Government Expenditure and Economic Growth: The Case of Nepal

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Abstract

This paper examines the effect of recurrent and capital expenditures on output growth in Nepal over 45 years from mid-July 1975 to 2019. The autoregressive distributed lag (ARDL) model is applied to investigate the existence of the long-run and short-run relationships between the variables. Furthermore, this study uses the natural logarithm of GDP as a proxy for output growth, the natural logarithm of recurrent expenditure (REX), and capital expenditure (CEX) as the proxies for recurrent and capital expenditures respectively. The empirical results show that recurrent and capital expenditures are co-integrated with economic growth and they positively affect output growth in the long-run as well as short-run. Thus, it can be concluded that government expenditure is one of the major components of economic development and more spending should be directed towards important sectors such as infrastructural development and industrial development to accelerate economic growth.

KeyWords: Recurrent expenditure, Capital expenditure, GDP, ARDL, Unit root test, Government expenditure

I. Introduction

In Nepal, government expenditure has continued to rise due to the receipts from tax revenue, foreign aid, and the increased demand for public (utilities) goods like roads, communication, power, education, and health. Besides, there is an increasing need to provide both internal and external security for the people and the nation (Sharma, 2012). In 2000, the government expenditure was Rs. 66,272.5 million which increased to Rs. 1,208,367.6 million in 2019. During that period, the recurrent expenditure grew from Rs. 40791.8 to Rs. 935,599.1 million and the capital expenditure also rose from Rs. 25,480.7 to Rs. 272,768.5 million. Hence, the composition of recurrent and capital expenditure shows that spending in defense, internal security, agriculture, health, education, construction, transportation and communication grew substantially during the period 2000 to 2019.

Government expenditure refers to expenses incurred by the government for the provision of public goods, services, works needed to foster economic growth and improve the welfare of the public and for the maintenance of the government itself. The relationship between government expenditure and economic growth is a hugely debatable topic among scholars. Some researchers believe that an increase in government expenditure on socio-economic and physical infrastructures leads to economic growth. For instance, government expenditure on health and education raises the productivity of labour and increases the growth of national output. Similarly, expenditure on infrastructures such as roads, communications, power, etc., reduces production costs, increases private sector investment and profitability of firms, thus promoting economic growth. However, others argue that an increase in government expenditure may slow down the overall performance of the economy. For example, to finance rising expenditure, the government may increase taxes and/or borrowing. Higher profit tax

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tends to increase production costs and reduce investment and profitability of the firms. Moreover, if the government increases its borrowings to finance its expenditure, especially from the banks, the private sector might have access to fewer funds thereby reducing private investment.

The rest of the paper is organized as follows: Section 2 presents the review of related literature, section 3 outlines the methodology being used, section 4 presents the results and discussion, and section 5 concludes the study.

II. Theoretical review

There are three schools of thought regarding the relationship between government expenditure and economic growth: Wagner's Law, Keynesian View, and the neoclassical growth model. While Wagner's Law and Keynesian View support that government expenditure has a positive effect on economic development, the neoclassical growth model argues that government fiscal policy does not have any effect on the growth of national output.

Adolph Wagner was the first to recognize a positive correlation between government expenditure and economic growth, which is commonly referred to as Wagner's Law. According to him, a long-run elasticity larger than unity is assumed for public spending and economic growth. This implies that the role of the government increases because of economic growth. This is explained by the increasing demand for regulatory and protective functions which are needed to sustain the increasing level of economic wealth. As countries grow wealthier, the demand for public goods like education, healthcare, and cultural services increases. The theory that as the country becomes industrialized, the need for goods and services provided by the government increases is based on the following three reasons. Firstly, the public sector will take over the administrative and protective functions previously performed by the private sector. Secondly, the need for the provision of social and cultural goods and services also increases. Thirdly, more government intervention is needed to maintain the proper functioning of market forces and also to manage and finance natural monopolies.

Similarly, the Keynesian View contends that economic growth occurs as a result of increasing public sector expenditure. In this situation, government expenditure is treated as an independent exogenous variable and could be used as an efficient policy variable to influence economic growth. Kneller et al. (1999) researched fiscal policy and growth to conclude that during the initial stages of economic development, public sector expenditure will be very high because the government provides basic infrastructural facilities (social overheads). Since most of these projects are capital intensive, the spending of the government will also increase steadily. In the same way, the investment in education, health, roads, electricity, water supply are necessities that can launch the economy from the practitioner stage to the take-off stage of economic development.

