Remittances and Economic Growth Nexus: Empirical Evidence from Nigeria, Senegal and Togo

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Abstract
Remittances inflow is one of the major sources of capital flows in the world. Though developing countries and especially Sub-Saharan Africa does not have a bigger share of this capital flow, remittances is noted to be very useful in promoting household welfare and health in developing countries. What is not certain is whether or not remittances lead to economic growth. Set out to investigate the causal link between remittances and economic growth in three of the leading remittances recipients in West Africa i.e. Nigeria, Senegal and Togo, the study used Granger-causality and co-integration tests under the Vector Autoregressive Regression (VAR) framework. The time series data used here is made of an annual data from 1980-2012. It is realized from the study that there is a unidirectional causal link in Nigeria and Senegal. Remittances are found to lead to economic growth while economic growth does not lead to remittances inflows. There is however no causal link between remittances and economic growth in Togo.

Key Words: Remittances, Economic Growth, Granger Causality and Vector Auto Regression

1. Introduction
According to UNCTAD (2012), remittances inflows have raised from $4billion to $25billion in the lower middle country from 2000 to 2010 while in the middle income country, remittances have graduated from $300billion to $756billion during the same period. Notwithstanding the fact that remittances flow to Sub-Saharan Africa is very minute compared with the rest of developing countries as seen in table 1 below nevertheless, remittances constitute a sizeable amount of income flow and thus deliberate policies must be directed towards this sector in Sub-Saharan Africa. For instance as depicted in table 2 below, as high as 24% and 10% of Lesotho and Togo GDPs respectively are made of remittances. Besides this, remittances are noted to be less volatile in their flows than the other capital flows like ODA, portfolio and FDI.

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Table 1: Remittances flows to Sub-Saharan African (SSA) countries and all Developing Countries (DC)

	1995	2000	2004	2005	2006	2007	2008	2009	2010
SSA	3.2	4.6	8.0	9.4	12.7	18.6	21.4	20.6	21.5
All DC	55.2	81.3	159.3	192.1	226.7	278.5	324.8	307.1	325.5

Source: Migration and Remittances Fact Book 2011, World Bank

Table 2: Top Ten Remittance Recipient Countries in Sub-Saharan countries

Top 10 remittances recipients 2010		Top 10 remittance recipients 2009 % of GDP	
Country	US$ billion	Country	US$ billion
Nigeria	10.0	Lesotho	24.8
Sudan	3.2	Togo	10.3
Kenya	1.8	Cape Verde	9.1
Senegal	1.2	Guinea-Bissau	9.1
South Africa	1.0	Senegal	9.1
Uganda	0.8	The Gambia	7.9
Lesotho	0.5	Liberia	6.2
Ethopia	0.4	Sudan	5.6
Mali	0.4	Nigeria	5.6
Togo	0.3	Kenya	5.4

Source: Migration and Remittances Fact Book 2011, World Bank

Theoretically, remittances can spur up economic growth through channels such as facilitating the financial market development, serving as sources of finance for entrepreneurial activities, insurance against shocks, financing household expenditure, financing of household capital formation, bridge savings gap and also bridging the external gap of financing. This has been empirically proven by a section of literature which found that remittances inflows lead to economic growth (see; Ramirez, 2013, Lartey, 2011, Pradhan et al., 2008 and Adenutsi, 2011)

On the other hand, remittances can retard economic growth. This can happen if the remittances received are used by recipients to reduce their labour supply to the economy (Chami et al, 2005). When this happens, the recipients who are supposed to be part of the active labour force will automatically become dependent thus relying solely on the migrant for survival. Where remittances inflows lead to so much appreciation of the local currency, it can

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also harm the economy of the country as it will discourage exportation thus reduce entrepreneurial competition in the recipients country (Lopez et al, 2007).

