

**GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH: EMPIRICAL  
EVIDENCE FROM SIERRA LEONE**

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# **GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM SIERRA LEONE**

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## **Abstract**

The paper investigates the effects of government expenditure on economic growth in Sierra Leone. Annual data from 1980 to 2019 is employed to test for unit root and estimate an autoregressive distributed lag model as cointegration is found. A model with total expenditure is estimated and a model that disaggregates total expenditure into recurrent and capital is also estimated. The results show that total expenditure has a positive effect on growth, capital expenditure has a positive effect while recurrent expenditure has a negative effect. Thus, inefficient allocation and use of government resources coupled with inadequate capital investment is not conducive to growth. It is a good option for government expenditures to be directed more into efficient and productive resources that promote growth and sustainable development.

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## 1. Introduction

Globally, government expenditure remains a significant tool for delivering on the growth and development objectives of economies. Government expenditure is usually used as a powerful fiscal instrument to increase income through increase in consumption and investment. The efficiency with which governments provide these goods and services is however important for macroeconomic stabilization. Government development expenditures are those devoted for the purposes of carrying out various governmental projects that build capital (physical and human), with the ultimate goal of increasing growth and improving welfare. Government expenditure directed to crucial areas such as education, infrastructure and health, among others, are therefore expected to lead to expansion in aggregate output. Therefore, in developing countries like Sierra Leone government expenditure is also beneficial towards stimulating economic growth when financial resources are conserved from external sources without the distortion of private sector growth. For instance, Onuoha, & Okoye, 2020, Akrani (2011b), Cooray (2009), Ranja and Sharma (2008) and Abdullah (2000), among others maintained that an expansion in government expenditures will significantly and positively impact economic growth. That is, an increase in government expenditure tailored towards socio-economic and physical infrastructures supports economic growth. Government spending can increase labour productivity and output through increased spending in activities in health, education, roads, energy sectors, among others. It is also the case that government expenditure can be more productive in driving growth when its financing does not crowd out the private sector, given the strong role of the private sector in economic activities, which is the case when the private sector is more productive than the public sector.

In Sierra Leone, the thrust of government expenditure policy is to promote sustainable economic growth and reduce poverty. Hence, government expenditure over the years has continued to increase to support security, infrastructure, agriculture, and human capital development, among others, to meet the medium to long term objective of improving social welfare.

In Sierra Leone, over the years government has increased expenditure to achieve sustainable growth and reduce unemployment. Real GDP growth in the 1980 was slow while the 1990s experienced negative growth rates while there were a few cases of positive but slow growth rates, which were mainly due to the rebel war that destroyed capital and instilled sustained

macroeconomic uncertainty. The first decade of the 2000s experienced strong growth, due to the implementation of several rehabilitation projects and the gradual reduction of macroeconomic uncertainty after the war was declared over in 2002. This was due to the knowledge that the war had ended. This was the case especially before the financial crisis (2008-2009). After the financial crisis, growth was strongest in 2013 when the country was in iron ore boom, with GDP growth registering about 20.1 %. This was however unsustainable as in 2014, the collapse in iron ore prices and the Ebola Virus Disease led to a contraction of the economy with a decline of about 21.7 % in 2015. The economy started recovery in 2016. However, the recovery dissipated in 2020 due to the impact of the COVID-19, with output contracting by about 20.2 %. In 2020 and 2015, which were health crisis periods and the economy recorded extreme negative growth rates, there were strong government interventions and hence increased expenditure to deal with the crises.

The trend in government expenditure shows that during the contractionary periods of the economy, government expenditure observed growth and the share of government expenditure in output increased. For example, in 2013 government expenditure was 15.7 percent of GDP which was lower than the previous year, due to the boom in iron ore. When the economy contracted in 2015, government expenditure was 20.7 percent of GDP and it rose further to 24.9 percent of GDP in 2021, when government strongly cared for removal of the economy from recession by stimulating aggregate demand.

In light of the observed trend and the role of government expenditure as a fiscal policy tool, the paper seeks to investigate the effect of government expenditure and economic growth in Sierra Leone.

The rest of the paper is organized as follows: section 2 is the methodology, section 3 discusses the results and section 4 is the conclusion.

