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The Impact of Trade on the Foreign Exchange Reserves of Sierra Leone

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Abstract

Abstracts

The chief interest of this study is to ascertain the effect trade has on the foreign exchange reserve of Sierra Leone from 1980 to 2014. Data sourced from the World Bank was used to do the empirical analysis. The unit roots test indicated that all variables employed in the

study became stationary at first difference. The Johansen cointegration test indicated that there exists a long-run relationship between the variables. From impulse response analysis, trade reacted negatively to foreign exchange reserve for the first two years of shock but subsequently reacted positively for the rest of the 10 year period. Similarly, foreign exchange reserves reacted negatively to a shock (trade deficit) in the trade of Sierra Leone. The Granger causality test results indicated a unidirectional causality between foreign exchange reserves and trade of Sierra Leone. The OLS results indicated that all the independent variables employed in the study except GDP were statistically significant to explain the dependent variable by a variation of about 89 percent. It is worth noting that all the variables used in the study have a retrogressive effect on foreign exchange reserves of Sierra Leone. It is therefore suggested that a vigorous industrialization process is embarked on to promote the export trade of Sierra Leone as a way of minimizing trade deficit as well as building up reserves.

Key Words: Trade, Foreign Exchange Reserves, Impact, Sierra Leone.

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1. Introduction

Global economic interdependence has been widely seen as a panacea for economic growth and development due to differences in natural resources endowment, factors of production as well as different levels of development. Thus, foreign trade plays a paramount role in the growth process of both developed and developing economies.

In the case of Sierra Leone, trade being beneficial to its economy, very much depend on its balance of trade as suggested by economic theory whether it is surplus or deficit. However, Sierra Leone like most Sub-Saharan African countries has recorded constant trade deficit over a decade now due to more imports than exports which also means a reduction in foreign exchange returns. Once most Sub-Saharan African countries including Sierra Leone import more than they export, it means these economies need a substantial amount of their foreign reserves to finance these deficits as well cater for their import bills.

The demand for foreign reserves has increased significantly in the global arena for reasons of guarding against depreciation of the domestic currency, resolve foreign payment obligations, chiefly, funding external trade needs, wealth accumulation, exchange rate management, ensuring the creditworthiness of domestic economy, and to guide against external shocks inter alia.

External exchange reserves buildup in developing economies is unswervingly related to the rise in the current account deficit in countries whose currency is used for accumulation, especially in the United States. Therefore, adjustments in the United States dollar have grave costs repercussions for other economies worldwide, typically in countries with their foreign exchange reserves denominated in dollars. The evolving economies experience demonstrate the significance of foreign exchange reserves buildup in order to solve precautionary problems, capital flows instability and other developments that may negatively affect expectations (Kruskovic and Tina 2014).

Owing to the various reasons why both developed and developing economies grave for foreign reserves buildup such as a guard against external shock, stabilization of domestic currency with respect to exchange rate and so on, many nations including Sierra Leone have embarked on conscious policies to increase their foreign reserves.

2. Literature Review

The profit of foreign reserves as a shock absorber of crisis associated with external economic transactions cannot be overemphasized. Fischer (2001), emphasizes this situation by stating that there is a restriction to the

level of foreign exchange reserves requisite to prevent the financial crisis, given the fact that accumulation of large foreign reserves involves higher costs. If foreign exchange reserve holding is stimulated by preventable desires, it should terminate at the level where the country has reached its optimal level. In addressing the issue of what constitutes an adequate foreign reserve, Frenkel and Jovanovic (1981) argued that some of the conditions for the demand for foreign exchange reserves of an economy center on variables, like total trade (import and export), external debt, possible trade shocks severity and considerations of monetary policy.

Shcherbakov (2002) argued that there are some common parameters used to assess the adequacy of foreign reserves for an economy. To the author, some of these measures show the level of foreign weakness of an economy and the ability of foreign exchange reserves to guard against this vulnerability. These parameters are the sufficiency of imports, adequacy of debts and monetary sufficiency. Notwithstanding, an active strategy for foreign exchange reserves administration appears to center on the creation of future wealth for a country. This happens when exchange rate, debt management, and monetary policy issues to central banks are of marginal interest. On the other hand, when weaknesses in the financial and corporate sectors are low; when government seriously drives a flexible exchange rate policy; and when the government has an efficient fiscal policy and sound management framework as well as developed domestic financial markets, in this case, the foreign exchange reserves portfolio is organized into active and non-active parts. The inactive portfolio focuses on macroeconomic objectives concentrating on main finance while the active portfolio is used for maximizing profit, taking into account the objective of liability management (Carlos et al 2004).

