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The Effect of Tax Reforms on Revenue Mobilization and Economic Growth of Sierra Leone: Evidence from Time Series

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Abstract

The fiscal authorities in Sierra Leone introduced series of reforms in the tax system ranging from continual revisions in tax rate to harmonization and instituting new taxes that are relatively easy to collect. Consequently, tax revenue increased for about 367% after the first and half decade of the reforms, but despite this progress, the output of the tax system as measured by the tax-GDP ratio remains very low averaging 11 per cent and has not been able to meet the secondary convergence criteria of the ECOWAS monetary cooperation performance target of 20 percent. With the use of the ARDL-ECM, the study examined the effect of tax reforms on taxation and the impact of the induced-reform tax revenue on the economic growth of Sierra Leone using time series data from 1981 to 2018. Specifically, the results of the study indicate that the tax reforms have indeed in the short-run created some positive effects on the Income Taxes, the Goods and Service Tax, and International Trade Taxes but some negative effects on the Non-Tax Revenues in the long run. Generally, the study concluded that although the tax reforms have not created the much-expected effect on tax revenue in the long run, tax revenue has a significant effect on the economic growth of Sierra Leone. Since he government intends to mobilize more revenue but tax reforms should be carefully designed with a comprehensive strategy with a periodic review of tax policies ensuring that private-sector investment is given the enabling environment to thrive.

Keywords: Tax Reforms, Tax Revenue, Real GDP

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Introduction

Taxation and revenue mobilization in developing countries has attracted global attention and resilience, and there is a growing consensus that domestic tax revenue must be the basic financing source for government expenditure with foreign aid playing essentially a supporting role. A core function of the tax system is to generate sufficient revenue to meet the ever-increasing public expenditures of the state. Nonetheless, most LDCs including Sierra Leone face difficulties in generating revenue. According to Eltony (2002), budget deficits and the unproductive use of public expenditures have constrained the critical investments in both human resources and basic infrastructure that are necessary for sustainable economic growth in some LDCs. Consequently, in the last three decades, many LDCs have embarked on economic and financial reform programmes contained in the larger SAPs that included measures to raise tax revenues and restructure the tax system.

LDCs need to rely substantially on domestic revenue mobilization if the MDGs are to be realized within the specified time frame. However, the experience with domestic resource mobilization of developing countries over the last thirty-five years has been mixed. In countries such as Botswana, Israel, Kuwait and Seychelles, the central government's share of tax revenue in GDP has been more than forty per cent, on average, per annum. Countries such as Argentina, Sierra Leone, Niger, Guatemala and Burkina Faso have struggled to raise their revenue above eleven per cent on annual basis (Gupta, 2007). For macroeconomic stability to be realized, the growth in tax revenue must approximate the growth in public expenditure according to the 1990 World Bank, report. The government of Sierra Leone objectives in recent years have been to expand the tax base, increase tax compliance, review exemption lists, strengthen tax administration and procedures, and automate and digitize processes but tax collections in Sierra Leone are still below potential. For instance, the ratio of tax revenue to GDP in 2018 was 13.7 per cent, and the revenue shortfalls contributed to higher fiscal deficits (14.70 per cent of GDP in 1987) and larger domestic financing (Kargbo and Festus,

2012). The higher domestic financing may have fuelled the inflationary pressure and precipitated an over-valued exchange rate.

The underlying argument is that the yield of tax revenue is a function of the existing tax bases, the rates, and the probability of collecting the specific levies. Sierra Leone also suffers from over-dependence on a small number of tax revenue sources, which are vulnerable to external shocks. Some of these sources include import and export taxes on mineral products whose prices are determined outside the influence of Sierra Leonean authorities. Besides the volatility in prices of mineral products, the granting of numerous tax exemptions such as the abolishment of the export tax on agricultural products and the smuggling of mineral products (such as diamond and cocoa) across the porous borders considerably reduce the tax base.

To meet the challenges of enhancing revenue collection, various reforms were introduced in the tax system, ranging from frequent revisions in the tax rates, harmonization of tariffs, introduction of new taxes and to autonomous revenue agency. However, these reforms have not been part of a concerted effort to reform the entire tax system but part of the efforts to raise more revenue through budget pronouncements affecting the tax rates or tax brackets. For instance, following the passing of the Minimum Wages Act in 1997, there were seven income tax brackets and the tax rates ranged from 8.0 per cent to 50.0 per cent but the Income Tax Act of 2018 reduced the tax brackets to five with the rates ranging from 15 per cent to 35 per cent. The reforms were also aimed at increasing efficiency and improving working conditions for the tax administration, and to reduce inequalities, distortion, and corruption. The NRA Act of 2000 also provided for the establishment of an autonomous revenue agency (the National Revenue Authority). In this regard, evaluation of these reforms constitutes an important ingredient of a tax system.

Despite the reforms introduced in the Sierra Leonean tax system, the country is still grappling with budget deficit partly due to poor revenue generation and moreover, very little is known about the performance dynamics of the reforms in terms of raising the revenue mobilization capacity of the tax system and how the reforms have affected each tax source. With the use of the ARDL-ECM approach, this study attempted to fill this

gap by evaluating the major tax reforms implemented in 2002 and its effects on the revenue productivity of the overall tax system and of individual tax handles and the economic growth in Sierra Leone with annual data covering the period between 1981 and 2018. Estimation results revealed that the reforms have indeed in the short-run created some positive effects on the Income Taxes, the Goods and Service Tax, and International Trade Taxes but some negative effects on the non-tax revenue in the long run. Generally, the study concluded that although the tax reforms have not created the much-expected effect on tax revenue in the long run, tax revenue has a significant effect on the economic growth of Sierra Leone.

