Effects of Public Debt on Economic Growth of Nepal

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Abstract

This study aims to analyze the effect of public debt dividing into internal and external debt on economic growth rate of Nepal using time series data from 1990 – 2021 A.D. The Autoregressive Distributed Lag (ARDL) model is employed to investigate the effect as well as long – run and short – run relationship between economic growth and public debt. It is found that in long run, effect of internal debt upon the economic growth rate of Nepal is negative. Similarly, the long run effect of external debt upon the economic growth rate is positive and significant. The short run effect analysis result also shows that effect of external debt upon economic growth rate is positive. It indicates that effect of external debt upon economic growth rate is consistent in both long-run and short-run. Furthermore, the results show that there is also the long run relationship between the economic growth rate (i.e. RGDPgr) and internal debt, external debt. Similarly, the result of ECM analysis shows that there is also short-run relationship between economic growth rate and internal debt, external debt. Moreover, there is not found strong effect of public debt on economic growth of Nepal.

Key words: Internal Debt, External Debt, Economic Growth Rate, ARDL.

I. Introduction

Generally, public debt is defined as any money owed by the central government. The modern concept of public debt emerged from Great Britain after the glorious revolution of 1688 A.D. In the British government, after 1688 AD, public borrowing was regularized, parliament gained substantial rights in the area of public finance, and the Bank of England was established and obtained the debt for an extended time at lower interest (Stasavage, 2003). Nowadays, most developing countries, even Nepal, adopt a deficit financing policy due to the resource gap, which is fulfilled by three principal means printing new currency or using government reserve or debt. There is a hot debate regarding debt's positive and negative effects on economic growth. High public debt in the existing fiscal deficit situation has a significant negative relationship with the country's economic activity. It is because; high debt leads to upward pressure on the real interest rate, which can crowd out private investment. When a government cannot finance its deficit by itself, it is forced to reduce spending or raise the revenue to stabilize the economy

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(Islam & Biswas, 2005). Nepalese economy gets internal debt from various sources like the central bank, banking, financial institutions, and citizens. Similarly, external debt is obtained from multilateral institutions like IMF, World Bank, ADB, etc., with a maturity period for more than 30 years at a meager interest rate and from its friendly nations. The amount of public debt is significant, but the economic growth of Nepal is slow; it has raised the question in the case of developing countries whether the debt is beneficial or not for higher economic growth (Sharma, 2014). Many economists like Keynes have favoured increasing government finance through debt and not through taxation because taxation will reduce incomes and demand as well, and debt will have no such effect. Besides, debt enables the government to use idle and unutilized funds of the public. Thus, there is strong justification in favour of public debt to cure unemployment (Sundharam & Andley, 1988).

Ever since the origin of the state, its role has been increasing though the nature and types of involvement have marked changed significantly in the twenty-first century. In the beginning, security was the prime concern. Governments used to collect contributions and borrowings from citizens to finance war and security. With the increased role from security to development and welfare, the financing requirements of the governments increased tremendously. The ballooning of public expenditure could not be financed solely by public revenue. Thus public debt became a significant source of deficit financing (Ghimire, 2007). Nepal is one of the low-income-earning countries in the world. Higher economic growth of a country needs an increase in real GDP, and it is possible with sufficient investment in productive sectors of an economy. Government investment in transport and communication, education, and health infrastructure significantly affect economic growth (Babatunde, 2018). The sources of funds are tax and non-tax in the context of Nepal. In comparison to the fund requirement, the tax revenue collection is very nominal.It may be due to the low income, savings, and low tax-paying capacity of people, as well as the ineffective revenue collection system of government. Tax collection is the primary source of government income; however, it is limited due to the very narrow tax base. There is a gap between government income and expenditure (Acharya, 2017).

There is a wide range of resource gaps due to the export-import gap, revenue-expenditure gap, and saving-investment gap. Therefore, the Nepal government has implemented deficit budgeting from the early days. This gap is mainly fulfilled by public debt. Nepal's government has conducted most of the development activities through the financing of public debt, and it is obtained as internal and external debt. Raising sufficient funds in the form of public debt is essential for sustained economic growth and to end prolonged poverty. Since a failure to meet debt obligations could lead to a severe financial crisis, managing public debt at a sustainable level is an important policy issue. Higher debt levels could contribute to higher growth, but it could also increase the probability of default (Ra & Rhee, 2005).