## 2. Methodology

### 2.1 The Model

This study closely follows the Keynesian growth model which indicates that an expansion of government expenditure stimulates economic activities. A model of growth is specified using government expenditure and some control variables. These control variables are exchange rate, private consumption and debt services. We however go further to disaggregate government expenditure into recurrent and capital expenditure to determine their independent effects on economic activities in Sierra Leone. The disaggregated model therefore examines the role of capital expenditure (CAPEXP) and recurrent expenditure (RECUEXP) on economic activities. Capital or development expenditure for example, expenditure on education, health and infrastructures are expected to boost economic growth in the long run while recurrent expenditure may not have a long run positive growth effect.

In light of this, the theoretical model is represented in equation (1) and in linear form, the model is given in equation (2).

$$RGDP = f(GEX, DEBT, EXCH, PRICON, D) \quad (1)$$

Where, RGDP is the real gross domestic product, GEX is expenditure, DEBT is debt services, EXCH is nominal exchange rate, PRICON is private consumption and D is dummy variable taking into consideration the war period from 1991-2000. In log-linear form, the model is given as follows.

$$lRGDP_t = \beta_0 + \beta_1 lTEX_t + \beta_2 lDEBT_t + \beta_3 lEXCH_t + \beta_4 lPRICON_t + \theta D + \varepsilon_t \quad (2)$$

Where,  $\beta$ s and  $\theta$  are the unknown coefficients of the variables,  $\varepsilon$  is the error term and t is time subscript.

Equation (3) gives the linear form of the disaggregate model.

$$lRGDP_t = \beta_0 + \beta_1 lCAPEXP_t + \beta_2 RECUEXP_t + \beta_3 lDEBT_t + \beta_4 lEXCH_t + \beta_5 lPRICON_t + \theta D + \varepsilon_t \quad (3)$$

## 2.2 Estimation Method

### Unit Root and Cointegration Tests

In order to investigate the stationarity properties, we employed the Augmented Dickey-Fuller (ADF) and Phillip and Perron (PP) tests for unit root. The unit root test results are used to determine whether the series are integrated of the same order, or different orders. If the variables are non-stationary at level, but stationary in first difference (if they are I(1)), cointegration test can be performed with ARDL or VAR approach. However, if some of the variables are stationary in level and some are stationary in first difference form, then to do the cointegration test the ARDL approach is used, given its virtues.

After establishing that the series are stationary at level and some are stationary at first difference level I(1), the most appropriate cointegration test to determine the existence of a long run relationship between government expenditure and economic growth is the autoregressive distributed lag model and the bound test approach developed by Paseran, Shin and Smith (2001). Since the Autoregressive Distributed Lag (ARDL) model is the appropriate approach when there is mixed order of integration. This approach is used given the results of the unit root tests. The model can be written in a modified version for equation (2) as:

$$\begin{aligned} \Delta lRGDP_t = & \beta_0 + \sum_{i=1}^{\tau} \beta_1 \Delta lRGDP_{t-i} + \sum_{i=1}^{\tau} \beta_2 \Delta lTEX_{t-i} + \sum_{i=1}^{\tau} \beta_3 \Delta lDEBT_{t-i} \\ & + \sum_{i=1}^{\tau} \beta_4 \Delta lEXCH_{t-i} + \sum_{i=1}^{\tau} \beta_5 \Delta lPRICON_{t-i} + \alpha_1 lRGDP_{t-1} \\ & + \alpha_2 lTEX_{t-1} + \alpha_3 lDEBT_{t-1} + \alpha_4 lEXCH_{t-1} + \alpha_5 lPRICON_{t-1} + \theta D + \varepsilon_t \end{aligned}$$