According to Bhatia (2002) in developed countries, public expenditure maintains steady economic growth through economic stabilization and investment activities. However, in underdeveloped economies, public expenditure plays an active role in reducing regional disparities, developing social overheads and infrastructures relating to transportation, communication, education and training, growth of industries, research and development, and so forth, which are essential for economic development. Myriads of empirical studies that focus on government spending and economic growth have been published in both advanced and developing economies. However, the results of those studies have varied across the countries due to the different levels of socio-economic development, the time of periods analyzed, and various research methods employed.

Landau (1983) examined the effect of government (consumption) expenditure on economic growth for a sample of 96 countries and discovered a negative effect of government expenditure on the growth of real output, which was consistent with the pro-market view. While examining 98 countries, Barro (1990) discovered that an increase in government spending on non-productive government services would lead to lower economic growth per capita. Barro (1996) extended his research to the period of 1960-1990 for 100 different countries. He indicated that in the respect of government policy, among the other determinants of economic growth, real GDP per capita might be enhanced by effective implementation of the law, lower inflation, and smaller government spending. Meanwhile, government spending, excluding spending on education and defense, showed a significantly negative impact on economic growth. Thus, greater government spending, which might be associated with higher taxation, would tend to reduce growth.

Alternatively, Devarajan et al. (1996) provided different results while claiming the impact of government spending on economic growth might depend on the composition of spending or even a particular share. The analysis of 43 developing countries for the over 20-year period showed that some shares of government spending had a positive and statistically significant growth effect. At the same time, the relationship between the capital component of public spending and GDP per capita remained negative.

Brahmasrene et al. (2007) examined the association between government expenditures and economic growth in Thailand, by employing the Granger causality test. The results revealed that government expenditures and economic growth are not co-integrated. Moreover, the results indicated a unidirectional relationship, as causality runs from government expenditures to growth. Lastly, the results illustrated a significant positive effect of government spending on economic growth. Olugbenga & Owoye (2007) investigated the relationships between government expenditure and economic growth for a group of 30 OECD countries during the period 1970-2005. The regression results showed the existence of a long-run relationship between government expenditure and economic growth. In addition, the authors observed a unidirectional causality from government expenditure to growth for 16 out of the countries, thus supporting the Keynesian hypothesis. However, causality runs from economic growth to government expenditure in 10 out of the countries, confirming Wagner's Law. Finally, the authors found the existence of a feedback relationship between government expenditure and economic growth for a group of four countries.

In India, Ranjan & Sharma (2008) examined the effect of government development expenditure on economic growth during the period 1950-2007. The authors discovered a significant, positive impact of government expenditure on economic growth. They also reported the existence of cointegration among the variables.

Al-Yousif (2000) indicated that government spending has a positive relationship with economic growth in Saudi Arabia. On his part, Ram (1986) studied the linkage between government expenditure and economic growth for a group of 115 countries during the period 1950-1980. The author used cross-sectional, time-series data in his analysis, and confirmed a positive influence of government expenditure on economic growth.

Cooray (2009) used an econometric model that takes government expenditure and quality by governance into consideration, in a cross-sectional study that includes 71 countries. The results revealed that both the size and quality of the government are associated with economic growth.

Abu-Bader & Abu-Qarn (2003) employed a multivariate co-integration and variance decomposition approach to examine the causal relationship between government expenditures and economic growth for Egypt, Israel, and Syria. In the bivariate framework, the authors observed a bi-directional (feedback) and long-run negative relationship between government spending and economic growth. Moreover, the causality test within the trivariate framework (that includes a share of government civilian expenditures in GDP, military burden, and economic growth) illustrated that military burden has a negative effect on economic growth in all the countries. Furthermore, civilian government expenditures have a positive effect on economic growth for both Israel and Egypt.

In Nepal, Kunwar (2019) used time series data ranging from 1975-2014 to establish the relationship between government expenditure and economic growth. He used the ARDL model to reveal that one period lagged of government expenditure has a significant and positive impact on real GDP. Similarly, Gupta (2018) also researched on annual series data between 2002/03 and 2015/16 to conclude that higher investment in the agriculture and non-agriculture sector (industry and service sectors) would lead to higher economic growth. Mainali (2012) also conducted a study on the relationship between government expenditure and output growth using annual time series data from 1975 – 2011. He employed Cointegration and Error Correction Model to reveal that there was a positive, significant impact of government recurrent and capital expenditure and a negative impact of miscellaneous and contingency expenditure to GDP.