Public debt, which is appropriately managed, creates sound functioning of the economic system, but unmanaged debt can generate severe economic problems in developing countries like; debt-trap, rise in inflation, instability in the domestic financial market etc. Similarly, the

higher debt-servicing obligation can lead to a lower nation's economic growth rate. The public debt stimulates economic growth; however, an uncontrolled increase in debt will negatively impact the economy. The government must borrow funds only in exceptional situations and allocate them efficiently with a focus on capital expenses (Roșoiu, 2019).

Economic theory suggests that a reasonable level of public debt taken by developing countries will promote economic growth. In the initial stage of development of such countries, there is a small stock of capital funds and likely to have ample opportunity for investment with high returns than in developed nations. When they use the borrowed fund in productive sectors and do not experience macroeconomic instability, policies that distort the economic incentives or sizable adverse shocks should increase economic growth. Public debt (government bonds) works as liquid assets; an increase in debt promotes economic growth (liquidity supply effect) but at the same time, if productive sectors are taxed and subsidies provided to the labour sector as per the fiscal policy. It leads to reduce the labour supply (income effect). The wage rate rises, producers reduce their production, and the demand for capital from the banking sector tends to fall. Ultimately, fiscal deterioration (i.e. increase in public debt and subsidy) reduces the productive capacity and interest rate (Kobayashi, 2015). There is not a uniform opinion of scholars regarding the effect of public debt on economic growth. Public debts have a nonlinear effect on economic growth (Pattillo, Ward & Ricci, 2002). In this regard, this study attempts to analyze the effect of public debt on economic growth of Nepal during the period of 1990 to 2021 A.D.

II. Theoretical Framework

This section presents the theoretical and empirical background of effect of public debt on economic growth. First part describes the theoretical support regarding effect of public debt on economic growth whereas second part gives the empirical evidences.

Theoretical Reviews

The classical economists were not in the favour of debt. Smith (1776) in the famous book 'An Enquiry into Nature and Causes of Wealth of Nation' states that government should not implement a deficit budget because the addition of debt is regarded as 'pernicious' for the country even if all of it is owed to domestic investors. The interest payment on public debt is like 'the right hand which pays the left.' The reason is that debt should be paid with interest immediately, which leads to an increase in the tax rate. At the same time, domestic capital flight leads to the devaluation of the domestic currency. It adversely affects the domestic producer. Smith further states that debt severely slows a nation's natural progress towards wealth and prosperity. David Ricardo (1772-1823) also in the same tone as Adam Smith regarding the effect of debt on economic growth. The Ricardian Equivalence Theorem viewed taxation and public debt as equivalent forms of financing government expenditure. The rationale behind this view is that the government is expected to pay back in some future time. If there is a closed economy, any one supposes repayment of debt is made through the imposition of the tax,

which means that, as per the rational expectation hypothesis, people buy a bond issued by the government by raising their savings. It causes the amount of savings matches the public deficit, resulting in the interest rate remaining the same as well as no change in demand and output, Buchanan (1976).

The neo-classical economists Solow-Swan believes that, the economic growth rate needs investment in technology improvement and human and physical capital development, which can be financed through debt. Modigliani (2000), refining the contributions of Buchanan (1988), argued that the national debt is a burden for the next generations, which comes in the form of a reduced lower stock of private capital. The scholar considered a situation in which the gross burden of national debt may be partially offset or aggregate when debt finances government expenditure that could contribute to the actual income of future generations, such as productive public capital formation.

Keynesian school of economic thought emerged after the great depression in 1929 A.D. Keynes (1936) stated that the market is in equilibrium at below full employment and it is not self-adjusting. The scholar added that resources in the private sector may remain unemployed. When resources are unemployed on a large scale, government employment of these resources does not necessarily deprive the private sector of anything. On the other hand, an increase in government spending by using idle men and materials is likely to raise the level of aggregate output and income. Therefore, in his opinion, the public debt needed not necessarily be unproductive, inflationary, and burdensome. Keynesians were optimistic about public debt-financed government expenditure during the economic recession. Keynes believed that deficit financing overcame the depression. Public debt should be taken for public capital investment but not for ordinary spending. Low investment, higher unemployment, low aggregate demand, and lower economic growth during the recession, public expenditure financed through debt promotes all those variables (Salsman, 2017).

