20.9796	10342558421	0.424
Cote D	2	2002	15.28441	3.077265	693.7132	2.6625	25.95811	10965593562	0.426
Cote D	2	2003	13.97225	3.296807	579.8974	3.104167	18.15996	13771813773	0.429
Cote D	2	2004	15.14843	1.457988	527.338	3.2	19.871	15359319829	0.433
Cote D	2	2005	15.03148	3.88583	527.2584	5.674025	19.24972	16476553053	0.405
Cote D	2	2006	15.8837	2.467191	522.4256	2.941351	21.09097	16570340963	0.443
Cote D	2	2007	17.22867	1.892006	478.6337	1.766704	26.60841	19846195535	0.449
Cote D	2	2008	16.83816	6.308528	446	-3.24269	25.83243	22630733184	0.455
Cote D	2	2009	16.10854	1.019505	470.2934	2.571438	29.62059	21711082911	0.476 2
Cote D	2	2010	15.79386	1.226456	494.7943	-0.25913	32.81859	23088982634	0.468
Cote D	2	2011	12.50391	4.912434	471.2486	3.562235	37.49245	21663077620	0.472
Cote D	2	2012	16.41186	1.304511	510.5563	1.826672	34.42499	25668397393	0.482
Cote D	2	2013	16.0154	2.58117	493.8996	1.520597	33.94043	30355124807	0.49
Cote D	2	2014	14.70163	0.448682	493.7573	1.375209	34.27986	33629287101	0.492
Cote D	2	2015	12.16421	1.2515	591.2117	-26.2184	26.1103	44900437525	0.501 3
Cote D	2	2016	11.83971	0.723178	592.6056	7.543038	27.628	47161057877	0.513
Cote D	2	2017	12.16867	0.685881	580.6567	7.108222	28.62593	50917788428	0.525
Cote D	2	2018	12.07207	0.359409	555.4465	3.281667	30.17682	58467506772	0.534
Cote D	2	2019	12.33959	-1.10686	585.911	3.542667	31.40065	57865261106	0.538
Cote D	2	2020	13.76543	2.425007	575.586	0	0	0	0.516
Burkina F	3	1990	0	-0.5043	272.2648	4.644633	18.1784	3519644528	0.342
Burkina F.	3	1991	0	2.162601	282.1069	6.654633	18.13057	3539502216	0.346
Burkina	3	1992	0	-1.99114	264.6918	6.947383	18.76154	2479548652	0.363

F.									
Burkina F.	3	1993	0	0.553456	283.1626	7.668034	19.86546	2605377101	0.369
Burkina F.	3	1994	0	25.17788	555.2047	8.95891	22.13048	2100474667	0.376
Burkina F.	3	1995	0	7.458845	499.1484	8.673565	23.97028	2676157385	0.38
Burkina F.	3	1996	0	6.097804	511.5524	7.9279	22.63043	3027637409	0.387
Burkina F.	3	1997	0	2.318691	583.6694	7.626481	24.67565	2834189612	0.392
Burkina F.	3	1998	0	5.084333	589.9518	7.850729	21.52619	3234714334	0.396
Burkina F.	3	1999	0	-1.07261	615.4733	7.622329	17.51094	3988885786	0.404
Burkina F.	3	2000	0	-0.30421	710.208	6.994335	18.62896	3472210878	0.414
Burkina F.	3	2001	0	5.007433	732.3977	7.135072	16.28399	3623304570	0.423
Burkina F.	3	2002	0	2.175695	693.7132	7.023944	14.68477	4114330259	0.432
Burkina F.	3	2003	0	2.034566	579.8974	7.964981	22.69471	5306217484	0.442
Burkina F.	3	2004	0	-0.40023	527.338	7.842456	20.76003	6199538954	0.452
Burkina F.	3	2005	11.3145	6.41504	527.2584	4.94407	17.96416	7036865511	0.461
Burkina F.	3	2006	11.62446	2.333109	522.4256	5.435522	18.7748	7411209182	0.471
Burkina F.	3	2007	12.23409	-0.23063	478.6337	2.204377	18.99529	8623368482	0.482
Burkina F.	3	2008	11.47776	10.6598	446	-3.82525	20.88266	10877342699	0.493
Burkina F.	3	2009	12.12913	2.608177	470.2934	2.511579	24.45058	10652640987	0.504
Burkina F.	3	2010	13.61964	-0.76423	494.7943	1.285141	25.62624	10922588101	0.515
Burkina F.	3	2011	13.94071	2.759767	471.2486	-1.38853	25.75645	12697147041	0.526
Burkina F.	3	2012	15.5745	3.818152	510.5563	-0.74164	26.4212	13571227916	0.533
Burkina F.	3	2013	16.82595	0.533739	493.8996	7.57802	28.28734	14772850898	0.543
Burkina F.	3	2014	15.46513	-0.25809	493.7573	5.995918	30.28943	14634528404	0.55
Burkina F.	3	2015	14.97639	0.724839	591.2117	7.545939	35.5971	12645488917	0.557
Burkina F.	3	2016	16.17725	0.441041	592.6056	2.622406	36.56257	13611224734	0.563