For equation (3), the ARDL version is:

$$\begin{aligned} \Delta lRGDP_t = & \beta_0 + \sum_{i=1}^{\tau} \beta_1 \Delta lRGDP_{t-i} + \sum_{i=1}^{\tau} \beta_2 \Delta lCAPEXP_{t-i} \\ & + \sum_{i=1}^{\tau} \beta_3 \Delta lRECUEXP_{t-i} + \sum_{i=1}^{\tau} \beta_4 \Delta lDEBT_{t-i} + \sum_{i=1}^{\tau} \beta_5 \Delta lEXCH_{t-i} \\ & + \sum_{i=1}^{\tau} \beta_6 \Delta lPRICON_{t-i} + \alpha_1 lRGDP_{t-1} + \alpha_2 lCAPEXP_{t-1} \\ & + \alpha_3 lRECUEXP_{t-1} + \alpha_4 lDEBT_{t-1} + \alpha_5 lEXCH_{t-1} + \alpha_6 lPRICON_{t-1} + \theta D \\ & + \varepsilon_t \end{aligned}$$

The ARDL is estimated using the following steps, first we identify the appropriate lag length of the models through the various criteria such as AIC, SBC, HQC and LR statistics. Secondly the bounds test is conducted to determine long run relationship of the variables from F-statistics which will be written in equation (1). Hence, the null hypothesis ( $H_0 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$ ) of no cointegration when the coefficients are equal to zero, and alternative hypothesis which states that the coefficients have a long run relationship and that are not equal to zero ( $H_1 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 \neq 0$ ). Therefore, if F-statistics is greater than the upper critical value we reject the null of no cointegration and conclude that there exists a long run relationship, whilst if null hypothesis is less than the lower critical value we do not reject the null of no cointegration. Consequently, if there exists a long run relationship between government expenditure and economic growth (i.e. for equation (2)) and disaggregated expenditure components of expenditure and economic growth (i.e. for equation (3)) we further estimate the short-run error correction ARDL model. The ECM approach is written as for both model one and model two:

$$\begin{aligned} \Delta IRGDP_t = & \beta_0 + \sum_{i=1}^{\tau} \beta_1 \Delta IRGDP_{t-i} + \sum_{i=1}^{\tau} \beta_2 \Delta ITEX_{t-i} + \sum_{i=1}^{\tau} \beta_3 \Delta IDEBT_{t-i} \\ & + \sum_{i=1}^{\tau} \beta_4 \Delta IEXCH_{t-i} + \sum_{i=1}^{\tau} \beta_5 \Delta IPRICON_{t-i} + \partial ECM_{t-1} + \varepsilon_t \end{aligned}$$

$$\begin{aligned} \Delta IRGDP_t = & \beta_0 + \sum_{i=1}^{\tau} \beta_1 \Delta IRGDP_{t-i} + \sum_{i=1}^{\tau} \beta_2 \Delta ICAPEXP_{t-i} \\ & + \sum_{i=1}^{\tau} \beta_3 \Delta IRECUEXP_{t-i} + \sum_{i=1}^{\tau} \beta_4 \Delta IDEBT_{t-i} + \sum_{i=1}^{\tau} \beta_5 \Delta IEXCH_{t-i} \\ & + \sum_{i=1}^{\tau} \beta_6 \Delta IPRICON_{t-i} + \emptyset EC_{t-1} + \varepsilon_t \end{aligned}$$

Where ECM and EC are the error correction term for model one and model two respectively. Also,  $\partial$  and  $\emptyset$  are the coefficients of the error correction terms for the two models in that order. Post diagnostic tests are conducted, which are serial correlation, functional form, normality, and heteroscedasticity tests.

## 2.3 The Data

The study utilizes total expenditure and further disaggregates total expenditure into recurrent expenditure and capital expenditure. Real gross domestic product is used as the measure of economic activities and its growth represents economic growth. Annual data from 1980 to 2019, which is chosen based on data availability for all the variables at the time of model estimation, is used. Data is from the World Bank's World Development Indicators (WDI) and the IMF's International Financial Statistics (IFS).

## 3. Discussions of Results

### 3.1 Descriptive Statistics

Table 1 shows the descriptive statistics of model variables, which shows that for real GDP, total expenditure, recurrent expenditure and debt service, the mean is more than the median. Thus, they are positively skewed, implying that for more than half of the sample period, the actual values are below their mean values. In the case of capital expenditure, private consumption and exchange rate, the median values are more than the mean values (they are negatively skewed). Thus, more than half of the sample period, the actual values are above their mean values.