Empirical Evidences

Reinhart and Rogoff (2010) divided debt-to- GDP ratio into four categories as; when debt-to-GDP levels are below 30 percent (low debt), when the debt-to-GDP ratio is 30-60 percent (medium debt), 60 to 90 percent (high), and above 90 percent (very high). The study found that high debt-to-GDP levels, i.e. 90 percent and above, are linked with remarkably lower growth outcomes across both advanced and emerging economies. It was a surprising result that in both economies, the relationship between public debt and growth was almost similar. However, it was not found in the context of inflation. The result showed no systematic relationship between a high level of debt and inflation for the advanced economy except in the USA. However, in the case of emerging economies, a high level of public debt coincides with higher inflation. The researchers also found that when the external debt reaches 60 percent of GDP, the growth rate declines by 2 percent in emerging market economies. Akram (2011) examined the impact of public debt on the economic growth of Pakistan and the impact of public debt on investment

because investment is the basic channel through which public debt affects the growth rate. The empirical estimation found that both in the long and short run external public debt has a negative and significant relationship with per capita GDP and investment. This result strongly confirmed the existence of 'Debt Overhang Effects.' The results showed that domestic debt has a negative and significant relationship with investment, suggesting it tends to crowd out private investment. Checherita-Westphal and Rother (2012) investigated the relationship between the public debt-to-GDP ratio and the per capita growth rate in 12 euro countries. The study found a nonlinear impact of debt on economic growth with a turning point- beyond which the government debt-to- GDP ratio harms long-term growth- at about 90 to 100 percent of GDP. When the relationships of public investment, private saving and total factor productivity were estimated individually, nonlinear impact was found on economic growth despite other channels influence growth rate. Obademi (2012) analyzed the long-run equilibrium relationship and impact of public debt on Nigeria's economic growth rate from 1975 to 2005 A.D. In the long run, the proportional impact of debt on economic growth showed that external debt, domestic debt, as percentage of GDP, and external debt service negatively impact the GDP growth rate. At the same time, the proportional impact of debt on growth was not found to be significant in the short run, except for the significant negative impact of debt service on the economic growth rate at a 5 percent level of significance. Regarding the combined effect of debt, the study concluded that though debt positively impacts growth in the short run but debt depresses the economic growth rate in the long run. Calderón and Fuentes (2013) analyzed how structural factors such as quality of institutions, financial market development, and GDP per capita level affect the impact of public debt on the economic growth rate. The result showed a robust negative relationship between public debt and economic growth rate. Evidence of non-linearity in this relationship was found in the level of development and public debt. Structural factors mentioned above help to reduce the negative effect of public debt on the economic growth rate. However, the quality of institutions assessed by the policy environment seems to have a substantial effect on improving the negative impact of public debt. An improved policy environment and its interaction with public debt had helped to explain the improved growth environment of industrial and developing countries. Teles and Mussolini (2014) studied the impact of productive public expenditure on economic growth given the public debt-GDP ratio. The study found that, higher debt-GDP ratio corresponds to a more negligible impact of productive expenditure on economic growth. Mencinger, Aristovnik, and Verbic (2014) empirically explored the transmission mechanism of the short-term impact of public debt on the economic growth rate. The empirical investigation mainly included a panel data set of 25 sovereign member countries of the EU, 'old' member countries, covering the period of 1980–2010, and 'new' member countries, covering the period of 1995–2010. The study examined and evaluated the direct effect of higher indebtedness on economic growth for countries in the EU, which are in the epicenter of the current sovereign debt crisis. The results indicated a statistically significant non-linear impact of public debt ratios on the annual GDP per capita growth rate for the 'old' and 'new' EU member countries included in the sample. Kim, Ha, and Kim (2017) conducted a research on the role of