Related Literature Review

Tax reforms in developing countries are strongly influenced by their economic structure, and most of the discussion on the relationship between reforms in the tax structure and economic performance focuses on the effects on GDP levels. In practice, however, it may be difficult to distinguish between effects on tax reforms and growth rates. Indeed, any policy that raises the level of GDP will increase the growth rate of GDP. Also, transitional growth may be long-lasting, and so it has not proved possible to distinguish effects on long-run growth from transitional growth effects, although some elements of the tax system are likely to have a bearing on long-run growth. Bhartia (2009) posits that "taxation theory may be based on the assumption that there is no relationship between tax paid and benefit recovered from state activities", but there is a link between tax liability and tax expenditures because levying taxes to citizens to finance state activities is appropriated evenly in society. Myles (2000) viewed economic growth as being the proximate for increased prosperity but investment in new capital, the implementation of new production techniques, and the introduction of new products are fundamentals of the growth process. However, this assertion can be constrained when government authorities employed contractionary fiscal policies. In support of this, Ferede and Dahlby (2012) opined that taxes can raise the cost of capital and mitigate incentives to invest to the extent that higher tax rates discourage investment, economic growth will be adversely affected, and the adverse effect of taxes on entrepreneurship reduces the creation of new ideas and lowers total factor productivity. Recognizing this,

over the past decades many LDCs countries including Sierra Leone have undertaken several structural reforms in their tax systems aiming to reduce tax rates and base broadening to enhance efficiency, while simultaneously maintain tax revenues.

Empirical studies on the tax revenue and economic growth relationship have arrived at different outcomes. While a fraction agrees that an inverse relationship exists between tax revenue and economic growth, others found a direct relationship to exist between tax revenue and economic growth. Some contend that tax revenue has mixed relationships with economic growth. Utilizing an ECM to examine the tax policy and its effects on macroeconomic activities in Barbados, Greenidge, and Drakes (2009) study suggests that total and indirect taxation has a contractionary effect on the economy in the short-run with no long-run impact, while direct taxation harmed growth in both the short-run and long-run. Also Padda and Akram (2009) came up with similar findings when they test whether the effects of tax policies on the economic growth of Pakistan, India, and Sri Lanka have over the period 1973– 2008. They found out that the impact of tax rate changes is transitory and negative for short-term in Pakistan and India but Sri Lanka is positive for the first year and thereafter it has also a negative effect on economic growth. However, Canavire-Bacarreza et al. (2013) came up with a contrary view in evaluating the impact of the most important tax instruments of Latin American countries. Their results suggest that, for the most part, personal income tax does not have the expected negative effect on economic growth in Latin America. They also find small negative effects of corporate income tax on growth for individual countries, specifically Argentina, Mexico, and Chile. Finally, their results suggest that greater reliance on consumption taxes has significant positive effects on growth in Latin American in general.

Method of the Research

Unit root Tests

Based on the ADF and the Zivot Andrews Tests, the results of the unit root tests indicate that all the variables under consideration exhibit unit roots at different critical levels. However, some of the variables were found stationary in levels. These variables are only

found stationary after differencing once, thus implying that the variables are of mix-order of integration. The results of the ADF and the Zivot Andrews unit root tests are presented in Tables 1 and 2 respectively.

Table 1: ADF Unit Root Test Result

Variable (Log)	**At level t-stat**	**Critical value (5%)**	**Conclusion**	**First difference t-stat**	**Critical value (5%)**	**Conclusion**
RGDP	-3.132	-3.556	Non-Stationary	-4.524	-2.975	Stationary
ALF	-1.974	-3.556	Non-Stationary	-6.380	-2.969	Stationary
FDI	-2.641	-2.969	Non-Stationary	-5.492	-2.972	Stationary
TRD	-2.631	-3.556	Non-Stationary	-6.061	-2.969	Stationary
EXR	-4.553	-3.564	Stationary	-2.904	-2.972	Stationary
TREV	-3.608	-3.556	Stationary	-5.049	-2.969	Stationary
INF	-1.878	-2.972	Non-Stationary	-4.989	-2.972	Stationary
DINV	-2.692	-3.564	Non-Stationary	-5.202	-2.975	Stationary
ITAX	-2.407	-3.556	Non-Stationary	-3.737	-2.972	Stationary
GST	-3.354	-3.560	Non-Stationary	-4.221	-3.564	Stationary
NTR	-3.592	-3.564	Stationary	-4.439	-3.568	Stationary
INTrTAX	-3.998	-3.556	Stationary	-6.320	-3.560	Stationary

Table 2: Zivot Andrews' Unit Root Test Result

Variable(Log)	Year	Test Statistic (At Level)	Conclusion	Test Statistic (First Difference)	Year	Conclusion
RGDP	2003	-5.400	Stationary	-11.874	2005	Stationary
ALF	1990	-18.960	Stationary	-8.708	1992	Stationary
FDI	1995	-5.962	Stationary	-8.835	1991	Stationary
TRD	1997	-3.821	Non-stationary	-7.256	1989	Stationary
EXR	1989	-5.255	Stationary	-6.651	1993	Stationary
TREV	1997	-3.908	Non-Stationary	-6.169	1989	Stationary
INF	2000	-6.289	Stationary	-9.514	2003	Stationary
DINV	1997	-7.315	Stationary	-7.591	1998	Stationary
ITAX	1990	-5.242	Stationary	-7.175	1988	Stationary
GST	1989	-4.717	Non-Stationary	-8.475	1998	Stationary
NTR	1987	-7.836	Stationary	-6.960	1999	Stationary
INTrTAX	1996	-4.976	Non-Stationary	-8.643	1998	Stationary

Asymptotic critical values at 5%: -5.08

Bounds Cointegration Tests

Following the ADF, and Zivot Andrews unit root tests, we observed that the variables have a mixed combination of both I(0) and I(1) series with a combination of both levels and first difference stationarity, thus, exploring cointegration test becomes necessary Therefore equations were estimated to examine for the presence of a long-run relationship between the dependent variables and their explanatory variables respectively using the Bounds test to cointegration approach. The results are presented in Table 3.