Peter and Machiel (2004) arguing in tandem with the motive of profit maximization to foreign exchange reserves administration, posits that “over a decade now, foreign currency reserves administration has changed its aim from sustaining liquidity and economic protection objectives to that of maximizing total profit”. In analyzing the impact and factors that influence foreign reserves, Umeora (2013) examined the accumulation of external reserves and its effects on exchange rates and inflation in Nigeria using ordinary least squares regression analysis. He found that foreign exchange reserves do not have a significant effect on the foreign

exchange rate. The study also discovered that foreign exchange reserves do not have significant effects on inflation in Nigeria.

In analyzing the factors that influences foreign exchange reserves in Nigeria over the period of 1999 to 2011, Irefin and Yaaba (2012) used the Autoregressive Distributed Lag (ARDL) to investigate restructured econometrics the 'Buffer Stock Model' of (1981) by Frenkel and Jovanovic with emphasis on level of income, interest rate, imports and exchange rate. Their findings altered the presence of buffer stock model for foreign exchange reserves aggregation and provided vital indicators in support of the level of income as the key variable influencing reserves aggregation in Nigeria.

Chowdhury et al (2014) conducted an empirical analysis of the factors influencing foreign exchange reserves in Bangladesh, applying the Augmented Dicky Fuller (ADF) test, to analyze unit roots properties of the variables and Engle-Granger residual-based cointegration test to examine the long run relationship among the variables, and some diagnostic tests for better modeling, results revealed the presence of strong relationship among foreign exchange reserves, exchange rate, remittances, domestic interest rate, broad money, United Payment Interface (UPI) of export and import, and per capita income. The study, therefore, suggested an efficient exchange rate administration, strong remittance related policies, quality products for exports trade and sustainable national income level as possible measures that can enhance the healthy amount of foreign exchange reserves for a developing country like Bangladesh.

Abdullateef and Waheed (2010) extended the study on the factors contributing to foreign exchange reserves by investigating the effect of variation in external reserve positions of Nigeria on domestic investment, price level, and exchange rate during the period 1986 to 2006. Using the Ordinary Least Square (OLS) and vector error correction (VEC) estimation techniques, they found out that change in foreign exchange reserves in the country affect only foreign direct investment (FDI) and exchange rates, and do not affect local investment and price level. The results further indicated that there is a need for comprehensive foreign reserve management strategies that will focus on maximizing the benefits from oil export revenue by using more of these resources

to improve local investment.

Chin-Hong, et al (2011) affirms the nexus between foreign exchange reserves and factors affecting it such as income level, exchange rate, the balance of payments and the real cost of foreign exchange reserves aggregation in Malaysia for the period 1975 to 2007. The co-integration test technique was used to analyze the data and the findings showed that the foreign exchange reserves and the identified factors affecting it were co-integrated. The implications of the findings are that the government needs to understand the vital variables which can significantly influence the volume of foreign exchange reserves to enable the country to have a better focus on how to maintain foreign exchange reserve sufficiency.

Charles-Anyaogu (2012), in his study on the relationship between selected macroeconomic factors and external reserve in Nigeria, utilized econometric analytical techniques of VAR and Wald tests and discovered that past values of gross domestic product explain the current values of foreign exchange reserves significantly. The result of the model further indicated that external reserve was statistically significant in the year of study but insignificant in past years; while among the macroeconomic variables only inflation was found to have serious implication on foreign exchange reserves while trade balance and exchange rate were found to have less impact on foreign exchange reserve.

The review above shows that very few studies have been done on the impact of trade on foreign reserve accumulation. For instance, Charles Anyaogu (2012) in his study examined trade under macroeconomic factors that affect external reserve. Also Chin-Hong, et al (2011) in investigating the determinants of external reserve in Malaysia identified the balance of payment as a proxy for trade. This study diverged from others by examining the impact of trade: imports and exports on foreign exchange reserves of Sierra Leone over the period 1980 – 2014.