corruption in the relationship between public debt and economic growth. The researcher finally concluded that corruption could play a crucial role in determining the effect of public debt policies. The public debt increases the economic growth of such countries with high transparency and no corruption. Matthew and Mordecai (2016) analyzed the impact of public debt on the economic development of Nigeria. The result of ECM showed that external debt and external debt service payment have an insignificant and adverse relationship with per capita GDP. But, the domestic debt stock has a positive and highly significant relationship with per capita GDP. Saungweme and Odhiambo (2019) reviewed the literature on the impact of public debt on economic growth from the period 18th century. The review of the study presented that the impact of public debt on economic growth is not given and varies depending on a set of heterogeneous factors, like the level of development of the sampled countries, institutional quality, the relative size of the public sector, the composition and structure of government debt and others. Similarly, Salmon (2021) also reviewed 40 existing economic literature published from 2010 to 2020 in the context of the relationship between public debt levels and economic growth by considering the debt threshold. For the 40 studies reviewed, 36 studies identify a statistically significant (linear or non-linear) negative effect of public debt on growth. Of the four remaining studies, two studies found that the adverse effects of public debt on growth can be primarily reduced by good quality institutions and good policy. At the same time, the other two studies found some weak evidence for the existence of a negative debt-growth relationship.

Dahal (2016) analyzed the Public debt stock, Education-centric human capital, and economic growth in Nepal in a Cobb-Douglas production function framework using the ARDL model. The study concluded that there is a positive impact of public debt on Nepal's economic growth, relying on the Keynesian proposition. Bhatta and Mishra (2020) estimated the debt-growth relationship. The results suggested that Nepal achieved higher growth rates when the public debt to GDP ratio was around 30 to 35 percent. The point estimate of the public debt threshold for Nepal is 33 percent, which is too low compared to the conventional benchmark of 90 percent, as Reinhart and Rogoff (2010) reported. The result mainly provides evidence for a non-linear relationship between economic growth and public debt. Upadhyaya and Pun (2022) investigated the effect of public debt on economic growth. It is found that in Nepal, public debt does not cause economic growth. The study also found that there is no significant unidirectional causal relationship between public debt and the economic growth of Nepal.

The above mentioned literatures show that there are not uniform result regarding the effect of public debt on economic growth in both theoretically and empirically. Moreover, the study is not conducted dividing the public debt into internal and debt, and its effect on economic growth. Therefore, this study becomes one milestone for this issue.

III. Research Methodology

This is quantitative research and follows the deductive approach. The study is based on a causal relationship research design. The study is based on secondary source of time series

data for six macroeconomic variables for the period from 1990 to 2021 A.D. Thus, the data is collected from the economic survey of MoF, A Handbook of Government Finance Statistics of NRB, annual report of CBS, Population monograph of Nepal etc., by using official websites of respected organizations.

Model Specification

In order to analyze the effect of public debt on the economic growth of Nepal, simple open macroeconomic debt growth model is employed, which is used by Mbah et al. (2016) and Kharusi and Ada (2018).

RGDPgr = f (IDg, EDg, GCFgr,POPgr, INFr)

To estimate the effect, the functional form of the model is converted into the linear form or multiple regression equation as given below;

$RGDPgr_t = \beta_0 + \beta_1 IDg_t + \beta_2 EDg_t + \beta_3 GCFgr_t + \beta_4 POPgr_t + \beta_4 INFr_t + \varepsilon_t$

Where,

RGDPgr= Growth rate of real gross domestic product

IDg = Growth rate of internal debt

EDg = Growth rate of external debt

GCFgr = Growth rate of gross capital formation

POPgr = Population growth rate

INFr = Inflation rate

β_0 = intercept

$\beta_{1....}$ B_6= coefficients, and ε = error term

Ex-Ante Diagnostic Check

Descriptive Statistics, Unit Root Test-Augmented Dickey Fuller Test (ADF) test is performed by estimating the following regression;

$\Delta Y_t = \alpha_0 + \gamma Y_{t-1} + \alpha_{2t} + \sum_{i=1}^{n} \beta_i \Delta Y_{t-i} + \varepsilon_t$