Table 3: Bounds Test for Cointegration Result

Variable	**LTREV**	**LRGDP**	**LTAX**	**LGST**	**LNTR**	**LNTR**
Optimal lag structure	(1,2,0,0,0)	(2,0,0,1,0)	(1, 0,0,1, 0)	(1,0,1, 0,0)	(2,0,2,2,2)	(2,0,2,2,2)
F-statistics	21.479	9.492	2.119	3.338	57.557	57.557
Critical values	5%	5%	5%	5%	5%	5%
I(0)	2.86	2.86	2.86	2.86	2.86	2.86
I(1)	4.01	4.01	4.01	4.01	4.01	4.01
Outcome	F>I(1)	F>I(1)	F<I(1)	F<I(1)	F>I(1)	F>I(1)
Decision	Cointegration	Cointegration	No Cointegration	No Cointegration	Cointegration	Cointegration
Remarks	Estimate ECM	Estimate ECM	Estimate ARDL	Estimate ARDL	Estimate ECM	Estimate ECM

Table 4: Data Sources and Measurement

No	Variable	Measurement	Data Source	Expected Sign
1	ALF	Ages 15-64 including people who are currently employed and people who are unemployed but seeking work as well as first-time job-seekers expressed in millions	ILO & Stat. SL	+
2	TRD	The value of all goods and other market services provided to and receive from the rest of the world expressed in USD	WDI	+
3	RGDP	Nominal GDP at CPI divided by the GDP deflator expressed in USD	WDI	+
4	FDI	Direct investment equity flows in Sierra Leone expressed in USD.	WDI	+
5	DINV	Outlays on additions to the fixed assets of the economy plus net changes in the level of inventories expressed in USD	WDI	+
6	EXR	The rate at which the Leone is officially exchanged for the USD expressed in Leones	BSL	±
7	INF	Annual percentage change in the cost of acquiring a basket of commodities expressed in percentages	WDI	±
8	TREV	Money collected by the NRA through the imposition of levies and taxes on facilities, incomes, sale of goods and services, transfers of properties, and other domestic/international transactions expressed in USD	ICTD & NRA	+
9.	TR	The changes in the structure of one or more taxes or the entire tax system undertaken by the Sierra Leone government		+
10	ITAX	Taxes on income, profits, and capital gains expressed in USD	ICTD & NRA	+
11	GST	A value-added tax levied on most goods and services sold for domestic consumption expressed in USD	ICTD & NRA	+
12	NTR	Monies collected from royalties, licenses, fees, and charges expressed in USD	ICTD & NRA	+
13	ITrTAX	Customs duties and other charges on imports and exports expressed in USD.	ICTD & NRA	+

Source: Own compilation based on literature

Model Specification

Model One: Impact of tax reforms on Tax Revenue

Since cointegration was established after performing the bounds tests for LTREV, the conditional ARDL (p,q_1,q_2,q_3) long-run model for $LTREV_t$ is estimated by an ECM and the short-run dynamic parameters associated with the long-run estimates were obtained through the following specification:

$$\Delta LTREV_t = \mu + \sum_{i=1}^{p} \emptyset_i \Delta LTREV_{t-i} + \sum_{j=0}^{q_1} \lambda_j \Delta LALF_{t-j} + \sum_{k=0}^{q_2} \sigma_k \Delta LDINV_{t-k} + \sum_{l=0}^{q_3} \rho_l \Delta LTRD_{t-l} + \vartheta ecm_{t-1} + Rdummy + \varepsilon_t \quad \text{----------(1)}$$

Where L represents the natural logarithm; TREV denotes the tax revenue; ALF represents the Active Labor Force; DINV represents Gross Fixed Capital Formation; TRD represents Trade; and, RDummy represents Reformed Dummy variable taking zero (0) before the reforms which started in 2003 and one (1) after the reforms, and μ is a standard error term. ∅, λ, σ are the short-run dynamic coefficients of the model's adjustment long-run equation (convergence to equilibrium); $\emptyset$, λ, σ are the short-run dynamic coefficients of the model's adjustment long-run equation (convergence to equilibrium); $\vartheta = (1 - \sum_{i=0}^{p} \delta_i)$, speed of adjustment parameter; (the statistically significant and negative sign of ecm_{t-1} coefficient ϑ, implies that any long-run disequilibrium among dependent variables and several independent variables will converge back to the long-term equilibrium association.); $\vartheta ecm_{t-1} = (LTREV_{t-i} - \emptyset X_t)$, is the error correction term or the extracted residual from the regression of the long-run equation; and, $\emptyset_i$ =, long-run parameter.

Model Two: Effect of reform induced-tax revenue on the Real GDP

Since cointegration was established after performing the bounds tests for LRGDP, the conditional ARDL (p,q_1,q_2,q_3,q_4) long-run model for $LRGDP_t$ is estimated by an ECM and the short-run dynamic parameters associated with the long-run estimates were obtained through the following specification:

$$\Delta LRGDP_t = \alpha + \sum_{i=1}^{p} \varphi_i \Delta LRGDP_{t-1} + \sum_{j=0}^{q_1} \omega_j LTREVF_{t-j} + \sum_{k=0}^{q_2} \lambda_k LEXR_{t-k} + \sum_{l=0}^{q_3} \sigma_k \Delta LINF_{t-l} + \sum_{m=0}^{q_4} \rho_l \Delta LFDI_{t-m} + \vartheta ecm_{t-1} + \varepsilon_t$$

---------- (2)

Where L represents the natural logarithm; RGDP represents real gross domestic product; TREVF denotes the fitted value of Tax Revenue; EXR represents nominal Exchange Rate; INF represents the Inflation Rate (average annual % change consumer price index); FDI represents the Foreign Direct Investment (net inflows), and, u_i represent the error term which is assumed to be identically and independently normally distributed with zero-mean. ω, λ, σ = the short-run dynamic coefficients of the model's convergence to equilibrium; $\vartheta = (1 - \sum_{i=0}^{p} \delta_i)$, speed of adjustment parameter; (the statistically significant and negative sign of ecm_{t-1} coefficient ϑ, implies that any long-run disequilibrium among dependent variables and several independent variables will converge back to the long-term equilibrium association.); $\vartheta ecm_{t-1} = (Lrgdp_{t-1} - \emptyset X_t)$, is the error correction term or the extracted residual from the regression of the long-run equation; and φ =, long-run parameter.

Model Three: Effect of tax reform on the different tax handles

Effect of the tax reform on Income Tax (ITAX)

Since no long-run cointegration was established after performing the bounds tests for LITAX, the short-run model for $LITAX_t$ is estimated by an ARDL and the parameters were obtained through the following specification:

$$\Delta LITAX_t = \alpha_o + \alpha_1 LITAX_{t-1} + \alpha_2 LALF_{t-1} + \alpha_3 LDINV_{t-1} + \alpha_4 LTRD_{t-1} + RdUMMY + \varepsilon_t$$

---------- (3)

Where L denotes natural logarithm, ITAX represents Income Tax, ALF denotes active labor force, DINV represent Gross Fixed Capital Formation, TRD represent Trade, and RDummy denotes the reform dummy variable taking 0 before the reforms which started in 2003 and 1 after the reforms, and μ is a standard error term.