**Table 1: Summary Descriptive Statistics of the variables**

	<b>LRGDP</b>	<b>TEXP</b>	<b>CAPEXP</b>	<b>RECUREXP</b>	<b>DEBTSERV</b>	<b>PRICON</b>	<b>LEXCH</b>
Mean	29.31066	100.3831	3.631465	9.575750	2.032467	90.03905	6.176302
Median	29.20161	99.71742	4.096474	9.510000	1.435252	91.22522	7.545913
Maximum	29.99979	137.6674	15.57220	14.33000	8.872757	107.7322	9.106115
Minimum	28.87805	77.31078	-4.079720	6.310000	0.212330	71.66696	0.048597
Std. Dev.	0.343161	12.53407	3.334305	1.865859	1.898945	8.785959	2.834833



### 3.2 Unit Root and Cointegration Tests

Table 2 shows the results of the unit root tests. The Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests are employed. Real gross domestic product, total expenditure and private consumption are stationary only after first differencing (they are I (1)). Recurrent expenditure, capital expenditure, debt services and nominal exchange rate are stationary in levels (they are I (0)). This shows that, the order of integration of the variables is a mixture of I (1) and I (0) variables. In this regard, to determine the existence or otherwise of cointegration, the application of the autoregressive distributed lag (ARDL) model approach is more appropriate for the cointegration tests.

**Table 2: Results of the Unit Root Tests**

Variables	ADF Test		PP Test		Conclusion
	Level	First Diff	Level	First Diff	
RGDP	0.3298	-5.6653***	0.2705	-5.6688***	I (1)
TEXP	-1.3350	-8.7652***	-1.8067	-9.0312***	I (1)
RECUREXP	-2.9440**	-7.8355***	-2.9440**	-9.6471***	I (0)
CAPEXP	-3.8054***	-8.2395***	-3.728***	12.2763***	I (0)
DEBTSERV	-2.9901**	-7.7964***	-2.8887	-8.0973***	I (0)
EXCH	-4.2193***	-6.9432***	-3.8411***	-3.0139**	I (0)
PRICON	-1.6177	-10.3873***	-2.8703	10.9033**	I (1)

\*\*, \*\*\* indicates, 5% and 1% significant level respectively

Table 3 shows the results of the cointegration test, which is meant to determine the existence of a long run relationship between real GDP and the model variables. This result is presented for the case with aggregate total expenditure and the disaggregated total expenditure (into recurrent and current).

Table 3: Results of the Cointegration Test

Critical value	(1) Aggregate Model		(2)		
		I (1)	I (0)	I (1)	I (0)
<b>Model 1</b> F-statistic = 7.207920 k = 4	10%	3.52	2.45	3.35	2.26
	5%	4.01	2.86	3.79	2.62
<b>Model 2</b> F-statistic = 6.616198 k = 5	2.5%	4.49	3.25	4.18	2.96
	1%	5.06	3.74	4.68	3.41

The F- statistic of the result for model two is greater than both the upper bound and lower bound critical values and confirms that there is cointegration. That is the F- statistic (6.616198) is greater than the 1% (4.68) and 5% (3.79) significance levels. Hence, we conclude that there is long run relationship between disaggregated government expenditure (capital and recurrent expenditure) and economic growth. Equally, model one bounds test indicated that the F-statistic (7.207920) is greater than the 10% (3.52%), 5% (4.01) and 1% (5.06) significance level. Hence, the F-statistic is higher than both the upper bound and lower bound. Therefore, we confirm there exist a cointegration between total government expenditure and economic growth. Then, proceed with the estimation of long run and short run coefficients of the variables of model one and model two using the ARDL approach. Table 4 shows the ARDL model using Akaike Information Criterion (AIC), Schwarz information criterion and Hannan-Quinn information criterion lag length selection for both model one (2, 2, 1, 0, 2) and model two (1, 2, 2, 2, 0,2).