Given the two strands of literature, the goal of this study is not only to empirically investigate whether or not remittances lead to economic growth in Nigeria, Senegal and Togo but also to determine the direction of the causality link between remittances and economic growth these countries. It will therefore examine whether or not remittances cause economic growth or it is the reverse or there is a two-way causality link. Though a lot of work has been carried out on the remittances and economic growth nexus, most of the studies have focused on the whether or not remittances lead to economic growth. Besides, most of them have generally used panel data to study developing countries therefore making it very difficult to address country specific issues from such studies(see; Fayissa and Nsiah, 2010, Gupta et al 2009, Feeny et al 2014, Lartey 2011, Driffield and Jones, 2013, Brown and Leeves 2011, Pradhan et al 2008). To the best of my knowledge the only studies that are close to this study are the works of Adenutsi(2011), Koyame-Marsh (2012) and Siddique et al (2011). Adenutsi (2011) examined the causal link between remittances and economic growth but his study is on Ghana alone which is very different from Nigeria, Senegal and Togo as far as remittances flows is concerned. Ghana is not part of the leading recepients of remittance in West Africa. The choice to examine Nigeria, Senegal and Togo is because these countries are among the top recepients of remittances per GDP in West Africa and there is also data available on them.

Koyame-Marsh 2012 studied ten countries in West Africa but only used OLS and hence could not examine the causality link among the variables. Besides, his results may not be robust if some of the assumptions of OLS are not met in his studies. Very closely related to this study is that of Siddique et al (2011). Siddique et al (2012) investigated the causality link between the variables in the economy of Bangladesh, Sri Lanka and India. Though the methodology is very similar, the countries under study are different in economy. Bangladesh, Sri Lanka and India are larger economies and receive remittances far more than the countries of study. Different outcome can therefore be expected from the study. Besides filling this literature gap, the study will give direction to policy makers regarding migration of workforce the processes involved in receiving remittances.

The rest of the work is structured as follows; section 2 will review related empirical literature while section 3 is devoted to the exposition of the data and methodology used for the study. Finally section 4 and 5 respectively look at the empirical results and analysis and the conclusion to the work.

2. Related Empirical Literature
It is well established that remittances contribute positively to household welfare in general (Adams 2010). However, the impact of remittances on economic growth is still debatable. Varied findings exist. Adams (2010) attributed the varied findings partly to: establishing the causal link between growth and remittances may not be wholly solvable using instrumental variables while the remittances impact on some economic variables is not observable in the short term. It can also lead to Dutch Disease effect where by the local currency of the recipient country will appreciate strongly against its trading partners thereby making it very discouraging

to export(Lopez et al, 2007).This section is devoted for the review of empirical evidence of the remittance growth nexus.

In establishing the impact of remittances on economic growth, Ramirez (2013) carried a study on both upper and lower economies in 23 Latin America and Caribbean countries. Using a fully modified OLS and Co-integration techniques, the study concluded that remittances have got significant positive impact on both the upper and lower economies. This happens as remittances serve as a substitute for credit in these countries. In a related studies conducted on SSA by Lartey (2011) using GMM a positive relationship between remittances and the growth was also established. This however happens as remittances are used for consumption.

Both of the above studies carried out on different continents go to confirm an earlier broader study on 39 developing countries in the world by Pradhan et al. (2008). In using fixed effect and random effect on standard growth model, they found remittances to impact positively on economic growth in developing countries. Testing this particular phenomenon on country specific, Adenutsi (2011) reported that remittances cause growth in Ghana not only in the short but also in the long run as well.

Driffield and Jonas (2013) in their study also found a positive impact of remittances on economic growth, using three step Least Squares. They however cautioned that this can only happen when institutions are established properly. Again, remittances is noted to promote economic growth in less financially advanced economies by serving as alternative source of finance for development to supplement the credit market (Giuliano and Ruiz-Arranz, 2009).

On the contrary, Roa and Takirna (2010) reported that aid and remittances have negative effect on output in receiving countries which serves as a confirmation of a previous study which realized that remittance flows is significantly negative to economic growth (Chami et al. 2005). Another study undertaken later on ECOWAS countries by Koyameh-Marsh (2012) found that remittances do not lead to economic growth in all the ten ECOWAS countries studied. He also realized that in Benin, the remittance reduce output of labour. These go to confirm an earlier study which discovered that there is no significant link between remittances and growth (Spatafora, 2005).

Brown and Heaves (2011) studied two countries with differences in their level of advancement in migrant remittances using two steps least squares and three steps least squares estimators with the two countries (Fiiji and Tonga). They reported a positive relationship in the country which is more advanced in migrant remittances while realizing no relationship to the country with early state of receiving remittances. Similar findings were established by Feeny et al. (2014). Using the dynamic panel data estimators (GMM) on 25 small island developing countries, they realized a positive impact on growth in all the islands except those of the Latin America Caribbean islands.