3. Materials and Methods

3.1. Model Specification

The empirical model used in this study is adopted from Nteegah and Okpoi (2016) with a few modifications starting with the standard production function as follows:

$$FEXRES_t = f(TRAD_t, REER_t GDP_t INF_t) \quad (1)$$

The stochastic form of the model is in the following:

$$FEXRES_t = \alpha_0 + \alpha_1 TRAD_t + \alpha_2 REER_t + \alpha_3 GDP_t + \alpha_4 INF_t + \varepsilon_t \quad (2)$$

Where, FEXRES is foreign exchange reserve defined as total reserves minus gold comprise special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. Gold holdings are excluded. It is measured in current U.S. dollars. TRAD is total trade including both exports and imports as a share of GDP (percentage of GDP). This variable is included in the study because the economic theory (mercantilist theory) suggests that when total trade is positive, it increases foreign reserves and vice versa. REER is real effective exchange rate which is the price of the domestic currency of Sierra Leone (Leones) against major currencies in the international market usually the US dollar (Leone/US dollar). GDP represents economic growth and it is included in the study because economic theory posits that excessive foreign reserves accumulation reduces domestic investment which leads to low economic growth. This, therefore, means that GDP can influence foreign reserves of a nation. It is measured in constant 2010 US dollars. INF means inflation and the proxy for this is the consumer price index (CPI) which is measured in percentage (%). This is included in the study because with high reserves, economic agents anticipate domestic currency to appreciate leading to a reduction in inflation. Furthermore, because of the

liquidity market effect, the spending of reserves increases money stock (for instance, when the government converts aid into domestic currency to spend it), which may fuel inflation.

3.2 Data Source

Time series data used for the study is taking mainly from the World Development Indicators of the World Bank. It covers the period from 1980-2014. This period is carefully chosen because; it is made up of periods before, during and after the civil war of Sierra Leone, which will enable us to do a thorough empirical analysis of the impact trade has on the foreign exchange reserves of Sierra Leone.

3.3. Pre Estimation Tests

Unit root test

Unit root test is carried out to avoid spurious regression. Economic time series may have a unit root and has to be differenced d times until they become stationary. At this point, time series are said to be integrated of order d denoted Y∼I (d). The Augmented Dickey-Fuller (ADF) test regression equation is as follows:

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \alpha_2 Y_{t-1} + \sum_{j=2}^{q} \alpha_j \Delta Y_{t-j+1} + \varepsilon_t \quad (3)$$

Where, Y_t a variable at time t, ε_t is the error term that is generated from a white noise process and is assumed to be independently and identically distributed with zero mean and constant variance. In other words, the first difference of $Y_t$is regressed against a constant, a time trend (t=1, 2 ...T), the first lag of $Y_t$and if necessary, lags ofΔY_t. Adequate lags ofΔY_t must are included to make sure that there is no autocorrelation in the error term. Therefore, the Akaike Information Criterion (AIC) is used to determine the lag length to be included. If a unit root is present, theα_2y would not be statistically different from zero. The test for a unit root is based on the t-statistic on the coefficient of the lagged dependent variable,Y_{t-1} ; α_2 This is compared with specific calculated critical values. If the calculated value is greater than the critical value, then the null hypothesis of a unit root is rejected, and the variable is considered stationary.

Johansen Co-integration Test

Co-integration means that there is a long-run relationship between variable or the variables have a common linear trend in the long-run. The main methods for testing co-integration are three names, the Engle-Granger two-step method, Johansen Procedure, and the Phillips-Ouliaris co-integration test. The maximum likelihood procedure (Johansen test) suggested by Johansen (1988 and 1991) and Johansen and Juselius (1990) is superior when the variables in the study are more than two for reason of the existence of multiple co-integrating vectors (Alkswani, 2000). The plus of Johansen's test is not limited to the multivariate problem alone but preferable to the Engle-Granger approach even with a two variable model (Gonzalo, 1994). Two statistic tests are used to determine the number of Co-integrating vectors; the Trace statistic and the Maximal Eigenvalue test. The first one tests the null hypothesis that the number of co-integrating vectors equals or less than (r). It is calculated as follows:

Trace = -T $\sum_{t=r+1}^{p} \ln(1-\hat{\lambda}_t)$ where $\hat{\lambda}_{r+1}, \ldots, \hat{\lambda}_p$ are the (p-r) smallest estimated Eigenvalues. The second test (λ_{max}), examines the null hypothesis that there is (r) of co-integrating vectors against the alternative that (r+1) co-integrating vectors. This test is calculated as follows:

$$\lambda_{max}(r, r+1) = -T \ln(1-\hat{\lambda}_{r+1})$$

Granger-Causality Test

Granger-causality is a term for a specific notion of causality time series analysis (Granger 1969). The idea of Granger causality is that a variable X Granger-cause Y if Y can be better predicted using the pasts of both X and Y than it can use the past of Y alone.

$$\Delta Y_t = \eta_1 + \sum_{i=1}^{n} \alpha_i \Delta X_{t-i} + \sum_{j=1}^{n} \beta_j \Delta Y_{t-j} + \mu_{1t} \ldots\ldots\ldots\ldots\ldots (4)$$

$$\Delta X_t = \eta_2 + \sum_{i=1}^{n} \lambda_i \Delta X_{t-i} + \sum_{j=1}^{n} \delta_j \Delta Y_{t-j} + \mu_{2t} \dots\dots\dots\dots\dots (5)$$

Where $\boldsymbol{\mu_{1t}}$and$\boldsymbol{\mu_{2t}}$ are the disturbance terms that are not correlated with one another, $\boldsymbol{\eta_1}$and$\boldsymbol{\eta_2}$ are constant terms, and $\boldsymbol{\alpha_i}$, $\boldsymbol{\lambda_i}$ $\boldsymbol{\beta_j}$ and$\boldsymbol{\delta_j}$ are coefficients. The reported F-Statistics are the Wald statistics for the joint hypothesis, for instance, $\alpha_{1=}\ \alpha_2 \dots = \alpha_n = 0$ The Granger causality approach allows determining the short-run or forecasting direction of the relations between two variables X and Y. It is worth noting that, the Granger-causality based on stationary variables ignores the long-run effects.

3.3. Model Estimation Techniques

Vector Autoregression (VAR)

The vector autoregression (VAR) model is used to determine the lag length to be used for the unit root test, Granger-causality test, the test of cointegration and last but not the least the impulse response function of the variables. The Akaike information criteria (AIC) will be used to establish the lag length to be used for the various techniques of estimation that involves lags.

In general, a VAR model with ρ lags in matrix notation is expressed as follows:

$$\mathrm{y_t} = \alpha + \theta_1 \mathrm{y_{t-1}} + \cdots + \theta_\rho \mathrm{y_{t-\rho}} + \varepsilon_t \qquad (6)$$

Where $\mathbf{y_t}$and its lagged values are vectors of endogenous variables, $\boldsymbol{\varepsilon_t}$ is the error term while$\boldsymbol{\theta s}$ are matrices of unknown coefficients to be estimated.

Impulse Response Function

It involves the measuring of unexpected changes in one variable X (the impulse) in time t and predicting its effect on the other variable Y in time t, t+1, t+2 etc. (the response). The impulse response function (IRF) defines the response of the dependent variable in the VAR model to shocks in the error terms. Alternatively,

the IRF detects the impact of a one-time shock in one of the innovations on current and future values of the endogenous variable.

The IRF is of the general equation as follow:

$$y_t = \alpha + \varepsilon_t + \emptyset_1 \varepsilon_{t-1} \emptyset_2 \varepsilon_{t-2} + \cdots + \emptyset_i \varepsilon_{t-i} \quad (7)$$

Where y_t is a vector of the considered dependent variables, α is a vector of the constants, ε_i is a vector of innovations for all variables that have been included in the VAR model and $\emptyset_i$ is a vector of parameters that measure the reaction of the dependent variable to innovations in all variables included in the VAR model.

