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MOVEMENT OF REAL EXCHANGE RATE ON CURRENT ACCOUNT CONSTRAINTS GROWTH IN LIBERIA. A VECTOR AUTOREGRESSIVE MODEL

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Abstract

The objective of this paper was to examine movement of Real Exchange Rate on Current Account constraints growth in Liberia. This study analysed the movement of real exchange rate and its constraints on current account balance in Liberia. The data collected was annual time series data from the Central Bank of Liberia and the International Monetary funds (IMF) data site for Liberia. Vector autoregressive model (VAR) and Johansen cointegration test to test for long run relationship were used and it was established that there exists no cointegrating equation amongst the variables and therefore no long run relationship amongst the variables. Augmented DF test as well as Unit roots to test for stationarity was used. The major result showed that current account balance does not move alongside real exchange rate in the Liberian economy and therefore, current account balance does not affect changes in real exchange rate in Liberia.

Keywords: account balance, Real Exchange rate, vector autoregressive model

1.0 Introduction

Liberia is an import based economy with nearly every consumable items being imported. The few and major export materials of the country remains raw iron ore, with no value addition, log, gold and diamonds, all of which consist of no value addition. The country imports its major staple food rice within the whopping amount of more than 200 million united stated dollars annually. Other basic commodities such as petroleum products (finished products), vehicles and spares parts, and several other consumables and assorted food items are imported into the country. The obvious explanation will be that Liberia has a current account imbalance which puts pressure on the scare foreign currency to address the existing high demand of imported commodities. The disparity between import and export which makes Liberia a net importer, pushes up the real exchange rate between the Liberian dollar and other currencies, especially the United States dollars which operates alongside the local Liberia dollar as a dual currency.

2.0 Literature Examination

One of the indicators of a healthy economy has to do with how well that economy manages current account balances. This vital component of a buoyant economy according to the IMF manual, as quoted in Kariuki (2009), contends that Current Account Balance (CAB) includes factor income, balance of transactions of goods and services and current transfers (16). It is essentially the difference of a country's net export minus its import and when the difference is negative, such situation is said to be current account balance deficit. In some cases, such deficit can be thought to be helpful while in other instances, it can be detrimental, depending on the circumstances that give rise to such deficit. Thus, according to the intertemporal argument countries that are capital deficient but possessing high opportunities for investments and low domestic savings may rely on deficit, triggered by foreign debt, to spur faster economic growth (16). Economic theory contends that this situation is valid if net foreign borrowings are channeled to investments with higher returns than the cost of capital. Therefore, despite running large CAB deficit, developing countries maybe intertemporally solvent provided current deficit (liabilities) will be covered by future revenues (10; 12).

3.0 Empirical Analysis

Unit roots test was conducted on two variables VAR system to test for stationarity or non-stationarity in the model amongst the variables. Herranz opined that unit roots are nonstationary autoregressive (AR) or autoregressive moving-average (ARMA) time series processes [5] that has 1 as a valid root of the characteristic polynomial [3]. The results showed that we can reject

the null hypothesis that the series has a unit roots on grounds that the Trace-statistic is Greater than the Probability value for all variables in the series at levels.

Table 1: Unit Roots Test Result

UNIT ROOT TEST RESULTS TABLE (ADF)				
Null Hypothesis: the variable has a unit root				
	At Level			
		CURRENT_ACCOUNT	RER	
With Constant	t-Statistic	-3.2126	-3.4787	
	Prob.	0.026	0.0134	
		**	**	
With Constant & Trend	t-Statistic	-4.1405	-3.6119	
	Prob.	0.0113	0.0405	
		**	**	
Without Constant & Trend	t-Statistic	-1.1861	-0.5988	
	Prob.	0.2117	0.452	
		n0	n0	
	At First Difference			
		d(CURRENT_ACCOUNT)	d(RER)	
With Constant	t-Statistic	-9.2677	-8.8195	
	Prob.	0	0	
		***	***	
With Constant & Trend	t-Statistic	-9.2179	-8.7141	
	Prob.	0	0	
		***	***	
Without Constant & Trend	t-Statistic	-9.3813	-8.8974	
	Prob.	0	0	
		***	***	
Notes:				
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant				
b: Lag Length based on SIC				
c: Probability based on MacKinnon (1996) one-sided p-values.				
This Result is The Out-Put of Program Has Developed By:				
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Source: eviews and author computation, 2021