In contrast, Regmi (2007) carried out research entitled “Fiscal Policy and Economic Growth in Nepal” using the annual time series data 1981-2003 and the endogenous s growth model with some minor modification. The study of Regmi found a negative effect of all the fiscal policy variables including distortionary taxes, productive expenditure, non-tax revenues, private investment, and budget deficit on economic growth. But unproductive expenditure and non-distortionary taxes did not affect economic growth.

III. Research Methodology

This study is based on the analysis of time series data extracted from various sources. Since Nepal has not yet embraced the practice of announcing quarterly GDP, annual data spanning from mid-July 1975 to mid-July 2019, is taken for this study. Data series on GDP, capital expenditure (CE), and recurrent expenditure (RE) were retrieved from various issues of Economic Survey published by Government of Nepal, Ministry of Finance, and Quarterly Economic Bulletin circulated by Nepal Rastra Bank.

The dependent variable in our model is GDP (economic growth), while independent variables are REX (recurrent expenditure), CEX (capital expenditure), and D (dummy variable). We have specified the following function,

$GDP_t = f(REX_t, CEX_t, D_t)$……………..(1)

To make our equation linear, we take the natural log of equation (1) as shown below;

$LGDP_t = \alpha_0 + \alpha_1 LREX_t + \alpha_2 LCEX_t + \alpha_3 D_t + u_t$ …………….(2)

Where is the stochastic error term and, which is the coefficient of LREX, is the elasticity of LGDP with respect to LREX. Especially, it measures the degree of responsiveness of LGDP to changes in the level of LREX ceteris paribus. In the same way, and also represent their respective coefficients and elasticities and thus exhibit similar behavior as .

After estimating the ordinary least squares (OLS), we proceed to test for stationarity or unit roots of our variables. In a stationary process, the mean, variance and autocorrelation characteristics do not change over time. Testing the stationary property of all variables is essential in order to avoid spurious regression and to figure out their order of integration. To perform this, we use two formal unit root tests: The Augmented Dickey-Fuller (ADF) and the Phillip-Perron (PP) unit root tests. The distribution of the ADF test assumes homoscedastic error terms and to resolve any potential problems generated by such assumption, PP test is applied which has relatively less restrictive assumption regarding the distribution of the error terms. Besides, it also corrects any possible serial correlation and heteroskedasticity in the errors. The ADF test takes the following equation:

$\Delta Y_t = \beta_1 + \delta Y_{(t-1)} \sum^{m}_{(i=1)} \alpha_i \, \Delta Y_{(t-i)} + \varepsilon_t$ ....(3)

We test the null hypothesis, (series is non-stationary) against the alternative hypothesis, (series is stationary).

To analyze long-run and short-run relationships among variables under study, instead of using cointegration approaches by Engle and Granger, (1987) and Johansen and Juselius, (1990), Autoregressive Distributive Lag (ARDL) bounds test developed by Pesaran et al., (2001) is implemented due to its various advantages. To illustrate, ARDL model allows test for the existence of relationships between variables regardless of whether the underlying repressors are purely I(0), purely I(1) or mixture of both, but none of the variables should be I(2). While traditional methods of cointegration estimate the long-run relationship by employingasystemofequations,theARDLmethodusesonlyasinglereducedform of equation (Pesaran&Shin,1995).Furthermore, ARDL technique generally provides unbiased estimatesofthelong-runmodelandvalidt-statistic,evenwhensomeoftheregressors are endogenous (Odhiambo, 2011). Since ARDL tests also suitable even when the sample size is small, it has superior small sample properties compared to the Johansen and Juselius, (1990) cointegration test (Pesaran&Shin, 1995).

The estimated ARDL model is given below:

$\Delta LGDP_t = \alpha_0 + \sum^{p}_{(i=1)} \alpha_{1i} \, \Delta LGDP_{(t-i)} + \sum^{q}_{(i=0)} \alpha_{2i} \Delta LREX_{(t-i)} + \sum^{q}_{(i=0)} \alpha_{3i} \Delta LCEX_{(t-i)} + \lambda_1 \, LGDP_{(t-1)} + \lambda_2 \, LREX_{(t-1)} + \lambda_3 \, LCEX_{(t-1)} + D_t + \upsilon_t$.........4

where is the white-noise error term and represents the first difference operator. The coefficients to and to represent the long-run and short-run dynamics of the model respectively.