Using the Granger-Causality test under the VAR technique, Siddique et al (2011) studied the direction of causality between remittances and the growth of three Asian countries namely India, Bangladesh and Sri Lanka. They had three findings for the study. In Bangladesh, remittance causes growth while economic growth does not cause remittances flow into the

country. In India there is no causality between the variables while in Sri Lanka a bi-directional causality was found where each variable causes the other. Closely related is another study by Jawaid and Raza (2012) on Korea and China using sensitivity analysis together with the Granger causality on 29 year period time series data. They reported a unidirectional relationship in both countries. In Korea, there was long run positive relationship between the variables caused by the remittances while in China remittances lead to negative impact on growth with no causality from economic growth.

3. Data and Methodology

3.1 Data
The data is made up of annual time series data of Remittances (Rem) per capita received and Gross Domestic Product (GDP) per capita of Nigeria, Senegal and Togo. The data ranges from 1980 to 2012. The GDP per capita is measured in US dollars and it is extracted from the International Monetary Fund (IMF) website while the remittances also measured in US dollars is obtained from United Nations Conference for Trade and Development (UNCTAD) website.

3.2 Unit Root Test
In order to avoid generating spurious results as unit root is normally associated with majority of time series data, we plotted the series to observe their trends and this can be seen in fig. 1 below. As can be seen clearly from the graph, there is a very discernible pattern or trend of movement which is upward trending and thus one can infer that the series are not stationary at levels. Following this, we conducted the unit root test formally on the natural logs of the variables (Remittance per capita and GDP per capita) for all the three countries. In testing for the stationarity of the variables, we used the Philip and Perron (1988) the Engle and Granger (1987) Augmented Dickey Fuller (ADF) tests. we carried out the test using both on constant (intercept) only and constant with trend in order to see how robust the outcome will be. In both the ADF and the Philip and Perron (PP) tests, the null and alternative hypotheses are:

H_0: the residual series are not stationary or have unit root (InGDP per capita and InRem per capita are not co-integrated)

H_1: the residual series are stationary or have no unit root (InGDP per capita and InRem per capita are co-integrated)

Rejection of the null hypothesis therefore means the series are stationary and thus co-integrated while the reverse will also be true.
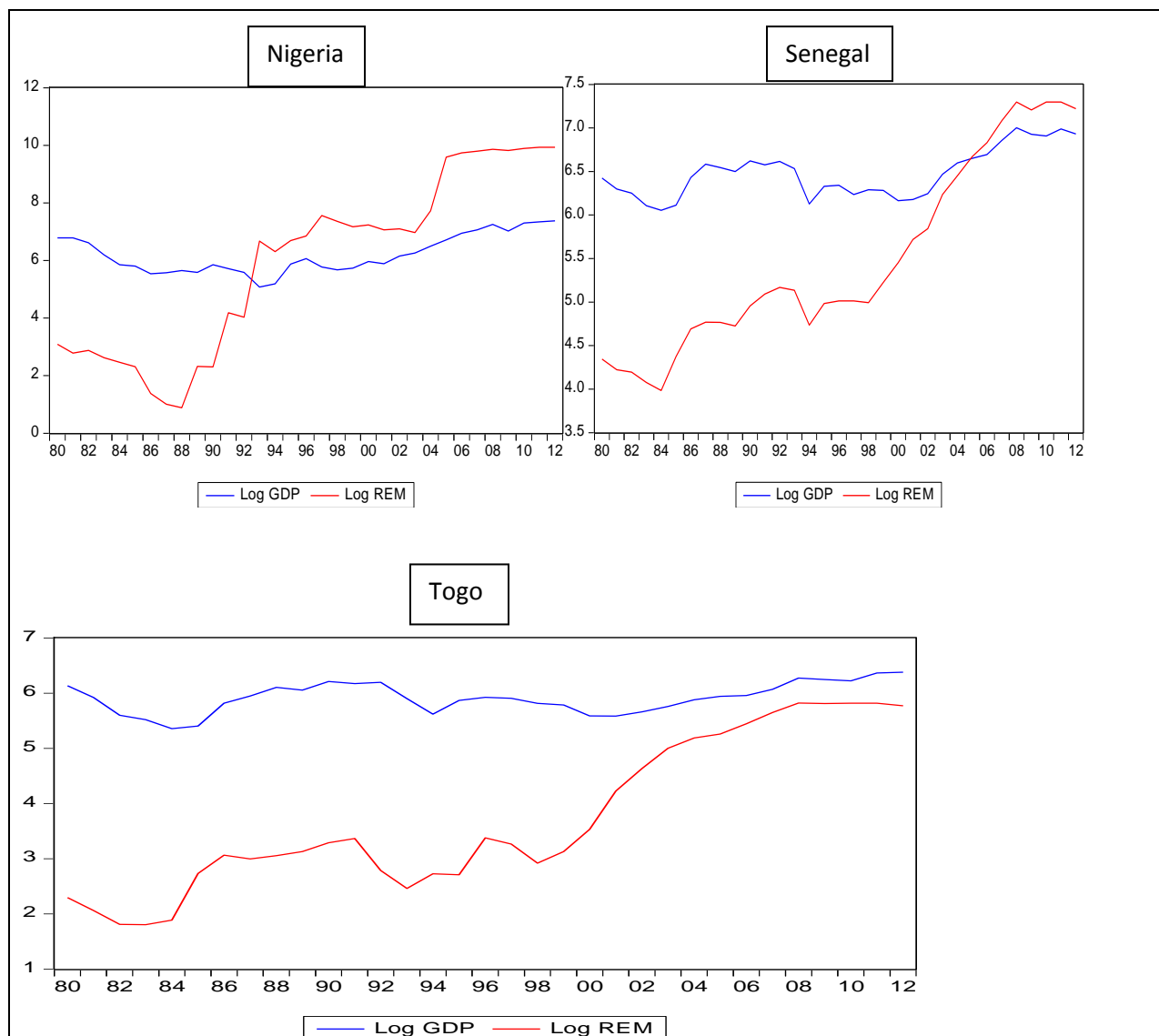
Figure 1: Trend in GDP and Remittances in the three countries