Effect of the tax reform on Goods and Services Tax (GST)

Since no long-run cointegration was established after performing the bounds tests for LGST, the short-run model for $LGST_t$ is estimated by an ARDL and the parameters were obtained through the following specification:

$$\Delta LGST_t = \alpha_o + \alpha_1 LGST_{t-1} + \alpha_2 LALF_{t-1} + \alpha_3 LDINV_{t-1} + \alpha_4 LTRD_{t-1} + RdUMMY + \varepsilon_t \quad (4)$$

Where L denotes natural logarithm, GST represents the Goods and Services Tax, ALF denotes active labor force, DINV represent Gross Fixed Capital Formation, TRD represent Trade, and RDummy denotes the reform dummy variable taking 0 before the reforms which started in 2003 and 1 after the reforms, and μ is a standard error term.

Effect of the tax reform on Non-Tax Revenue (NTR)

Since cointegration was established after performing the bounds tests for LNTR, the conditional ARDL (p,q_1,q_2,q_3,q_4) long-run model for $LNTR_t$ is estimated by an ECM and the short-run dynamic parameters associated with the long-run estimates were obtained through the following specification:

$$\Delta LNTR_t = \mu + \sum_{i=1}^{p} \emptyset_i \Delta LNTR_{t-i} + \sum_{j=0}^{q_1} \lambda_j \Delta LALF_{t-j} + \sum_{k=0}^{q_2} \sigma_k \Delta LDINV_{t-k} + \sum_{l=0}^{q_3} \rho_l \Delta LTRD_{t-l} + \vartheta ecm_{t-1} + Rdummy + \varepsilon_t \quad (5)$$

Where L denotes natural logarithm, NTR represents Non-Tax Revenue, ALF denotes Active Labor Force, DINV represent Gross Fixed Capital Formation, TRD represent Trade, and RDummy denotes the reform dummy variable taking 0 before the reforms which started in 2003 and 1 after the reforms, and μ is a standard error term. $\emptyset, \lambda, \sigma$ are the short-run dynamic coefficients of the model's adjustment long-run equation (convergence to equilibrium); $\vartheta = (1 - \sum_{i=0}^{p} \delta_i)$, speed of adjustment parameter; (the statistically significant and negative sign of ecm_{t-1} coefficient ϑ, implies that any long-run disequilibrium among dependent variables and several independent variables will converge back to the long-term equilibrium association.);

$\vartheta ecm_{t-1} = (LNTR_{t-i} - \emptyset X_t)$, is the error correction term or the extracted residual from the regression of the long-run equation; and, $\emptyset_i$ =, long-run parameter.

Effect of the tax reform on International Trade Tax (ITrTAX)

Since no long-run cointegration was established after performing the bounds tests for LITrTAX, the short-run model for $LITrTAX_t$ is estimated by an ARDL and the parameters were obtained through the following specification:

$$\Delta LITrTAX_t = \alpha_o + \alpha_1 LITAX_{t-1} + \alpha_2 LALF_{t-1} + \alpha_3 LDINV_{t-1} + \alpha_4 LTRD_{t-1} + RdUMMY + \varepsilon_t \quad (6)$$

Where L denotes natural logarithm, ITrTAX represent International Trade Tax, ALF denotes active labor force, DINV represent Gross Fixed Capital Formation, TRD represent Trade, and RDummy denotes the reform dummy variable taking 0 before the reforms which started in 2003 and 1 after the reforms, and μ is a standard error term.

Results, Analysis and Discussions

Long-run estimates with short-run dynamic coefficients when tax revenue is used as a dependent variable based on the ECM

Having established a cointegrating relationship among Tax Revenue, Active Labor Force, and Gross Fixed Capital Formation, the study then proceeds to estimate the long-run estimates of the short-run dynamic coefficients. The estimates are presented in Table 5:

Table 5: Long-run estimates with short-run dynamic coefficients when Tax Revenue is used as a dependent variable

Regressor	**Coefficient**	**Standard Error**	**t-Stat.**	**Prob(stat)**
Adj. Ltrev L1	-0.6224092	0.0777118	-8.01	0.000
LR				
Lalf	0.411886	0.1475049	2.79	0.009
Ldinv	0.0469195	0.0189267	2.48	0.019
Ltrd	0.7520074	0.0852563	8.82	0.000
RDummy	-0.0207955	0.1636549	-0.13	0.900
SR				
Lalf				
LD	-0.2937447	0.1888932	-1.56	0.131
Constant	0.4061497	1.378295	0.29	0.770
Diagnostic Tests	***Statistics***			
R-squared	0.9756			
Adj. R-squared	0.9694			
Durbin Watson stat	1.793228			
F-statistic	*21.479*			
Prob(F-statistic)	0.000			
White's test	35.99 (0.3753)			
Shapiro-Wilk W test	*0.114(0.455)*			
Ramsey RESET test	*1.46(0.2461)*			

Dependent variable: LTREV (1, 2, 0, 0, 0)

Interpretation: From Table 5, except for the Reform Dummy, all the other explanatory variables have positive signs with Trade exerting a huge significance in explaining Tax Revenue in Sierra Leone. However, the short-run dynamic coefficient of the Active Labor Force is negative and statistically significant at the 5 percent level. In addition, the estimated coefficient for the ECT reported in Table 5 is negative and statistically significant at the 5 percent level with the correct sign by nearly 62 percent of disequilibria from the previous year's shock on tax revenue converge back to the long-run equilibrium in the current year. From Table 4 also, the coefficient on Trade suggests that long-run changes in Trade have a positive and huge significant effect on Tax Revenue and that a percentage point increase in trade increases tax revenue by 0.75 percent. The result further indicates that the coefficient of long-run changes in the Active Labor Force exerts a positive impact on tax revenue to an extent that a percentage point increase in the Active Labor Force increases Tax Revenue by 0.41 percent, but in the short-run exert a negative impact to the extent that for every one percentage point increase in the Active Labor Force leads to a 0.29 percent decline in tax revenue. The Shapiro-Wilk test indicates that the data came from a normally distributed population, the DW-statistic shows no evidence of serial correlation suggesting that there is no autocorrelation problem in this model. From the outcome of the White test-statistic, we are also observed that there is no heteroscedasticity in the model. Using a p-value of 0.05, the RESET statistic shows that there are no omitted variables in this model and is sufficient to explain the relationship between tax revenue and the dependent variable when tested for functional misspecification, and the CUSUM plot indicates that the model is stable as it lies within the five percent boundary.