2.1 Vector Autoregressive Model (VAR)

The model equation for our VAR system is given as:

$$rert = \alpha + \sum_{i=1}^{k} \beta_i rer_{t-1} + \sum_{j=1}^{k} \varphi_j current\_account_{t-j} + \varepsilon_{1t}$$

$$current\_accountt = \lambda + \sum_{i=1}^{k} \beta_i current\_account_{t-1} + \sum_{j=1}^{k} \varphi_j rer_{t-j} + \varepsilon_{2t}$$

Where the VAR model is specified in their level form and not first difference. We need to specify that the variables were not logged transform simply because current account constraints were in most part all negative numbers and of course the log of negative number simply don't exist or undefined.

Where rer is the real exchange rate; current_account is the current account constraints. εt is the stochastic error term.

Table 2: VAR results

Vector Autoregression Estimates		
Date: 05/03/21 Time: 13:09		
Sample (adjusted): 3 44		
Included observations: 42 after adjustments		
Standard errors in ( ) & t-statistics in [ ]		
	CURRENT_ACCOUNT	RER
CURRENT_ACCOUNT(-1)	0.467723	0.064205
	-0.16436	-0.03129
	[2.84580]	[2.05184]
CURRENT_ACCOUNT(-2)	0.203329	-0.02135
	-0.17598	-0.0335
	[1.15542]	[-0.63733]
RER(-1)	0.024542	0.426133
	-0.90862	-0.17299
	[0.02701]	[2.46333]
RER(-2)	0.073632	0.08684
	-0.84528	-0.16093
	[0.08711]	[0.53961]
C	-99.5502	129.1183
	-248.324	-47.278
	[-0.40089]	[2.73104]
R-squared	0.364776	0.333216
Adj. R-squared	0.296104	0.261131
Sum sq. resids	251119.9	9102.549
S.E. equation	82.38339	15.68486
F-statistic	5.311801	4.622554
Log likelihood	-242.212	-172.547
Akaike AIC	11.77199	8.454612
Schwarz SC	11.97885	8.661478
Mean dependent	-232.842	245.6039
S.D. dependent	98.19408	18.24723
Determinant resid covariance (dof adj.)		1654259
Determinant resid covariance		1283832
Log likelihood		-414.563
Akaike information criterion		20.2173
Schwarz criterion		20.63104
Number of coefficients		10

Source: author computation in eviews, 2021

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Table 3: VAR model with p-values

System: UNTITLED				
Estimation Method: Least Squares				
Date: 05/03/21 Time: 13:13				
Sample: 3 44				
Included observations: 42				
Total system (balanced) observations 84				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.467723	0.164356	2.8458	0.0057
C(2)	0.203329	0.175979	1.155417	0.2516
C(3)	0.024542	0.90862	0.02701	0.9785
C(4)	0.073632	0.845279	0.087109	0.9308
C(5)	-99.5502	248.3237	-0.40089	0.6897
C(6)	0.064205	0.031291	2.051843	0.0437
C(7)	-0.02135	0.033504	-0.63733	0.5259
C(8)	0.426133	0.172991	2.463326	0.0161
C(9)	0.08684	0.160932	0.539608	0.5911
C(10)	129.1183	47.27801	2.731044	0.0079
Determinant residual covariance		1283832		
Equation: CURRENT_ACCOUNT = C(1)*CURRENT_ACCOUNT(-1) +				
C(2)*CURRENT_ACCOUNT(-2) + C(3)*RER(-1) + C(4)*RER(-2) +				
C(5)				
Observations: 42				
R-squared	0.364776	Mean dependent var		-232.842
Adjusted R-squared	0.296104	S.D. dependent var		98.19408
S.E. of regression	82.38339	Sum squared resid		251119.9
Durbin-Watson stat	1.982584			
Equation: RER = C(6)*CURRENT_ACCOUNT(-1) + C(7)				
*CURRENT_ACCOUNT(-2) + C(8)*RER(-1) + C(9)*RER(-2) +				
C(10)				
Observations: 42				
R-squared	0.333216	Mean dependent var		245.6039
Adjusted R-squared	0.261131	S.D. dependent var		18.24723
S.E. of regression	15.68486	Sum squared resid		9102.55
Durbin-Watson stat	1.950579			