4. Discussion and Findings

4.1. Model Estimation Results

Ordinary Least Square Estimation

As in Table 6, holding other factors constant, a 100 percent increase in trade reduces foreign exchange reserves by about 1.8 percent. This is not surprising because Sierra Leone has consistently recorded trade deficit for some time now and for that matter, its reserves are used to settle these imbalances. The same applies to real exchange rate where an increase in the real effective exchange rate by 100 percent reduces foreign reserve by 0.27 percent. Furthermore, ceteris paribus, an increase in GDP by 100 percent also reduces foreign reserves by about 8.9 percent. This is so because economic theory posits that excessive foreign reserves accumulation reduces domestic investment which leads to low economic growth. So with this low economic growth, it means what is produced in the domestic economy cannot meet local demand, therefore, the need for more imports than exports resulting in trade deficit paving way for foreign reserves to be used in settling these trade deficits.Tables

All tables should be numbered with Arabic numerals. Headings should be placed above tables, left justified. Leave one line space between the heading and the table. Only horizontal lines should be used within a table, to distinguish the column headings from the body of the table, and immediately above and below the table. Tables must be embedded into the text and not supplied separately. Below is an example which authors may find useful.

Table 1: Ordinary Least Square Estimation

Variables	Coefficients	Std. Error	t-Statistic	P-Value
Constant	20.45886	18.76744	1.090125	0.2850
Trade	-0.018199***	0.005775	-3.151101	0.0039
REER	-0.002799***	0.000880	-3.181160	0.0036
LOG(GDP)	-0.089450	0.903957	-0.098954	0.9219
INF	-0.010612***	0.002472	-4.292215	0.0002
FERES(-1)	7.80E-09***	1.98E-09	3.947417	0.0005
R-square	0.894152			
Adj. R-square	0.875251			
Durbin-Watson	1.567654			
F-Statistic (Prob.)	47.30625 (0.00000)			
Observations	34			

Note: ***, **, * denote significant at 1, 5, and 10 percent levels of significance

An increase in inflation by 100 percent reduces foreign reserves by about 1 percent. This is so because, with high reserves, economic agents anticipate domestic currency to appreciate leading to a reduction in inflation but the appreciated domestic currency reduces the export trade of the economy leading to a trade deficit that leads into reserves depletion because it is used to offset these imbalances. The lag of foreign exchange reserves was used to correct autocorrelation in the model and though statistically very significant, it is economically not significant. In summary, with the exception of GDP, all other independent variables are statistically significant at 5 percent levels of significance. The model explains a large portion of the variation in the foreign reserves, that is, about 89.4 percent of the variation in foreign reserve, is explained in the model.

Heteroskedasticity and Serial Correlation Test

From the tests given in Table 2, it is clear that there is both serial correlation and heteroskedasticity in the series. The probability under F-Statistics shows that we fail to reject the null hypothesis of serial correlation

and heteroskedasticity in our data series. So, ordinary least square cannot be applied because it gives inconsistent estimates.

Table 2: Heteroskedasticity and Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test			
F-Statistics	1.057357	Prob. F(2,26)	0.3618
Obs*R-Squared	2.557390	Prob. Chi-Square(2)	0.2784
Ramsey RESET Test			
F-Statistic	2.267597	Prob. F(1,27)	0.1437
Log Likelihood ratio	2.741900	Prob. Chi-Square(1)	0.0977
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-Statistic	1.229023	Prob. F(5,28)	0.3219
Obs*R-Squared	6.118999	Prob. Chi-Square(5)	0.2948
Scaled Explained SS	8.949291	Prob. Chi-Square(5)	0.1111

Unit Root Test

The results of the unit root test indicate that the series employed in the study become stationary after first difference. As can be seen from Table 3 in column 7, all the variables are integrated of order one.

Table 3: Augmented Dickey-Fuller Test (ADF) Results

Variables	ADF Test Statistics		
	Level	1st Difference	I(d)
FERES	1.004278	-4.637496 (1)	I (1)
TRAD	-2.204591	-3.836380(1)	I(1)
REER	-2.962043	-3.991681(1)	I(1)
GDP	1.597089	-5.006644(1)	I(1)
INF	-3.421901	-6.181984(1)	I(1)
Critical Value (5%)	-3.552973	-3.552973	

Note: I(d) indicates the d-the order of integration.