Where, $\gamma = \phi - 1$

Auto Regressive Distributed Lag (ARDL) Model for Data Analysis

The study has used the ARDL approach, which allows the use of different optimal lags for the different variables, which is not possible in the standard co-integration test. It estimates the long

run equilibrium relationship among the variables as well as short run effect through Error Correction Term (ECT). The Pesaran et al. (2001) generalized ARDL (p, q) model is a;

$$Y_t = \gamma_{0i} + \sum_{i=1}^{p} \delta_i Y'_{t-i} + \sum_{i=1}^{q} \beta_i X'_{t-i} + \varepsilon_{it} \quad \ldots\ldots (1)$$

Where, Y'_t is a vector and the variables in $(X'_t)'$ are allowed to be purely *I*(0) or *I*(1) or co-integrated; β and δ are coefficients; γ is constant; i = 1, 2, 3, …, k, p, q are optimal lag orders. ε_{it} is vector of error terms.

Ex-Post Diagnostic Test

The study uses Breusch-Godfrey test to ensure serial correlation, Jarque and Bera test for normality, Breusch-Pagan & White heteroscedasticity tests for heteroscedasticity and KUSUM test for stability.

IV. Results and Conclusion

Unit Root Test

The most frequently used unit root test method is Augmented Dickey Fuller test (ADF) – a parametric approach originally proposed by Dickey and Fuller (1981). The ADF is tested at a constant level and constant trend. If ρ=0 or α =1, there is a unit root and the variable under consideration is non-stationary or integrated. If the null hypothesis is rejected, then the time series variable is stationary.

Table 1
ADF Test Result

Variables	ADF (Constant)		ADF (Constant & Trend)		Integrated or Nonintegrated
	At level	At First difference	At level	At First difference	
Growth rate of real domesticproduct	0***	0***	0***	0***	I(0)
Growth rate of internal debt	0***	0***	0***	0***	I(0)
Growth rate of external debt	0***	0***	0***	0***	I(0)
Growth rate of grosscapital formation	0***	0***	0***	0***	I(0)
Population growth rate	0.47	0.14	0***	0***	I(1)
Inflation rate	0.01**	0.07*	0***	0***	I(0)

Note: Author's own calculation
Notification: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1% and (no) Not Significant

Table 1 result shows that the variables are of mixed order i.e. I (0) and I (1), the ARDL modeling is the most appropriate approach to this model, as suggested by Pesaran and Shin (1997).

Descriptive Analysis

This study adopts a descriptive research design to describe the feature of data set on the basis of measures of central tendency, dispersion, etc., which is presented by table 2.

Table 2
Descriptive Statistics

Variable Statistics	Growth rate ofreal gross domestic product (RGDPgr)	Growth rate of internal debt (IDg)	Growth rate of external debt (EDg)	Growth rate ofgross capital formation (GCFgr)	Growth rate ofpopulation (POPgr)	Inflation rate (INFr)
Mean	4.23	16.70	5.07	7.05	1.85	7.64
Median	4.33	9.92	-2.59	8.25	1.59	8.03
Maximum	7.89	102.15	61.32	45.47	3.75	21.05
Minimum	-2.10	-61.46	-43.09	-33.17	1.02	2.43
Std. Dev.	2.08	41.17	27.17	14.23	0.70	3.59
Skewness	-0.83	0.32	0.299	-0.18	0.68	1.47
Kurtosis	4.45	2.73	2.59	4.62	2.57	7.15
Jarque-Bera	6.49	0.63	0.69	3.71	2.74	34.51
Probability	0.07	0.72	0.70	0.16	0.25	0.11
Sum	135.45	534.55	162.38	225.69	59.19	24.78
Sum Sq. Dev.	134.36	52556.31	22886.05	6275.70	15.21	399.16
Observations	32	32	32	32	32	32

Note: Author's own calculation by using EViews-12

Table 2 depicts that all the variables are normally distributed because p-value of J-B test is above the 5 percent level of significance. Moreover, results show that the growth rate of real gross domestic product, GCFgr has long left tail (negative skewness) and leptokurtic. IDg, EDg and POPgr have long right tail (positive skewness) and platykurtic. However, INFr has long right tail (positive skewness) and leptokurtic.

VAR Lag Length Selection Criteria

Estimating the lag length of the autoregressive process for a time series is a crucial econometric exercise in most economic studies. The purpose of choosing optimal lag is to reduce residual correlation. Using VAR, the optimal lag is that, which has the minimum value as reported by each of the criteria as AIC, SIC, HQ, or FPE.