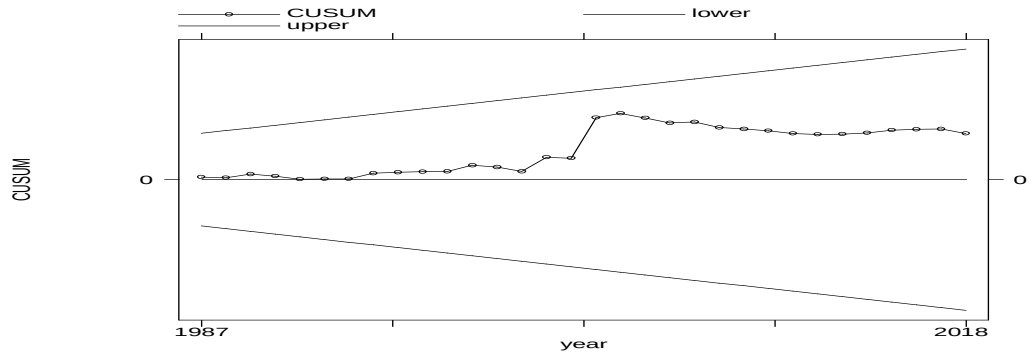

Figure 1: CUSUM statistic

Analysis: Tax reforms are necessary for developing countries to enhance administrative efficiency and ensuring better taxpayer compliance but the negative sign on the Reform

Dummy suggests that the reforms have not created much impact on the revenue mobilization as expected. This result was also evidenced in the report of Kargbo and Egwaikhide (2012) when they claimed that "the tax reforms have not been part of a concerted effort to reform the entire tax system but part of the efforts to raise more revenue through budget pronouncements affecting the tax rates or tax brackets." A typical example to substantiate this assertion is the huge amount of duty exempted by government authorities amidst the reforms. For example, in 2011, total exemptions amounted to Le586 billion (representing about 41 percent of total revenue collected and 5 percent of GDP). This situation revealed that despite the tax reforms, revenue collection is still compromised by state authorities posing a risk to the very essence of the tax reforms-revenue mobilization. Talierico (2003) supported this view that even if the tax structure has been simplified and a comprehensive strategy being designed but if the political will is not available then the chance of a successful tax reform drops dramatically. This suggests that government authorities should give the tax authority the autonomy in assessing and collecting taxes for enhanced revenue mobilization. The negative impact of the Active Labor Force on Tax Revenue in the short-run could be attributed to the level of the labor force participation rate in the country at the material time. Consistent with the data from the 2020 ILO estimates, between 2003 and 2018, total employment from Agricultural sector employment decline to 63 percent while employment in the services sector, and Wages and Salaried workers increased to 32 percent, and 10.4 percent respectively. From this analysis, it is safe to justify the negative effect of the Active Labor Force on Tax Revenue in the short run. The positive and significant impact of Trade on Tax Revenue could be as a consequence that Sierra Leone's trade liberalization scheme is operationalized by the implementation of the ASYCUDA ++ in 2010 to facilitate trade and investment, thus, leading to a high magnitude of import and trade tax revenue. According to Prithett and Sethi (1994), the higher tariff incentives the more importers apply for exemptions thereby affecting the productivity of the tax system but the lower the tariff in some areas become a reason to increase in the tax base by reducing the marginal benefit to avoid taxation, hence liberalization leads to a rise in revenue. The insignificant influence of Gross Fixed Capital Formation on Tax Revenue could be attributed to the increase in the company tax rate which has a crowding-out effect on investors, hence, depriving them of the required capital that will stimulate domestic private investment. This finding is consistent with the work carried out by Raza et al. (2011) in examining the impacts of corporate income tax and firm size on investment in Pakistan for six years for selected manufacturing companies respectively. Their

result shows that there is a negative relationship between Corporate Income Tax and Investment in Pakistan, while the firm size and investment reveal a positive relationship with each other.

Long-run estimates with short-run dynamic coefficients when real GDP is used as a dependent variable based on the ECM

Having established a cointegrating relationship among Real GDP, the predicted value of Tax Revenue, Exchange Rate, Inflation, and Foreign Direct Investment, the study proceeds to estimate the long-run estimates of the short-run dynamic coefficients. The estimates are presented in Table 6:

Table 6: Long-run estimates with short-run dynamic coefficients when Real GDP is used as a dependent variable

Regressor	**Coefficient**	**Standard Error**	**t-Stat.**	**Prob(stat.)**
ADJ.	-0.8274654	0.1555384	-5.32	0.000
Lrgdp				
L1				
LR				
Ltrev	0.2865926	0.0620773	4.62	0.000
Lexr	-0.0316246	0.0258208	-1.22	0.231
Linf	-0.2538081	0.1167481	-2.17	0.038
Lfdi	0.0077017	0.0105892	0.73	0.473
SR				
Lrgdp				
LD.	-0.1647988	0.1086818	-1.52	0.141
Linf				
D1.	0.4722055	0.0730331	6.47	0.000
Constant	3.911391	1.024176	3.82	0.001
Diagnostic Tests	***Statistics***			
R-squared	0.8361			
Adj. R-squared	0.7951			
Durbin Watson stat	2.0529			
F-statistic	*9.492*			
Prob(F-statistic)	*0.000*			

White's test		*36 (0.4215)*
Shapiro-Wilk Test	***W***	0.114(0.454)
Ramsey RESET test		*1.14(0.237)*

Dependent Variable: LRGDP (2, 0, 0, 1, 0)

Interpretation: The estimated coefficient for the ECT reported in Table 6 is negative and statistically significant at the 5 percent level with the correct sign by nearly 82 percent of disequilibria from the previous year's shock on economic growth converge back to the long-run equilibrium in the current year. From Table 6, it is evident that the results of the short-run dynamic coefficients of both Tax Revenue and FDI have the expected signs and are significant at the 5% level in the long run. This suggests that changes in Tax Revenue have a positive and statistically significant effect on real GDP at the 5% level to the extent that a one percent increase in Tax Revenue increases economic growth by approximately 0.3 percent in the long run. Also, the coefficient of the long-run changes in FDI exerts a positive but insignificant impact on real GDP in the long run as a one percent increase in FDI only increases economic growth by 0.01 percent. The Shapiro-Wilk test indicates that the data came from a normally distributed population, the DW statistic indicates evidence of no serial correlation suggesting that this model is not suffering from problems of autocorrelation. The outcome of the White test shows that there is no heteroscedasticity in the model. Using a p-value of 0.05, the RESET statistic shows there are no omitted variables in this model and that the regression model is sufficient to explain the relationship between real GDP and the dependent variables when tested for functional misspecification, and the CUSUM plot indicates that the model is stable as it lies within the five percent boundary.