3.3 Co-integration and Granger-causality Tests

We adopted the co-integration and Granger-causality tests the through Vector Autoregressive Regression (VAR). The main reason here is to observe the causal dynamics between per capita remittances and per capita GDP in each of the country and at the same time determine the long run dynamics between the variables. The co-integration test is conducted using the Johansen (1992) and the Johansen and Juselius (1992) framework. Due to the sensitivity nature of both the co-integration and the Granger-causality tests to lag lengths, we employed the VAR lag length selection criteria in choosing the appropriate lag lengths. As presented in the table below, lag 1 has been chosen for both Nigeria and Senegal while lag 2 is selected for Togo. Following the optimal lag length selection of 1 for Nigeria and Senegal with 2 lag length for Togo, I adopted a model used by Siddique et al(2012) for the Granger-causality dynamics for

both variables. For Nigeria and Senegal, the model is on the first-difference of the series and it is as follows;

$$InRem_t = \alpha_{01} + \alpha_{11} + InRem_{t-1} + \beta_{11}InGDP_{t-1} + \varepsilon_{1t} \qquad (1)$$

$$InGDP_t = \alpha_{02} + \alpha_{12}InRem_{t-1} + \beta_{12}InGDP_{t-1} + \varepsilon_{2t} \qquad (2)$$

We tested whether In GDP_{t-I} does not appear in the remittances equation to test economic growth does not cause remittances and $InRem_{t-1}$ does not appear in the economic growth equation to test remittances does not cause economic growth. In the situation of Togo where the optimal lag length is 2, the model will be as follows;

$$InRem_t = \alpha_{01} + \alpha_{11} + InRem_{t-1} + \alpha_{21}InRem_{t-2} + \beta_{11}InGDP_{t-1} + \beta_{21}InGDP_{t-2} + \varepsilon_{1t} \qquad (3)$$

$$InGDP_t = \alpha_{02} + \alpha_{12} + InRem_{t-1} + \alpha_{22}InRem_{t-2} + \beta_{21}InGDP_{t-1} + \beta_{22}GDP_{t-2} + \varepsilon_{2t} \qquad (2)$$

The null hypothesis for the "non-causality" that "growth does not cause remittances" is

$H_0: \beta_{11} = \beta_{21} = 0$

If the null hypothesis is rejected it would mean that economic growth causes remittances.