Table 4 shows the ARDL Long run Estimated Results

Model One					Model Two				
Variables	Coefficients	t-statistics	Standard error	P-values	Variables	Coefficients	t-statistics	Standard error	P-values
C	10.199036	1.534037	6.648492	0.0000	C	24.146064	3.550510	6.800731	0.0000
TEXP	0.029743	0.005724	5.196134	0.0000	RECUREXP	-0.051620	0.013178	3.917122	0.0008
DEBT	0.000250	0.029234	0.008551	0.9932	CAPEXP	0.033848	0.006318	5.357046	0.0000
EXCH	0.064629	0.018055	3.579487	0.0014	DEBT	-0.029288	0.013237	2.212641	0.0381
PRICON	-0.026140	0.007553	3.460817	0.0019	EXCH	0.000155	0.000017	8.883917	0.0000
D	-0.393846	0.117215	3.360032	0.0025	PRICON	-0.002646	0.002238	1.182254	0.2503
					D	-0.078259	0.045852	1.706796	0.1026

Source: Authors' compilation from Eviews

Results in Table .. above shows the results for both model one and model two. In model one, total government expenditure and all the variables except debt services are statistically significant at 1 percent. However, the debt services sign is positive and is insignificant. In model two with disaggregated expenditure components, the results indicated that both recurrent and capital expenditure, exchange rate have the expected signs and are significant at 1 percent. Whilst, private consumption and dummy have the expected signs but are insignificant.

Model one long run analysis from table 4, shows that total government expenditure has significant positive effect on economic growth, such that a 1 percent increase in total expenditure will lead to a 0.03% increase in economic growth. The positive relationship between government expenditure and economic growth is consistent with the Keynesian theory that spending on various growth sectors of the economy will have a multiplier effect on creating higher disposable income and enhancing the private sector. Also it helps mitigate challenges relating to economic recession by stimulating economic growth. The findings of this study is consistent with Beraldo et al., (2009) and Wang (2011), Kimaro et al (2017) etc.

Results from model two in table 4 show that recurrent expenditure negatively influence economic growth in the long run and highly significant. This implies that a 1 percent increase in recurrent

expenditure will lead to a 0.05% reduction in economic growth. This confirms Barro (1990) endogenous growth model assumption that considers recurrent expenditure as a consumption component of government expenditure. Similarly, the study provides support to the findings of Gukat and Ogboru (2017).

The results show that capital/development expenditure has a positive and significant impact on economic growth in the long run. That is, a 1 percent increase in capital expenditure is expected to increase economic growth by 0.034%. This is in line with the neo-classical and endogenous growth models which emphasize increasing spending on both physical and human capital, such as infrastructures, health, and education, which will have a multiplier effect on productivity, hence transcending to long-term growth and development. The outcome of the study is in line with Babatunde (2018) and Nyarko-Asomani et al. (2019) and contradicts studies by Saidu and Ibrahim (2019) and Ebong et al. (2016).

Similarly, debt services relating to the size of the economy is positive but insignificant, implying that if well managed and prudently allocated, it will tackle and improve the real sector, thereby fostering overall economic growth. However, in model two, debt services is negative and significant at 5 percent. This means that a 5 percent increase in debt services will approximately reduce economic growth by 0.03%. This reflects that the sources of financing these expansionary fiscal policies in the midst of insufficient revenue to finance various government projects, though loans could lead to high inflation, unemployment, and corruption (Ayadi, 2008) if misappropriated and misallocated, will negatively impact economic growth.

The exchange rate to economic growth is positive and significant at 1 percent in both model one and model two. This means that a relatively stable exchange rate and improvement in real sector productivity prioritized by government could boost economic growth. Meanwhile, private consumption expenditure is negative in both model one and model two, but is significant at 1 percent in model one and insignificant in model two. Hence, both models reveal that private consumption expenditure is negatively related to economic growth over the period of study. For model one, a 1 percent increase in private consumption is to decrease economic growth by 0.026%. Furthermore, a dummy variable reflecting the disruption of economic activities during the war period is negative in both model one and model two. Moreover, the war dummy is significant in

model one but insignificant in model two. Hence, this confirms the negative impact of the war on economic growth during the period of study. Table 5 shows the short run model results.