Burkina F.	3	2017	16.79797	1.482999	580.6567	3.671701	41.10114	15004724823	0.572
Burkina F	3	2018	16.64484	1.955943	555.4465	7.324446	41.68263	16709478294	0.579
Burkina F	3	2019	18.65543	-3.23339	585.911	7.03484	43.29521	16948196332	0.583
Burkina F	3	2020	19.43434	1.88444	575.586	6.316919	43.29521	0	0
Senegal	4	1990	18.84895	0.325099	272.2648	1.193603	17.82268	8368221953	0.376
Senegal	4	1991	20.25806	-1.75356	282.1069	1.104943	18.52364	8191411787	0.377
Senegal	4	1992	20.83561	-0.10994	264.6918	2.050688	19.13106	8858825098	0.3745
Senegal	4	1993	20.86121	-0.58643	283.1626	4.644476	16.53089	8429723413	0.377
Senegal	4	1994	20.0554	32.29367	555.2047	6.193213	17.12621	5767531384	0.376
Senegal	4	1995	19.66976	7.864008	499.1484	6.137487	16.26287	6903217181	0.378
Senegal	4	1996	20.56716	2.754307	511.5524	4.730511	17.06936	7329864193	0.375
Senegal	4	1997	20.58983	1.753165	583.6694	3.789377	16.82512	6562394553	0.379
Senegal	4	1998	20.52681	1.156781	589.9518	3.630833	16.77407	7270683084	0.382
Senegal	4	1999	20.21237	0.827251	615.4733	3.661667	17.78233	7259585290	0.385
Senegal	4	2000	20.88937	0.731982	710.208	4.068333	18.73282	6589255557	0.39
Senegal	4	2001	20.99557	2.974501	732.3977	3.666667	15.9508	7000679477	0.404
Senegal	4	2002	20.33636	2.337302	693.7132	4.701667	16.46056	7455876652	0.407
Senegal	4	2003	20.23473	-0.052	579.8974	4.9325	20.42292	9735081722	0.418
Senegal	4	2004	21.21506	0.514782	527.338	4.5975	22.02439	11451593755	0.426
Senegal	4	2005	22.87318	1.711333	527.2584	5.080833	22.24362	12721083426	0.434
Senegal	4	2006	24.44072	2.112286	522.4256	4.455426	23.43392	13917810267	0.438
Senegal	4	2007	25.94594	5.853304	478.6337	0.716084	23.9451	16813601876	0.447
Senegal	4	2008	24.50483	7.347202	446	-0.53769	23.63666	20470560657	0.457
Senegal	4	2009	19.00713	-2.24802	470.2934	-1.45694	26.47332	18405147520	0.461
Senegal	4	2010	21.40886	1.228681	494.7943	6.029017	28.17914	18221881003	0.468
Senegal	4	2011	22.56864	3.403228	471.2486	3.99522	28.83623	20538255962	0.471
Senegal	4	2012	22.10932	1.418229	510.5563	1.658754	28.38858	20809070306	0.487
Senegal	4	2013	20.90646	0.710245	493.8996	2.358519	29.79742	21969024872	0.494
Senegal	4	2014	20.56639	-1.09026	493.7573	5.176135	31.72897	22744261199	0.499
Senegal	4	2015	21.01906	0.135212	591.2117	7.617963	35.12698	20042106745	0.506
Senegal	4	2016	20.76204	0.837285	592.6056	4.04115	37.37748	21132167836	0.509
Senegal	4	2017	21.11609	1.318153	580.6567	4.298274	37.79338	23903562983	0.465
Senegal	4	2018	21.96175	0.460986	555.4465	4.514048	40.7525	26602012975	0.435
Senegal	4	2019	21.42124	1.758565	585.911	2.780833	41.20247	27096205420	0.442
Senegal	4	2020	0	2.547435	575.586	2.2275	0	0	
Togo	5	1990	15.7391	1.015342	272.2648	2.429167	36.05004	1731938620	0.406
Togo	5	1991	15.77225	0.387082	282.1069	2.083333	36.47068	1849000902	0.409