The null hypothesis too for the test "non-causality" that "remittances does not cause growth is stated as:

$H_0: \alpha_{12} = \alpha_{22} = 0$

Table 3: Lag Length Selection Criteria

Nigeria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-380.6906	NA	2.55e+09	27.33504	27.43020	27.33021
1	-320.1651	108.0812*	45055442*	23.29751*	23.58298*	23.48298*
2	-318.7866	2.264648	54665607	23.48476	23.96055	23.96431
3	-315.7580	4.542868	59414142	23.55415	24.22025	24.22011
4	-311.2906	6.062913	58952865	23.52076	24.37718	24.37718
5	-307.8186	4.216080	63845894	23.55847	24.60520	24.60520
Senegal						
Lag	LogL	LR	FPE	AIC	SC	HQ

0	-465.4286	NA	1.08e+12	33.38776	33.48291	33.41685
1	-422.9511	75.85272	6.95e+10*	30.63936	30.92483*	30.72663*
2	-419.7493	5.259983	7.41e+10	30.69638	31.17217	30.84183
3	-418.7637	1.478454	9.32e+10	30.91169	31.57780	31.11533
4	-415.6532	4.221337	1.02e+11	30.97523	31.83165	31.23705
5	-405.8261	11.93293*	7.01e+10	30.55901*	31.60574	30.87901
Togo						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-336.1148	NA	1.06e+08	24.15106	24.24622	24.18015
1	-261.7391	132.8139	693923.0	19.12422	19.40969*	19.21149
2	-255.9562	9.500424*	614680.7*	18.99687*	19.47266	19.14232*
3	-254.7070	1.873847	758616.8	19.19335	19.85946	19.39699
4	-253.3986	1.775640	943266.3	19.38561	20.24203	19.64743
5	-249.2902	4.988757	976164.5	19.37787	20.42460	19.69787

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion
Notes: based on this, lag 1 is chosen for Nigeria and Senegal while lag 2 is selected for Togo for the co-integration tests and the Granger Causality Tests.

4.0 Empirical Results and Analysis

4.1 Summary Descriptive Statistics
Table 4 below also shows the summary statistics of the GDP per capita and remittances per capita in the three countries. With the GDP per capita, Senegal recorded the highest mean of $678.709 while Nigeria has the highest GDP per capita of $1603.600 and also the lowest per capita GDP of $160.529 therefore resulting in the highest standard deviation of $435.449 while Togo recorded the lowest GDP per capita standard deviation of $101.911. With the remittances per capita flows, Nigeria tops in both the highest mean value of $4951.437 and the highest

maximum value of $20618.850 and again recorded the highest standard deviation in the remittances per capita flow with $7875.968 while Togo again recorded the lowest standard deviation in the remittances per capita flow with a value of $122.886.

Table 4: Background Statistics of Yearly Movement of GDP and Remittances

	Nigeria	Senegal	Togo
GDP			
Mean	616.430	678.709	384.043
Maximum	1603.600	1098.900	589.791
Minimum	160.529	425.444	212.019
Std Dev	435.449	199.005	101.911
Remittances			
Mean	4951.437	438.982	98.698
Maximum	20618.850	1477.678	337.059
Minimum	2.425	53.758	6.0777
Std Dev	7875.968	500.846	122.886
Observations	33	33	33
Time Period	1980-2012	1980-2012	1980-2012

4.2 Results of Unit root Test

The results of the test for stationarity are presented in the table 5 below. Both of the variables became stationary at the first difference using both the ADF and PP tests with constant only and constant with trend except remittance per capita in Togo which became stationary only after the second difference. This means the variables are integrated order 1 and order 2 i.e. I(1) and I(2). This implies that the variables do not have long run relationship but may have short run relationship or co-movement in them and may also have some long run relationship. This then called for the performance of co-integration test to confirm this. This stationarity at first difference and second difference can be clearly seen in figure 2 below where the graphs plotted do not exhibit any discernible pattern that can be followed.