Table 3

VAR Optimal Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-573.19	NA	2.37e+09	38.61	38.89*	38.70
1	-516.30	87.22*	6.20e+08*	37.22*	39.18	37.84*
2	-491.14	28.51	1.75e+09	37.94	41.58	39.10

Note: Authors's own calculation

*Notification: * indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion.*

Results from table 3 has verified that the maximum lag length appropriate for the model is '1', which is chosen based on minimum values generated by each of the criteria.

Estimation of ARDL Model

The ARDL (1,0,1, 1, 1, 0) model is selected on the basis of all criteria like Schwarz Bayesian Criterion (SBC), Akaike Information Criterion (AIC), and Haann Quinn criterion for the model. According to Pesaran (1997), AIC and SBC perform relatively well in small samples, although the SBC is slightly superior to the AIC (Pesaran& Shin, 1999). As the data are annual and there are only 31 observations, the maximum lag order is set to 1, following Pesaran and Shin (1999).

The table 4 shows that R^2 is 0.65, which indicates that the independent variables selected under the study explain the dependent variable i.e.,RGDPgr (i.e., economic growth), by 65 percent. The value of the F-statistic is above the critical value, and the p-value is less than the 5 percent level of significance, which indicates that the joint effect of overall variables is significant or the model is best fitted and statistically significant. The value of D-W is near about two means variables are free from autocorrelation. According to Barro (1991,1997), RGDPgr (-1) is taken as initial income, i.e., one period lagged negative income, and a significant result of initial income shows that steady-state equilibrium or convergence or catch-up effect of the economy. The coefficient of RGDPgr (-1) has a negative sign and significant result, which shows that the system of economy in the study period attained steady-state equilibrium.

Table 4

ARDL Estimated Result (Growth Equation)

Variables	Coefficients	Probability
Growth rate of real gross domestic product (-1)	-0.331	0.0921
Growth rate of internal debt	-0.011	0.1681
Growth rate of external debt	0.013	0.2928
Growth rate of external debt(-1)	0.025	0.0883
Growth rate of gross capital formation	0.090	0.0007
Growth rate of gross capital formation (-1)	0.040	0.1325
Population growth rate	-0.046	0.5847
Population growth rate (-1)	1.478	0.0910
Inflation rate	0.047	0.5623
R-squared	0.6453	F-stat
Adjusted R^2	0.4933	Prob(F-Stat)
S.E. of Regression	1.50	AIC
Sum of standard Resid	47.48	SC
D-W statistics	1.9295	HQ

Note: Author's own calculation

ARDL Bounds Test for Co-integration

The cointegration testing procedure specifically helps us to know whether the underlying variables in the model are cointegrated or not, given the endogenous variable. The results of this test are shown in Table. As reported in Table 4, the F-statistic for the ARDL bounds test is

9.09, which is greater than the lower bound (3.41) and upper bound (4.68) critical values at a 1 percent level of significance, signifying that there is adequate evidence to reject the null of no-cointegration.

Table 5

F-Bounds Test (for long run relationship)Null hypothesis: No levels relationship

Test statistics	Value	Significance	I(0)	I(1)
F-Stat	9.09	10%	2.26	3.35
		5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

Source: Author's own calculation

This verifies that there exists a long-run relationship between RGDPgr andthe growth rate of internal debt, growth rate of external debt, gross capital formation growth rate, population growth rate, and inflation rate in Nepal during the period 1990 - 2021.

Long-run and Short-run Dynamics

The long-run results reported in Panel A of Table 6 reveal a positive relationship between RGDPgr and EDg, GCFgr and POPgr, statistically significant at less than 5 percent level. There is a negative relationship between RGDPgr and IDg but statistically insignificance even at the 10 percent level. There is a positive relationship between INFr and RGDPgr but statistically insignificant. The long-run coefficient of IDg is -0.008, implying that a one percent increase in internal debt leads to a decline in RGDPgr by 0.008 percentage in the long run. It indicates there is a very weak negative effect of the growth rate of internal debt on the economic growth rate. The coefficient of EDg is 0.028 indicating that an increase in the growth rate of external debt by 1 percent leads to a rise in RGDPgr by 0.028 percent in the long run. The coefficient of GCFgr is 0.99, which indicates that 1 percentage increase in gross capital formation growth rate in the country leads to an increase in the economic growth rate (RGDPgr) by 0.099 percent in the long run.