Togo	5	1992	17.14699	1.393787	264.6918	1.95	30.16565	1328608222	0.4
Togo	5	1993	17.18952	-1.00688	283.1626	2.268333	32.43662	1019039714	0.391
Togo	5	1994	18.58239	39.16277	555.2047	2.574167	29.96431	1374493731	0.397
Togo	5	1995	19.13969	16.4335	499.1484	2.553333	30.58325	1624571783	0.41
Togo	5	1996	18.98587	4.6875	511.5524	1.614167	24.97057	1736242787	0.418
Togo	5	1997	11.49113	8.250825	583.6694	1.521667	22.52204	1803465373	0.426
Togo	5	1998	11.12411	0.975338	589.9518	1.3875	21.0551	1735912937	0.425
Togo	5	1999	11.30626	-0.05321	615.4733	1.8025	22.0213	1553395808	0.426
Togo	5	2000	11.6036	1.862606	710.208	1.920833	23.26793	1593507026	0.427
Togo	5	2001	11.05457	3.919591	732.3977	1.754167	20.64873	1782350117	0.43
Togo	5	2002	9.99446	3.059819	693.7132	1.748333	18.42729	2153908042	0.433
Togo	5	2003	10.15886	-0.93	579.8974	2.050833	20.14017	2316865827	0.438
Togo	5	2004	10.42996	0.393079	527.338	2.175	24.60733	2521269059	0.439
Togo	5	2005	11.22148	6.782929	527.2584	2.719853	25.01378	2709439326	0.438
Togo	5	2006	12.59415	2.228978	522.4256	5.272253	30.34165	3090312157	0.444
Togo	5	2007	12.58312	0.945673	478.6337	-0.20677	32.35085	3893747434	0.439
Togo	5	2008	13.57313	8.694828	446	-6.07644	34.73304	3892337188	0.447
Togo	5	2009	13.18851	3.713606	470.2934	3.339915	37.06309	3977108842	0.456
Togo	5	2010	12.81024	1.445945	494.7943	4.450338	39.82759	4791448422	0.466
Togo	5	2011	14.41866	3.563515	471.2486	4.134464	43.43045	4503403345	0.479
Togo	5	2012	14.17344	2.577182	510.5563	3.273636	44.1376	5082946791	0.482
Togo	5	2013	13.08629	1.825395	493.8996	3.509354	47.82098	5400173324	0.488
Togo	5	2014	13.22951	0.190875	493.7573	5.427113	46.82278	5099280004	0.493
Togo	5	2015	14.78576	2.583905	493.7573	1.618232	51.68221	5308733161	0.499
Togo	5	2016	16.67678	1.285247	592.6056	3.322004	53.99449	5331637020	0.502
Togo	5	2017	16.57436	-0.98029	580.6567	4.243532	56.40663	6001498596	0.506
Togo	5	2018	15.66379	0.928171	555.4465	3.409167	57.92823	6123387204	0.51
Togo	5	2019	17.8681	0.685898	585.911	3.661667	56.08846	6223387204	0.515
Togo	5	2020	17.987	1.82754	575.586	3.797708	56.08846	0	0.513