In order to investigate the existence of the long-run relationship among the variables in the system, the bound tests approach to cointegration developed by Pesaran et al., (2001) has been used. This test is based on the Wald or F-statistic and follows a non-standard distribution. Under this, the null hypothesis of no cointegration is tested against the alternative of cointegration . Pesaran et al., (2001) provide lower critical bound assuming I(0),and upper critical bound assuming I(1) in the ARDL model. If the estimated F-statistic value is higher than I(1), the null hypothesis of no cointegration is rejected (presence of cointegration); but if it is less than I(0), we fail to reject the null of no cointegration (absence of cointegration). However, if it lies within the I(0) and I(1), the result is considered to be inconclusive. After bounds test confirms the presence of cointegration among the variables, the long-run and short-run coefficients can be investigated as shown below in equations 5 and 6 respectively.

$$LGDP_t = \alpha_0 + \sum_{i=1}^{p1} \alpha_{1i} LGDP_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} LREX_{t-i} + \sum_{i=0}^{q2} \alpha_{3i} LCEX_{t-i} + D_t + \mu_t \text{ .... } (5)$$

$$\Delta LGDP_t = \alpha_0 + \sum_{i=1}^{p1} \alpha_{1i} \Delta LGDP_{t-i} + \sum_{i=0}^{q1} \alpha_{2i} \Delta LREX_{t-i} + \sum_{i=0}^{q2} \alpha_{3i} \Delta LCEX_{t-i} + D_t + \psi ECT_{t-1} + \vartheta_t \text{ .... } (6)$$

In equation 6, is the speed of adjustment andrepresents the error correction term lagged by one time period. The value of should be negative and fall between 0 and 1. Generally, signifies the speed of adjustment to converge back to its long-run equilibrium.

IV. Results and Conclusion

Table 1: Descriptive Statistics

	LGDP	LREX	LCEX
Mean	12.36226	9.993656	9.772641
Median	12.54438	10.09333	10.04291
Maximum	15.05643	13.74894	12.51638
Minimum	9.717218	6.303534	6.874509
Std. Dev.	1.646536	2.206308	1.409623
Skewness	-0.092487	-0.012724	-0.212068
Kurtosis	1.790838	1.813725	2.558493
Jarque-Bera	2.805539	2.639803	0.702786
Probability	0.245915	0.267162	0.703707
Sum	556.3017	449.7145	439.7688
Sum Sq. Dev.	119.2876	214.1829	87.42967
Observations	45	45	45

The descriptive statistics for all three variables are presented in Table 1. A distribution is considered normal if the value of skewness and kurtosis are respectively 0 and 3. From Table 1, it can be seen that skewness values of LGDP, LREX, and LCEX are close to 0 and therefore, mirror a normal distribution. The values of the standard deviation indicate that recurrent expenditure and GDP are relatively more volatile compared tocapital expenditure. From the probability values of Jarque-Bera statistic of all three variables, we fail to reject the null hypothesis at 5% level of significance implying that these variables have a normally distributed curve.

Table 2: Unit Root Test for stationarity

Variables	ADF Test (Intercept)		PP Test (Intercept)	
	Level	First Difference	Level	First Difference
LGDP	-0.197855	-	0.090259	-
LREX	0.072976	-	0.169624	-
LCEX	-0.704255	-	-0.715698	-

Variables	ADF Test (Trend and Intercept)		PP Test (Trend and Intercept)	
	Level	First Difference	Level	First Difference

LGDP	-1.620028	-	-2.146185	-
LREX	-2.906663	-	-2.906663	-
LCEX	-1.830171	-	-2.009333	-

Note: The presented values are test statistics. "*" indicates that results are significant at 1 percent level.

From Table 2, it can be observed that both ADF and PP tests reveal similar results. LGDP, LREX and LCEX are non-stationary at levels, but become stationary after first difference at 1% level of significance. Hence, our series are integrated of order I(1), but none of them are I(2) which is prerequisite before applying the ARDL model.