Source: author computation in eviews, 2021

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The result above shows that the model for current account does not suffer from serial correlation because the Durbin-Watson of 1.98 is within the threshold and less than 2.5. The same characteristic can be said of real exchange rate, that the model is free from serial correlation having a DW stat of 1.95. Further analysis of the model to test for joint significance amongst the variables can be done using the Wald test. I am interested in the first lag of real exchange rate and the second lag of real exchange rate on current account

Table 4: Wald test for short run causality

Wald Test:			
System: {%system}			
Test Statistic	**Value**	**df**	**Probability**
Chi-square	**0.012852**	**2**	**0.9936**
Null Hypothesis: C(3)=C(4)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		**Value**	**Std. Err.**
C(3)		**0.024542**	**0.90862**
C(4)		**0.073632**	**0.845279**
Restrictions are linear in coefficients.			

Source: author's computation in eview, 2021

The result from the Wald test shows that we cannot reject the null hypothesis that c(3)=c(4)=0 or that the first lag of real exchange rate and the second lag of real exchange rate and therefore those two variables does not have a joint effect on current account. Further examination of the model for joint significance. if I want to know whether the first lag of current account and the second lag of current account have any joint significance on real exchange rate is again shown in the table below:

Table 5 on wald test to show the joint significance of the first lag and second lag of current account on RER

Wald Test:			
System: {%system}			
Test Statistic	**Value**	**df**	**Probability**
Chi-square	**4.499565**	**2**	**0.1054**
Null Hypothesis: C(6)=C(7)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		**Value**	**Std. Err.**
C(6)		**0.064205**	**0.031291**
C(7)		**-0.02135**	**0.033504**
Restrictions are linear in coefficients.			

Source: Author computation in eviews, 2021

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The result shows that the first lag and second lag of current account has joint significance on current account as shown in the result below:

Table 6

Wald Test:			
System: {%system}			
Test Statistic	**Value**	**df**	**Probability**
Chi-square	**18.05725**	**2**	**0.0001**
Null Hypothesis: C(1)=C(2)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		**Value**	**Std. Err.**
C(1)		**0.467723**	**0.164356**
C(2)		**0.203329**	**0.175979**
Restrictions are linear in coefficients.			

Source: author compilation in eviews, 2021

The result from the table above shows that the first and second lag of current account are the only variables that have joint significance on current account in the model and that we can reject the hypothesis that c1=c2=0 and we can say that those 2 variables have a joint significance on current account.

Table 7

Wald Test:			
System: {%system}			
Test Statistic	**Value**	**df**	**Probability**
Chi-square	**9.316245**	**2**	**0.0095**
Null Hypothesis: C(8)=C(9)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		**Value**	**Std. Err.**
C(8)		**0.426133**	**0.172991**
C(9)		**0.08684**	**0.160932**
Restrictions are linear in coefficients.			

Source: author compilation in eviews, 2021

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The result from the table above shows that the first and second lag of real exchange rate are the only variables that have joint significance on real exchange rate in the model and that we can reject the hypothesis that c(8)=c(9)=0 and we can say that those 2 variables have a joint significance on real exchange rate.

4.0 Conclusion

The movement of real exchange rate does not have any impact on current account in the Liberia economy as shown by the model and that there exist no long run nor short run relationship between the two variables in the Liberian economy. Thus in Liberia, the persistent current account disequilibrium is a result of the under performance of the economy as a result of the country heavy reliance of basic imports for nearly every products while its major exports, namely iron ore and rubber, timber, etc have not accrued the kind of revenues due to the lack of value addition.

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