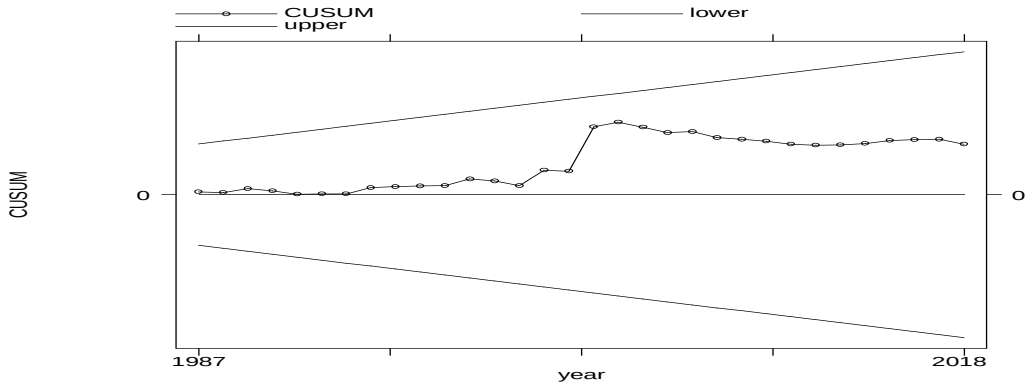

Figure 2: CUSUM statistic

Analysis: Amidst the other factors, tax rates can also determine the attractiveness of a location for undertaking investments. Coupled with other fundamental factors which have the potential to mitigate FDI inflows in Sierra Leone, the results of this study could have been a consequence of increased tax rates during the tax reform agenda which necessitated an increase in revenue mobilization but discourage FDI as rational investors might not want to invest in a country with an unfavourable tax regime. A study to assess the impact of changes in tax rates on FDI inflows in both Australia and the USA, Wijeweera, and Mounter (2007) found out that a reduction in tax rates leads to an increased level of FDI in Australia and a one percent increase in corporate tax rates leads to a one percent decline in FDI inflow for the United States. The negative coefficient of real GDP in the short-run suggests that the previous year's growth harms the current year's GDP. The ECT coefficient indicates that about 17 percent of the previous year's shock is unaccounted for in the long-run equilibrium of the current year. This finding is consistent with the works of Padda and Akram (2009) when they study the impact of tax reforms on the economic growth of three Asian countries. They found out that the impact of tax rate reforms is transitory and negative in the short-run for Pakistan and India but Sri Lanka is positive for the first year and thereafter also harms economic growth. The positive coefficient of the Inflation Rate in the short-run contradicts the traditional growth theories of Inflation, and, reflects the fact that below a given level of the inflationary rate, inflation is necessary for the economy to grow as explained in the Quantity Theory of Money. According to Milton Friedman (1968), the effective use of monetary policy may increase employment but cause inflation, but an increase in nominal wage translates into an expected rate of inflation, causing a reduction in the real wages, thus enabling firms to increase labor demand, hence, the need for stable money supply with a minimal government role to correct the market imbalance. The negative sign of the Exchange Rate, in the long run, is consistent with the theory of macroeconomic stability and growth nexus as depreciation in the local currency will put pressure on the inflationary rate causing the nominal GDP to be deflated when consumer prices increase, thereby strengthening the argument of no positive relationship.

Long-run estimates with short-run dynamic coefficients when NTR is used as a dependent variable based on the ECM

Having established a cointegrating relationship among NTR, the Active Labor Force, Gross Fixed Capital Formation, Trade, and the reform dummy, the study proceeds to estimate the

long-run estimates of the short-run dynamic coefficients, and the results are presented in Table 7:

Table 7: Long-run estimates with short-run dynamic coefficients when LNTR is used as a dependent variable

Regressor	**Coefficient**	**Standard Error**	**t-Stat.**	**Prob(stat.)**
Adj. LNTR L1	-0.7084577	0.0526384	-13.46	0.000
Long-Run				
Lalf	3.122731	0.5198299	6.01	0.000
Ldinv	0.8426417	0.0995789	8.46	0.000
Ltrd	0.3553223	0.3357771	1.06	0.301
dum_2003	-0.7127231	0.5469346	-1.3	0.205
Short-Run				
LNTR LD	-0.1230205	0.0374799	-3.280	0.003
Ldinv D1	0.6307225	0.0761641	8.280	0.000
Ltrd LD	-0.7000189	0.3413905	-2.050	0.052
dum_2003 D1	1.485839	0.5940107	2.500	0.020
Constant	-26.32299	5.832736	-4.510	0.000
Diagnostic Tests	***Statistics***			
R-squared	0.9943			
Adj. R-squared	0.9913			
Durbin Watson stat	1.568198			
F-statistic	*57.557*			
Prob(F-statistic)	*168.32*			
White's test	*36 (0.4215)*			
Ramsey RESET test	*2.26 (0.158)*			

Dependent Variable: LNTR (2, 0, 2, 2, 2)

Interpretation: The core observation from Table 7 is that except for the reform dummy, all the variables have the same expected positive signs and are significant in explaining Non-Tax Revenue in Sierra Leone in the long run. Trade has a minimal effect while the Active Labor Force has the largest effect on Non-Tax Revenue in the long run. However, in the short run, the coefficient of the Non-Tax Revenue and International Trade were negative. Table 7 reveals that the ECT is negative and statistically significant at the 5% level as expected with the correct sign suggesting that about 71 percent of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year. Apparently, on average, ceteris paribus, a percentage change in Non-Tax Revenue is associated with a 0.71 percent decline in Non-Tax Revenue at the 5% level of significance. Table 7 further indicate that in the long run, a percentage point change in Trade is associated with a 0.36 percent increase in Non-Tax Revenue, and, a percentage point change in the Active Labor Force is associated with a 3.1 percent increase in Non-Tax Revenue while a percentage point change in Gross Fixed Capital Formation is associated with a 0.84 percent increase in Non- Tax Revenue. In the short run, a percentage point change in the tax reform is associated with a 1.49 percent increase in the Non-Tax Revenue, however, a percentage point change in Trade is associated with a 0.7 percent decline in Non-Tax Revenue. But a percentage point change in Gross Fixed Capital Formation is with a 0.63 percent increase in Non-Tax Revenue.