Table 3: Optimal Lag Length Selection

VAR Lag Order Selection Criteria						
Endogenous variables: LGDP LREX LCEX						
Exogenous variables: C						
Date: 11/19/20 Time: 23:55						
Sample: 1975 2019						
Included observations: 43						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-61.11441	NA	0.003960	2.982065	3.104940	3.027378
1	130.9581	348.410*	7.95e-07*	5.53293*	5.04143*	5.35168*
2	136.7497	9.69748	9.30e-07	-5.38370	-4.52358	-5.066520

Note: * indicates lag order selected by the criterion.
Source: Appendix 1

Most favorable lag length of the model is obtained by using Vector Autoregressive (VAR) lag order selection criteria. Results from Table 3 have verified that the maximum lag length appropriate for the model is '1' which is chosen on the basis of minimum values generated by each of the criterions. Similarly, Akaike Information Criterion (AIC) also has suggested that 1 lag should be taken for the ARDL model.

In order to verify the existence of long-run relationship among the variables under consideration, ARDL bounds test of cointegration is performed on equation (4). The results of this test are shown in Table 4.

Table 4: ARDL Bounds Test for Co-integration

Test Statistic	Value	k		
F-statistic	7.514090	2		
Critical Value Bounds				
Significance	I0 Bound	I1 Bound		

10%	3.17	4.14		
5%	3.79	4.85		
2.5%	4.41	5.52		
1%	5.15	6.36		

Source: Appendix 2 and 3

As reported in Table 4, the F-statistic for the ARDL bounds test is 7.514090, which is greater than lower bound (5.15) and upper bound (6.36) critical values at 1 percent level of significance, indicating that there is adequate evidence to reject the null of no cointegration. This verifies that there exists a long-runrelationship between output growth and government expenditure in Nepal during the period mid-July 1975-2019. In other words, these variables have long-run equilibrium and tend to move together in the long-run. Now the next step is to implement the ARDL model to estimate the long-run and short-run coefficients. The long-run and short-run results of the ARDL(1,0,0) model are reported in Panel A and Panel B of Table 5 respectively.

Table 5: Results of ARDL (1, 0, 0) Model

Panel A: Long Run Coefficients (Dependent variable - LGDP)				
Regressor	Coefficient	Std. Error	t-Statistic	Prob.
LREX	0.642642	0.032326	19.879865	0.0000
LCEX	0.117040	0.054325	2.154440	0.0374
DMY	0.194907	0.060858	3.202621	0.0027
C	4.787650	0.221830	21.582482	0.0000
Panel B: Short run Coefficients (Dependent variable - LGDP)				
Regressor	Coefficient	Std. Error	t-Statistic	Prob.
(REX)	0.315404	0.085907	3.671451	0.0007
(LCEX)	0.057442	0.022879	2.510733	0.0163
(DMY)	0.095659	0.041132	2.325638	0.0253
	-0.490792	0.120748	-4.064590	0.0002
= LGDP - (0.6426*LREX + 0.1170*LCEX + 0.1949*DMY+ 4.7876)				

Source: Appendix 3

The long-run results reported in Panel A of Table 5reveal a positive relationship between government expenditures and GDP. The coefficients of LREX and LCEX are positive and statistically significant at the 1 and5 percent level respectively, implying that recurrent expenditure and capital expenditure have a positive effect on economic growth. This result is consistent with the findings made by Devarajan et al. (1996), Brahmasrene et al. (2007), Ranjan & Sharma (2008), Mainali (2013), Gupta (2018), and Kunwar (2019).

Panel B of Table 5 illustrates the short-run dynamics of the ARDL (1, 0, 0) model and the results are almost similar to that of the long-run. It can be observed that the coefficients of LREX and LCEX are positive and statistically significant at the 1 and 5 percent level respectively, indicating that both of these government expenditures have a significant and positive effect on output growth in Nepal in the short-run. Most importantly, the coefficient of is statistically significant at the 1 percent level with a negative sign. The coefficient of shows the speed of adjustment toward long-run equilibrium if any disequilibrium exists in the short-run. The coefficient of is -0.490792, implying that deviations in the short-run towards the long-run equilibrium are corrected by 49.07 percent each year.

The stability of the ARDL parameters is also tested by applying the CUSUM and CUSUMSQ tests developed by Brown, Durbin and Evans, (1975).