4.3.4 Cointegration Test Results

Since all variables have the same order of integration, they can be cointegrated. Therefore, we carry a test for cointegration to assert a long run relationship between the variables. The cointegration results are given in two different approached. The first approach using trace statistics in Table 4 and the second approach is maximum Eigen value approach in Table 5. From both trace statistics and max-Eigen value tests, it is clear that there is a long-run relationship between the variables used in this study.

Table 4: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.696932	101.3100	69.81889	0.0000
At most 1 *	0.634626	61.91461	47.85613	0.0014
At most 2	0.369957	28.68910	29.79707	0.0667
At most 3	0.308457	13.44417	15.49471	0.0995
At most 4	0.037835	1.272786	3.841466	0.2592

Note: Trace test indicates 2 cointegrating equations at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level and **MacKinnon-Haug-Michelis (1999) p-values.

Table 5: Unrestricted Cointegration Rank Test (Maximum Eigen Value)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.696932	39.39538	33.87687	0.0099
At most 1 *	0.634626	33.22551	27.58434	0.0084
At most 2	0.369957	15.24493	21.13162	0.2721
At most 3	0.308457	12.17139	14.26460	0.1044
At most 4	0.037835	1.272786	3.841466	0.2592

Note: Max-eigenvalue test indicates 2 cointegrating equations at the 0.05 level.

Granger-Cause Analysis

From the cointegration test, we have assured the existence of a long run relationship between the variables. However, it is important to know the causal direction. That is, which variable's change leads into the other variable's change. This requires that we undertake a Granger Causality Test as in Table 6.

Table 6: A Granger Causality Test

Pairwise Granger Causality Tests
Sample: 1980 2014
Lags: 1

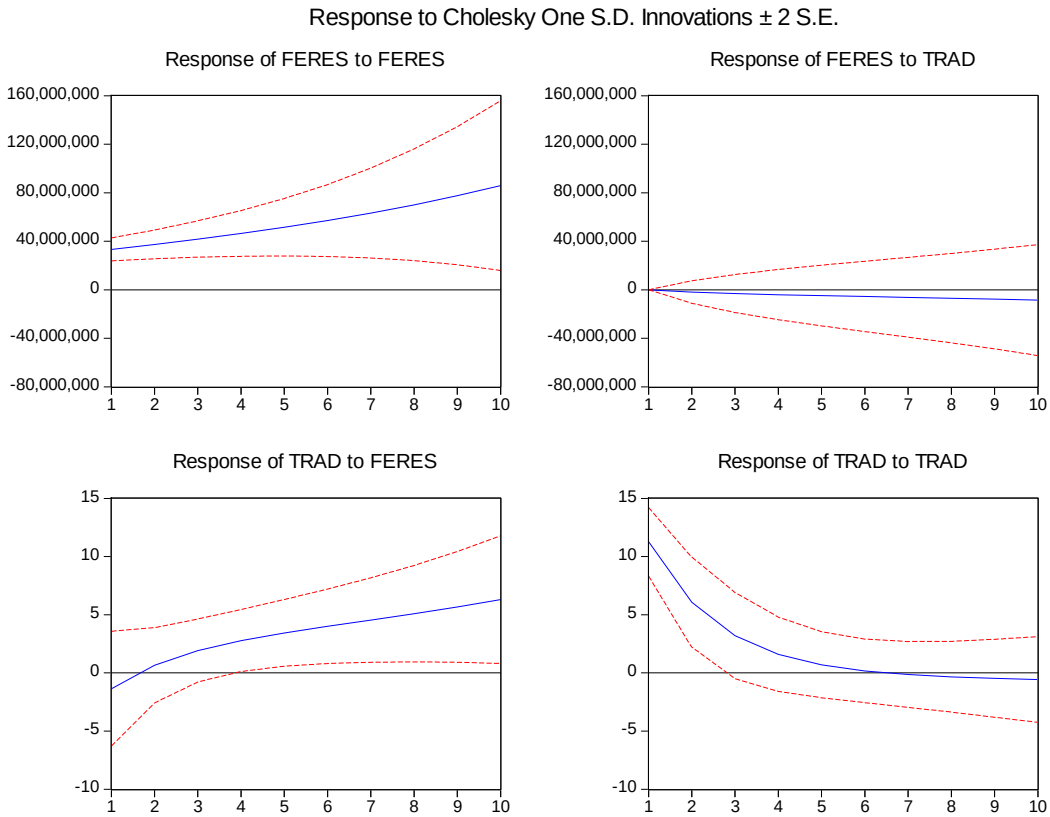
Null Hypothesis:	Obs	F-Statistic	Prob.
FERES does not Granger Cause TRAD	34	7.89852	0.0085
TRAD does not Granger Cause FERES		0.17227	0.6810