Table 5: Unit Root Test

	LEVEL				1ST DIFF				2ND DIFF			
	ADF		PP		ADF		PP		ADF		PP	
	C	C+T	C	C+T	C	C+T	C	C+T	C	C+T	C	C+T
lnGDP												
Nigeria	0.564	-1.489	0.223	-1.461	-4.956*	-7.116*	-5.002*	-7.397*				
Senegal	-0.553	-1.624	-0.684	-1.799	-4.760*	-4.714*	-4.764*	-4.720*				
Togo	-1.050	-1.870	-1.522	-2.186	-4.300*	-4.300*	-4.229*	-4.215#				
lnRem												
Nigeria	5.003	4.357	0.209	-1.255	-4.367*	-4.556*	-4.368*	-4.538*				
Senegal	-0.669	-3.390	0.453	-1.333	-3.832*	-3.809#	-3.799*	-3.933#				
Togo	-0.960	-4.183	0.535	-1.325	-2.165	-1.982	-2.197	-2.061	-5.501*	-5.526*	-5.672*	-5.526*

Note: Significance at 1% is denoted by * and while # denotes 5% significance. C represents Constant while C+T represents Constant with trend. All the countries have I(1) integration for both variables except Togo which has I(2) integration with Remittances.
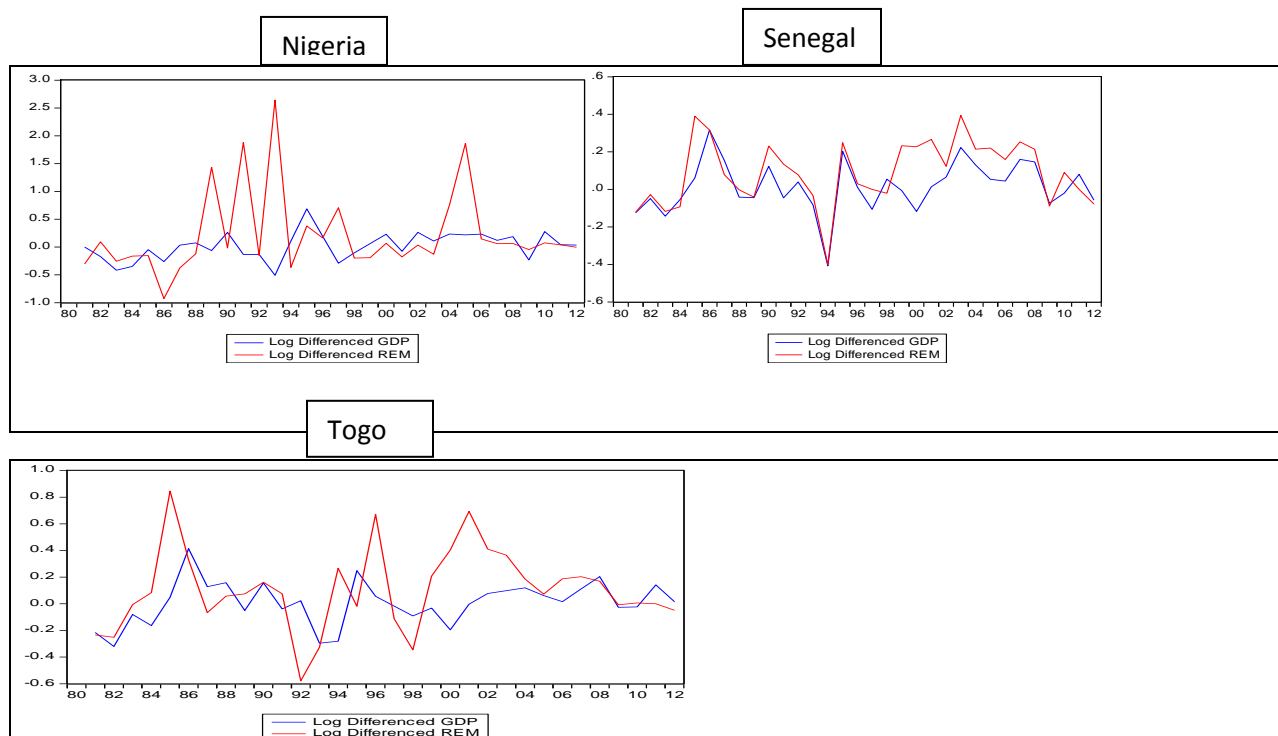
Figure 2: Non-discernible Trend in GDP and Remittances in the three countries

4.3 Results of Co-integration Test

Using the Johansen co-integration techniques which involves the use of maximum Eigen values and the trace statistics, the results are presented in a summarized form in the table 6 below. From the results, it can be realized that there is at least one co-integration relationship between the variables in the situation of Nigeria where the maximum Eigen value and that of the trace statistics of 19.137 and 19.176 respectively are greater than the 5% critical values of 14.265 and 15.496. In the case of Togo and Senegal, there is no co-integration relationship among the variables since the critical value at 5% is greater than both the maximum Eigen values and the trace statistics values.