Figure 1: Plot of Cumulative Sum of Recursive Residuals

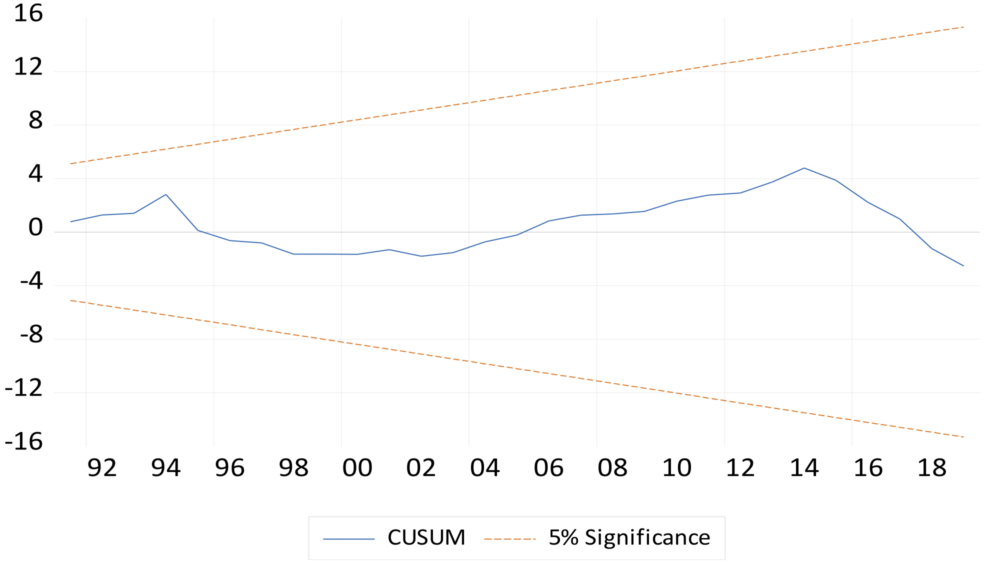

Figure 2: Plot of Cumulative Sum of Squares of Recursive Residuals

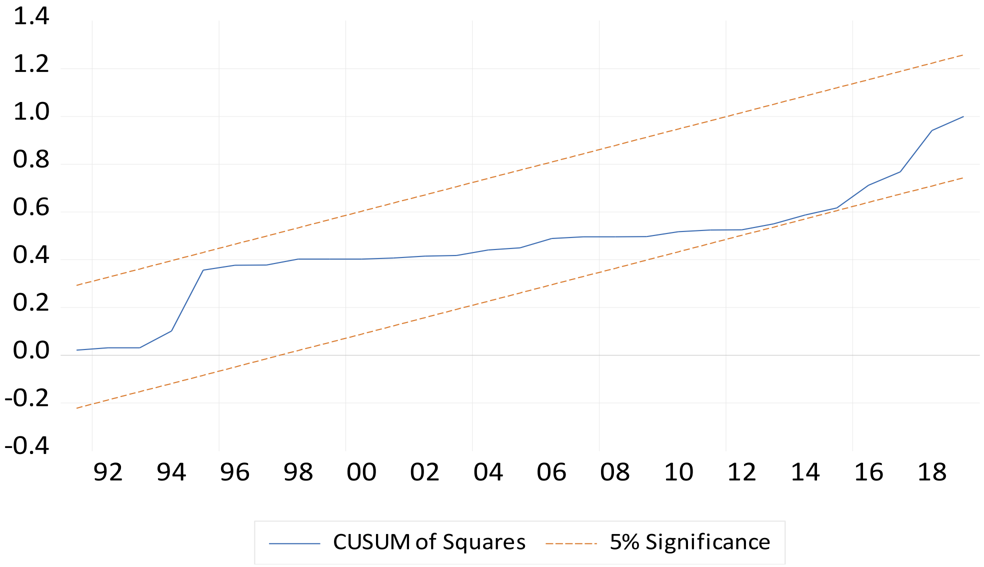

Figure 1 and 2 show plots of the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) respectively. These results depict that the ARDL parameters are stable as graphs of the CUSUM and CUSUMSQ are within the critical bounds at the 5 percent level of significance. Thus, the model is stable and confirms the stability of the long-run coefficients of the regressors.

This paper examines the effect of recurrent expenditure and capital expenditure on economic growth in Nepal. Results from the ARDL model show evidence of long-run and short-run relationships between economic growth (GDP) and recurrent expenditure (REX) and capital expenditure (CEX). Based on these results, it can be determined that government spending has contributed positively to the economic growth of Nepal in the long-run as well as short-run. Besides, reviews of literature in the national and international context, as well as the findings of this study suggest that government expenditure is one of the major components of economic development. However, there are many inefficiencies involved in the allocation of government expenditure resulting in sluggish economic progress. Therefore, this study recommends that government spending should be directed towards important sectors such as infrastructural development and industrial development to accelerate economic growth.

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