From Table 6, it is clear that trade does not Granger cause foreign exchange reserves as we fail to reject the null hypothesis that trade does not Granger cause foreign exchange reserve. However, we reject the null hypothesis that foreign exchange does not Granger cause trade at 1 percent level of significance. This means foreign exchange reserve does Granger cause trade.

Impulse Response Function (IRF) Outputs

The impulse response function (IRF) is estimated for all the variables employed in the study, however, only the principal variables, that is, foreign exchange reserves and trade reactions are presented while the rest are placed at the appendix. The IRF performed for the variables is a 10 years period projected into the future by first estimating the VAR model. The results are presented in Figure 1

Figure 1: Impulse Response Results



Considering row 1, figure 2, trade (TRAD) reacted negatively to a shock in foreign exchange reserves (FERES) for the first two years but since then been positive for the entire projection period. The initial negative reaction suggests that with more foreign reserves buildup, the investment capacity in the domestic economy reduces in the areas of critical infrastructure such as electricity, roads, the building of factories etc. which therefore result in no or minimal value added to primary products before being exported hence trade deficit.

Row 2 figure1 indicates the reaction of foreign exchange reserves to a shock in external trade of Sierra Leone. The IRF output indicated foreign exchange reserve (FERES) reacting negatively to a shock in trade of Sierra Leone. This is not surprising because Sierra Leone has recorded trade deficit for some time implying that, the

country imports more than it exports meaning, the only way to offset these trade imbalances is by using the external reserves of Sierra Leone for the settlement of these deficits. In this case, the trade deficit is the shock that foreign exchange reserve reacts to.

5. Conclusion

The study covered a period from 1980-2014 with the techniques of estimation being Augmented Dickey-Fuller (ADF) test of unit root, VAR model(lag selection criteria and impulse response function), cointegration test to establish the long run relationship between the variables, OLS to ascertain the effect trade has on foreign exchange reserves of Sierra Leone and the Granger causality test . Annual time series mainly secondary data was used in the study accessed from World Development Indicators, World Bank official website.

The unit roots indicated that all variables employed in the study became stationary at first difference. The Johansen co-integration test indicated that there exists a long-run relationship between the variables. The impulse response function indicated that trade reacted negatively to foreign exchange reserve for the first two years of shock but subsequently reacted positively for the rest of the 10 year period.

Similarly, foreign exchange reserves reacted negatively to a shock (trade deficit) in the trade of Sierra Leone. The Granger causality test results indicated a unidirectional causality between foreign exchange reserves and trade of Sierra Leone. The OLS results indicated that all the independent variables employed in the study except GDP were statistically significant to explain the dependent variable by a variation of about 8.9%. It is worth noting that all the variables used in the study have a retrogressive effect on foreign exchange reserves of Sierra Leone.

Policy Implication

The OLS results indicated that all the variables used in the study have a negative effect on foreign exchange reserves of Sierra Leone. Principally, trade has a negative effect on foreign exchange reserves of Sierra

Leone. This is because Sierra Leone has recorded trade deficit for some time suggesting that, these imbalances are settled by using its foreign exchange reserves.

Based on this, it is therefore suggested that the only way for Sierra Leone to come out of the problem of trade deficit is by embarking on a conscious industrialization process. With this, the value will be added to its main primary export commodities to facilitate high foreign exchange returns needed for investment in the domestic economy to warrant economic growth which subsequently leads to improvement in export trade and reserves buildup as well. Thus, there is a symbiotic relationship between them.

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