Analysis: Though the reforms created some positive effects on the NTR in the short run, this effect failed to persist into the future. The reason could have been as a result of the legislation creating the NTRD which denied the NRA from "assessing" royalties, and other fees from taxpayers as contained in the (NRA Act 2002). According to the NRA Act 2002, the Authority is mandated to only collect taxes and not assess tax from this tax handles. In addition, royalty payments dropped drastically in 2014 and 2015 during the twin shocks of the Ebola and the fall in commodity prices of the Iron Ore which saw the Non-Tax Revenues reduced by 19 percent from Le352Bn in 2014 to Le286Bn in 2015.

Short-run estimates when ITAX was used as a dependent variable based on the ARDL

Since no long-run cointegrating relationship was established among ITAX, the Active Labor Force, Gross Fixed Capital Formation, Trade, and the reform dummy, the study proceeds to estimate the short-run estimates, and the results are presented in Table 8:

Table 8: Short-run estimates for LITAX

Regressor	**Coefficient**	**Standard Error**	**t-Stat.**	**Prob(stat.)**
LITAX L1	0.8595222	0.0867792	9.900	0.000
Lalf	0.4818275	0.7285976	0.660	0.513
Ldinv	0.0397177	0.0486968	0.820	0.421
Ltrd L1	-0.7999843	0.3866894	-2.070	0.047
dum_2003	0.066604	0.4358068	0.150	0.880
Constant	-5.194748	10.34483	-0.500	0.619
Diagnostic Tests	***Statistics***			
R-squared	0.9747			
Adj. R-squared	0.9696			
Durbin Watson stat	1.991867			
F-statistic	*2.119*			
Prob(F-statistic)	*192.53*			
White's test	*34.66 (0.1193)*			
Ramsey RESET test	*16.29 (0.642)*			

Dependent Variable: LITAX (1, 0, 0, 1, 0)

Interpretation: The core observation from Table 8 is that except for the coefficient of international trade, all the variables have the same expected positive signs and are significant in explaining Income Tax in Sierra Leone. Gross Fixed Capital Formation has a minimal effect while the Active Labor Force has the largest effect on Income Taxes. Table 8 reveals that the tax reform was positive in the short-run as a percentage point change in the dummy variable is associated with a 0.07 percent increase in Income Tax at the 5 percent level of significance. Following this, a percentage point change in the active labor force is associated with a 0.48 percent increase in Income Tax, and, a percentage point change in Gross Fixed Capital Formation is associated with a 0.04 percent increase in Income Tax at the 5 percent level of significance, while a percentage point change in international trade is associated with a 0.79 percent decline in Income Tax at the one percent level of significance.

Analysis: The positive effect of the reform on the Income Taxes cannot be overemphasized as the reforms brought some automated systems such as the DTIS, which profiled all domestic taxpayers from registration to filing of returns thereby increasing compliance. Despite this, the reforms also brought in a review in the income tax rates to increase domestic

tax. For almost two decades there have been series of tax rates fluctuations amidst the reforms. The PAYE tax bracket was 25-40% between the periods 2000 to 2010, though it was reviewed downwards to 15%-30% between 2011 and 2015, it was also reviewed upwards to 35% between 2016 and 2018. Despite this, Withholding Tax for both local and foreign contractors was increased from 5% in 2000 to 5.5%, and 10% to 10.5% in 2016 respectively. Kargbo and Festus (2012) claims that the "tax reforms have not been part of a concerted effort to reform the entire tax system but part of the efforts to raise more revenue through budget pronouncements affecting the tax rates or tax brackets".

Short-run estimates when GST was used as a dependent variable based on the ARDL

Since no long-run cointegrating relationship was established among GST, the Active Labor Force, Gross Fixed Capital Formation, Trade, and the reform dummy, the study proceeds to estimate the short-run estimates, and the results are presented in Table 9:

Table 9: Short-run estimates for LGST

Regressor	**Coefficient**	**Standard Error**	**t-Stat.**	**Prob(stat.)**
LGST L1	0.7732861	0.1760668	4.39	0.000
Lalf	-0.9823172	2.919308	-0.34	0.739
Ldinv	0.1295158	0.3246574	0.4	0.693
Ltrd	-0.2097673	1.382525	-0.15	0.88
dum_2003	3.123798	2.456204	1.27	0.213
Constant	26.82937	39.29805	0.68	0.500
Diagnostic Tests	***Statistics***			
R-squared	*0.7166*			
Adj. R-squared	*0.6599*			
Durbin Watson stat	*2.019313*			
F-statistic	*3.338*			
Prob(F-statistic)	*12.64*			
White's test	*34.00 (0.1351)*			
Ramsey Test	*2.06 (0.1261)*			

Dependent Variable: LGST (1, 0, 1, 0, 0)

Interpretation: The core observation from Table 9 is that except for the Active Labor Force and International Trade, Gross Fixed Capital Formation has the expected positive sign and is

significant at the 5 percent level in explaining GST in Sierra Leone. The findings from Table 9 indicate that the tax reform was positive in the short-run as a percentage point change in the dummy variable is associated with a 3.12 percent increase in the GST at the 5 percent level of significance. Following this, a percentage point change in Gross Fixed Capital Formation is associated with a 0.13 percent increase in GST, but a percentage point change in the Active Labor Force is associated with a 0.98 percent decline in the GST at the 5 percent level of significance, while a percentage point change in International Trade is associated with a 0.21 percent decline in the GST at the five percent level of significance.