Sources; WDI 2021

Appendix 2

Pairwise Granger Causality Tests

Date: 10/26/21 Time: 07:38

Sample: 1 155

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
M2 does not Granger Cause HDI	153	1.12314	0.3280
HDI does not Granger Cause M2		0.64842	0.5244

EXH does not Granger Cause HDI	153	0.88999	0.4128
HDI does not Granger Cause EXH		1.84265	0.1620
INF does not Granger Cause HDI	153	0.68704	0.5047
HDI does not Granger Cause INF		2.71761	0.0693
INT does not Granger Cause HDI	153	2.46157	0.0888
HDI does not Granger Cause INT		5.30190	0.0060
GVE does not Granger Cause HDI	153	0.12693	0.8809
HDI does not Granger Cause GVE		3.96894	0.0209
REV does not Granger Cause HDI	153	2.70797	0.0700
HDI does not Granger Cause REV		0.08408	0.9194
EXH does not Granger Cause M2	153	0.53983	0.5840
M2 does not Granger Cause EXH		8.82716	0.0002
INF does not Granger Cause M2	153	1.69658	0.1869
M2 does not Granger Cause INF		1.48817	0.2291
INT does not Granger Cause M2	153	0.15251	0.8587
M2 does not Granger Cause INT		0.07463	0.9281
GVE does not Granger Cause M2	153	0.71682	0.4900
M2 does not Granger Cause GVE		7.35583	0.0009
REV does not Granger Cause M2	153	6.29960	0.0024
M2 does not Granger Cause REV		5.86920	0.0035
INF does not Granger Cause EXH	153	4.91922	0.0085
EXH does not Granger Cause INF		14.0376	3.E-06
INT does not Granger Cause EXH	153	0.51247	0.6001
EXH does not Granger Cause INT		0.44061	0.6445
GVE does not Granger Cause EXH	153	0.24823	0.7805
EXH does not Granger Cause GVE		0.17894	0.8363
REV does not Granger Cause EXH	153	5.43607	0.0053
EXH does not Granger Cause REV		0.39605	0.6737
INT does not Granger Cause INF	153	2.26958	0.1069
INF does not Granger Cause INT		3.47124	0.0336
GVE does not Granger Cause INF	153	0.00802	0.9920
INF does not Granger Cause GVE		1.02456	0.3615
REV does not Granger Cause INF	153	3.70902	0.0268
INF does not Granger Cause REV		0.14226	0.8675

GVE does not Granger Cause INT	153	0.00188	0.9981
INT does not Granger Cause GVE		0.31486	0.7304
REV does not Granger Cause INT	153	1.05845	0.3496
INT does not Granger Cause REV		0.00061	0.9994
REV does not Granger Cause GVE	153	66.2854	3.E-21
GVE does not Granger Cause REV		0.02047	0.9797

Null Hypothesis: HDI has a unit root
 Exogenous: Constant
 Lag Length: 1 (Automatic - based on SIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.723435	0.0046
Test critical values: 1% level	-3.473382	
5% level	-2.880336	
10% level	-2.576871	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(EXH) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 3 (Automatic - based on SIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.959926	0.0000
Test critical values: 1% level	-4.020396	
5% level	-3.440059	
10% level	-3.144465	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(GVE) has a unit root
 Exogenous: Constant
 Lag Length: 3 (Automatic - based on SIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-10.37606	0.0000

Test critical values:	1% level	-3.474265
	5% level	-2.880722
	10% level	-2.577077

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INF has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.247353	0.0000
Test critical values:	1% level	-3.473096
	5% level	-2.880211
	10% level	-2.576805

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INT has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.315243	0.0000
Test critical values:	1% level	-3.473096
	5% level	-2.880211
	10% level	-2.576805

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(M2) has a unit root
 Exogenous: Constant
 Lag Length: 1 (Automatic - based on SIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-12.50234	0.0000
Test critical values:	1% level	-3.473672

5% level	-2.880463
10% level	-2.576939

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(REV) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.47367	0.9988
Test critical values:		
1% level	-2.88046	
5% level	-2.57694	
10% level	2.356436	

*MacKinnon (1996) one-sided p-values.