Similarly, the value of POPgr is 0.762. It indicates an annual population growth rate increase by

one percentage leads to a rise in economic growth rate by 0.76 percent in the context of Nepal. The coefficient of INFr is 0.036, which indicates that the annual 1 percentage increase in inflation rate causes an increase in RGDPgr by 0.036 percentage in the long run.

Table 6

Long Run and Short Run Relationship

Panel A: Long Run Coefficients (Dependent variable – RGDPgr)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
Growth rate of internal debt (IDg)	-0.0086	0.0060	-1.4292	0.1677
Growth rate of external debt (EDg)	0.0286	0.0126	2.2663	0.0341
Growth rate of gross capital formation (GCFgr)	0.0991	0.0258	3.8260	0.0010
Growth rate of population (POPg)	0.7625	0.3441	2.2157	0.0379
Inflation rate (INFr)	0.0360	0.0609	0.5908	0.5609
EC = RGDPgr – (-0.0086*IDg + 0.0286*EDg + 0.0991*GCFgr+0.7625*POPgr+0.036*INFr)				

Panel B: Short Run Coefficients (Dependent variable – RGDPgr)/ECT

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.3013	0.3834	6.0017	0.0000
D (EDg)	0.0131	0.0080	1.6179	0.1206
D (GCFgr)	0.0909	0.0114	7.9459	0.0000
D (POPgr)	-0.4629	0.6916	-0.6693	0.5106
CointEq(-1)*	-1.3314	0.1619	-8.2214	0.0000

Note: Author's own calculation

According to the result given in above panel A, the existence of a stable long-run relationship among the variable is further confirmed by the significant error correction term (Benerjee &

Mestre, 1998). The coefficient of ECT_{t-1} shows the speed of adjustment toward long-run equilibrium if any disequilibrium exists in the short-run, i.e., how quickly the deviation in the unrestricted model returned back in long-run values. The coefficient of ECT is -1.33, implying that instead of monotonically converging to the equilibrium path directly, the error correction process fluctuates around the long-run value in a dampening manner. The value of the coefficient, which lies between -1 to -2, produces the dampened fluctuation (Narayan & Smyth, 2006).

Model Diagnostic Tests

Diagnostic tests investigatethe goodness of fit, stability, parsimoniality, functional form, and a well-behaved modelin general.

Table 7

Diagnostic test

Diagnostic test	F-statistic	Probability value (p)
Serial Correlation LM Test	F(2,19) = 0.27	0.7640
Heteroscedasticity Test	F(9,21) = 2.00	0.1111
Normality	JB = 0.83	0.6587

Note: Author's own calculation

Since the results of the p-values for LM test, heteroscedasticity test and JB test are greater than 0.05, we fail to reject the null hypothesis, revealing that the long-run and short-run estimates are free from serial correlation, heteroscedasticity of the error term and data are normally distributed implying the acceptable fit of the model.

Stability Diagnostic: CUSUM Test

The stability of the ARDL parameters was also tested by applying the CUSUM and CUSUMSQ tests developed by Brown et al.(1975).This test is incorporated to check that stability of the model whether dependent variable is stable or no at 5 percent significance level. Blue line of figures lies between two red lines, which indicates model is stable and desirable.