Table 6: Co-integration Test

H_0	λmas	95% critical value	Trace	95% critical value
Nigeria				
r = 0	19.137*	14.265	19.176*	15.495
r ≤ 1	0.0387	3.841	0.0387	3.841
Senegal				
r = 0	6.190	14.265	6.285	15.495
r ≤ 1	0.095	3.841	0.039	3.841
Togo				
r = 0	9.346	14.265	10.463	15.495
r ≤ 1	1.117	3.841	1.117	3.841

Note: * denotes a significance at 5% level of trace means 1 co-integration equation and denotes rejection of the hypothesis of no integration at 5% level using Mackinnon-Haug-Michelis (1999) p-values

4.4 Results of Granger-causality test

Presented in table 7 below are the results of the Granger-causality test. In the case of Nigeria and Senegal, there is a unidirectional causality link flowing from remittances to economic growth. This means economic growth does not lead to the flow of remittances into the two countries but remittances flow into these countries cause economic growth. On the part of Togo however, there is no causality link at all between the two variables. It means therefore that economic growth does not cause remittances flow into Togo nor does remittance flow into the country cause economic growth. This is in line with findings of Siddique et al (2011). This is very surprising to note giving the fact that Togo has the highest remittance per capita as percentage of GDP in West Africa per the 2009 assessment by World Bank

Table 7: Results of Granger Causality Teat between Economic Growth and Remittances

Null Hypothesis	p-values of the F-test	Conclusion at the 5% level
Nigeria		
(1)H_0: Growth ≠> Remittances	0.566	Do not Reject H_0
$\beta_{11} = 0$		That is, Economic Growth does not cause remittances
(2)H_0: Remittances ≠> Growth	0.002	Reject H_0
$\alpha_{12} = 0$		That is, Remittances causes Economic Growth
Senegal		
(1)H_0: Growth ≠> Remittances	0.090	Do not Reject H_0
$\beta_{11} = 0$		That is, Economic Growth does not cause remittances
(2)H_0: Remittances ≠> Growth	0.016	Reject H_0
$\alpha_{12} = 0$		That is, Remittances causes Economic Growth
Togo		
(1)H_0: Growth ≠> Remittances	0.092	Do not Reject H_0
$\beta_{11} = \beta_{21} = 0$		That is, Economic Growth does not cause remittances
(2)H_0: Remittances ≠> Growth	0.073	Do not Reject H_0
$\alpha_{12} = \alpha_{22} = 0$		That is, Remittances does not cause Economic Growth

5.0 Conclusion

Remittances inflows have been on the ascendancy throughout the world in recent times partly due to globalization and interconnectivity of nations. This globalization and interconnectivity of nations have made it possible for people to migrate to other countries where they work and remit home to support relatives or to invest or insure against economic shocks. It has therefore made remittances a good source of capital for development especially in developing countries

where capital supply is always in short supply. Being effective in reducing poverty and promoting health in developing countries, remittances can also lead to negative impact on labour supply, education and economic growth (Adams, 2010).

The study used a time series data for 33 years on three leading recipients of remittances in West Africa. Granger-causality and co-integration tests were explored in the study. The study established that remittances lead to economic growth while economic growth does not lead to remittances in both Nigeria and Senegal. The study however found no significant relationship between the variables in Togo. The findings are in line with results of Siddique et al(2011) and Jawaid and Raza(2012). It is however partly contrary to the findings of Koyameh-Marsh (2012). In the works of Koyameh-Marsh (2012), remittances are established to have no effect on economic growth in ten ECOWAS countries where my chosen countries come from. It is only in the case of Togo that, Koyameh-Marsh (2012) findings have similarities.

It is recommended that polices regarding emigration should be put in place to make it more encouraging to emigrate and remit to home countries in the case of Senegal and Nigeria since remittances promote economic growth. For the situation of Togo, more research needs to be conducted to ascertain the usage into which remittances are put into and that has led to the no causal relationship between the variables that can then inform policies appropriately. Further studies is needed because, the remittances could be causing reduction in household productivity which could affect growth negatively. It is also possible that remittances cause Dutch disease effect on the economy. Finally, it is possible that other factors such as quality institutions need to be put in place before remittances can lead to economic growth effectively. For any serious policy purpose, further studies which will interrogate exhaustively all these factors mentioned above on the case of Togo is needed.

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