Table 5. Short run Estimated Results

Model One					Model Two				
Variables	Coefficient	t-Statistic	Std. Error	Prob.	Variable	Coefficient	t-Statistic	Std. Error	Prob.
D(LRGDP(-1))	-0.259692	-2.089281	0.124297	0.0470	D(RECUREXP)	-0.012402	-1.822770	0.006804	0.0826
D(TEXP)	0.001582	0.928263	0.001704	0.3621	D(RECUREXP(-1))	0.020536	2.687060	0.007643	0.0138
D(TEXP(-1))	-0.008205	-3.991282	0.002056	0.0005	D(CAPEXP)	0.009689	3.098559	0.003127	0.0054
D(DEBT)	-0.008529	-1.370380	0.006224	0.1827	D(CAPEXP(-1))	-0.008229	-2.193551	0.003751	0.0397
EXCH	-0.001337	-0.325600	0.004105	0.7474	D(DEBT)	-0.020881	-3.018983	0.006917	0.0065
D(PRICON)	-0.002613	-1.444699	0.001809	0.1610	D(DEBT(-1))	0.016816	2.284579	0.007360	0.0328
D(PRICON(-1))	0.006869	3.361745	0.002043	0.0025	D(EXCH)	0.000111	2.116743	0.000052	0.0464
E(-1)	-0.358141	-6.664546	0.053738	0.0000	D(EXCH(-1))	-0.000271	-4.298627	0.000063	0.0003
LM test (serial correlation)					PRICON				
Normality test					ECM(-1)				
Heteroscedasticity									
					LM test (serial correlation)				
					Normality test				
					Heteroscedasticity				

We deduce from the short run results in model one that, the total expenditure, and debt services with negatively and significantly impact economic growth in the short run. Also, private consumption with a lag positively influence economic growth. The short run results contradicts the long run. The error correction term have the appropriate negative sign and indicate that speed of adjustment is (0.3581). That is the short run disequilibrium will be corrected 36% annually. Furthermore model two, recurrent expenditure is negative but not significant, hence with a lag is positive and significantly impacts growth in the short run. Capital expenditure on the other hand is positive and significant, thus with a lag is negative and highly significant. Similarly, debt negatively impact economic growth, yet with lag as positive effect on growth and significant. Likewise, exchange rate recorded mixed effect on growth. Private consumption is negative but

insignificant. Hence, the error correction term or speed of adjustment indicates that the model will correct itself by 81% every year.

Consequently, all the explanatory variables such as total government expenditure, recurrent expenditure, capital expenditure, debt services, exchange rate and private consumption can influence real gross domestic product (dependent variable) both in the long run and short run in the two models.

Furthermore, from table 5 the post diagnostics test to check the robustness of the ARDL model, such as the Breuch-Godfrey normality test reveal that the residuals are normally distributed. Equally, there is no serial correlation and heteroscedasticity is also not an issue in both model one and two respectively. This is shown in table...

#### **4. CONCLUSION**

The study investigates the impact of total government expenditure on economic growth on the one hand, and on the other hand, the effect of the disaggregated expenditure such as capital expenditure and recurrent expenditure on economic growth in Sierra Leone using the ARDL approach over the period 1980 to 2019. The results indicate that, there is total expenditure and its major compositions have a long and short run relationship with economic growth. As such, the estimated coefficient reveal that there exist a positive and significant relationship between total expenditure and economic growth during the period of study. Similarly, in model two capital expenditure positively affect economic growth, however deduce that recurrent expenditure negatively impact economic growth. Meanwhile, both debt service and private consumption negatively and significantly linked with economic growth, while exchange rate affect economic growth positively. In concluding, it worth noting that economic growth is ensured through government intervention (i.e. expansionary fiscal policy) to enhance productive sectors such as health, education, maintenance of security, infrastructure and hence eliminate all barriers to economic growth. These expenditures may also boost the productivity of the labour force and hence per capita income. Similarly, government investment on both human and physical capital accelerates economic growth evidenced from the findings. The ambiguity of recurrent expenditure, and that government resources directed to consumption sometimes are less productive and negatively impact economic growth.

Furthermore, in the absence of fiscal discipline, inefficient allocation and use of government resources coupled with inadequate capital investment fiscal expansion through debt will negatively influence economic growth. Hence, debt services at a particular level could be negative and significantly affect economic growth in Sierra Leone. As well, effective management of exchange rate could positively and significantly influence economic growth though this has strong economic diversification and productivity caveat associated with it. Thus it is a good option for government expenditures to be directed more into efficient and productive resources that promote growth and sustainable development.

## References