Analysis: Though Mureșan et al. (2014) claim that a high VAT rate may constraint the possibility of consumption and investment, but the implementation of the GST in 2010 has helped to simplify and streamline the collection of indirect taxes and also reduce the administrative cost borne by the Authority and taxpayers. The GST replaced seven existing taxes (import sales tax, domestic sales tax, entertainment tax, restaurant tax, food tax, message tax, hotel accommodation tax, and professional services tax). Before the implementation of the GST, the collection of these seven taxes was very complex and difficult as the collection method was largely manual which most often than not resulted in tax avoidance and evasion.

Short-run estimates when LINTrTax was used as a dependent variable based on the ARDL

Since no long-run cointegrating relationship was established among LINTrTax, the Active Labor Force, Gross Fixed Capital Formation, Trade, and the reform dummy, the study proceeds to estimate the short-run estimates, and the results are presented in Table 10:

Table 10: Short-run estimates for LINTrTax

Regressor	Coefficient	Standard Error	t-Stat.	Prob(stat.)
LITrTax L1	0.7727042	0.1816408	4.250	0.000
Lalf	-0.9533188	2.8866	-0.330	0.744
Ldinv L1	0.120507	0.3173612	0.380	0.707
Ltrd	-0.0338415	1.332289	-0.030	0.980
dum_2003	3.06589	2.407491	1.270	0.213
Constant	23.40161	40.21392	0.580	0.565

Diagnostic Tests	*Statistics*
R-squared	0.7338
Adj. R-squared	0.6805
Durbin Watson stat	*2.020716*
F-statistic	*3.199*
Prob(F-statistic)	*13.78*
White's test	*32.09 (0.1902)*
Ramsey Test	*2.14 (0.1163)*

Dependent Variable: LINTrTax (1, 0, 1, 0, 0)

Interpretation: The core observation from Table 10 is that except for the Active Labor Force and International Trade, Gross Fixed Capital Formation has the expected positive sign and is significant at the 5 percent level in explaining GST in Sierra Leone. The findings from Table 10 indicates that the tax reform was positive in the short-run as a percentage point change in the dummy variable is associated with a 3.06 percent increase in the Trade Taxes at the 5 percent level of significance. Following this, a percentage point change in Gross Fixed Capital Formation is associated with a 0.12 percent increase in Trade Taxes, but a percentage point change in the Active Labor Force is associated with a 0.95 percent decline in the Trade Taxes at the 5 percent level of significance, while a percentage point change in International Trade is associated with a 0.03 percent decline in the Trade Taxes at the five percent level of significance.

Analysis: The positive effect of the reform on the Trade taxes reflects the expectations of the reforms implemented at the Customs and Services Department. Before 2010, the collection of customs duties and other related charges were manually done and there were serious bottlenecks in the implementation of the trade facilitation scheme as it takes nearly a week or more to clear goods at the ports. However, the implementation of the ASYCUDA++ in 2010 brought in an online declaration of goods with a reduction of the number of days in clearing goods to twenty-four hours per declaration, thus, increasing revenues from trade taxes, and also facilitate the easy movement of goods in and outside the country.

In terms of diagnostics tests, the DW-statistics of these models shows no evidence of serial correlation suggesting that there is no autocorrelation problem in this model. From the outcome of the White test statistics, we are also observed that there is no heteroscedasticity in the model. Using a p-value of 0.05, the RESET statistics show that there are no omitted variables in these models and are sufficient to explain the relationship between respective tax

handles and their explanatory variables when tested for functional misspecification. And the CUSUM plot confirms that the model is stable as it lies within the 5 percent boundary.

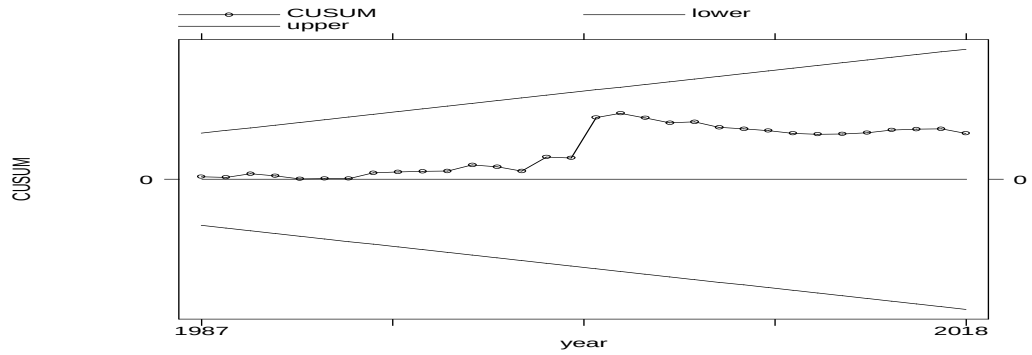

Figure 3: CUSUM statistic plot for tax handles

Conclusion and Recommendation

The study investigated the impact of tax reforms on tax revenue, and, the effect of the reformed- induce tax revenue on the economic growth of Sierra Leone over the period, 1981 to 2018. The study found out that the tax reforms created a positive effect on the three tax handles (ITAX, GST, and INTrTax) for a short period but a negative effect on the NTR in the long run. It can also be inferred from the results that short-run coefficients of the reforms are higher than the long-run coefficients and that the statistical significance of the ECT showed the speed of adjustment in the tax system. This trend possibly explains the presence of administrative lags in the tax collection system as tax policy guidelines announced in budget speeches normally require time to be implemented. Generally, despite the fact tax revenue fosters economic growth, the tax reform does not create the much-expected effect on the overall tax revenue productivity in the long run. Thus, not all tax reforms could be productive. Based on the findings of this paper, some suggestions for policy considerations were listed below:

- Tax reforms must be carefully developed with a comprehensive strategy before undertaking them; and, tax authorities must think through the pace and sequences of the tax reforms, with all levels of government exhibit a strong political will to modernize the tax administration;

- In ensuring that private investments are allowed to thrive, fiscal policy should aim at channelling resources towards the private sector, production, while providing tax incentives to attract foreign direct investment;
- To increase the tax base and escape from a single source of domestic revenue, the government should adopt policies that would diversify the economy to create more employment that will enhance domestic production, stimulate exports that will mitigate the negative relationship effects of exchange rate on the economy; and
- To increase more taxes from the NTRD, the government should review the 2002 NRA Act and give the NRA the mandate of assessing and collecting taxes from royalties payments, licenses, fees, and other charges being currently assessed by the respective MDAs in the country.

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