Figure 4.5

Plot of Cumulative sum of Recursive Residuals

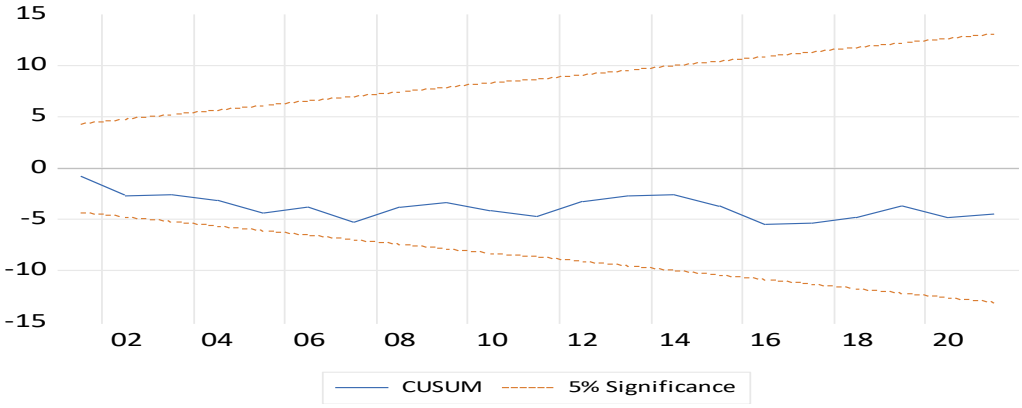
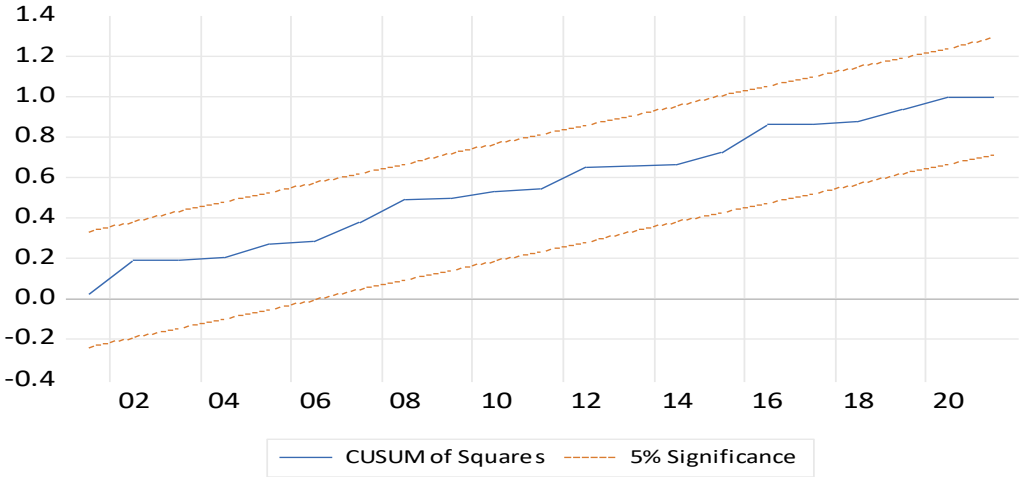


Figure 2

Plot of Cumulative Sum of Squares of Recursive Residuals



Discussion

The result of this study shows that the coefficient of internal debt is negative but insignificance. This result is also consistent with the classical and neo-classical views. It also consistent with the finding of Obademi (2012), Atique and Malik (2012), Singh (1999), Anyanwu and Erhijakpor (2004). The coefficient of external debt is positive and statistically significance, means positive effect of external debt on economic growth of Nepal. This result is consistent with the Keynesian view as well as finding of Bhatta (2003), Kasidi and Said (2013), Ndubuisi (2017), Frimpong and Oteng-Abayie (2006), Sulaiman and Azeez (2012). This implies that increase in domestic debt reduces the economic growth but increase in external debt increases the economic growth in the context of Nepal. The coefficient of growth rate of gross capital formation is positive and significant, means gross capital formation promotes the economic growth rate of Nepal. This result is consistent with the Baum, Checherita-Westphal and Rother (2013), Pradhan and Yadav (2002). The coefficient of POPgr is positive and significant in case of long run but negative in short run. Even though the result of long run effect is contradictory with the conventional wisdom. But consistent with the finding of Kuznets (1966), Simon (1977), (Thuku, Paul & Almadi, 2013) and (Ali, Ali & Amin, 2013). This result is inconsistent with the finding of Peterson (2017), Brander and Dowrick (1994), Blanchet (1988). The coefficient of INFr is also positive but insignificant. It implies there is the positive effect of inflation rate on economic growth rate of Nepal. This result is consistent with the finding of Sarel (1996), Nell (2000), Fakhri (2011) and Khan and Senhadji (2001).

Conclusion and Implications

The study found that in long run, effect of internal debt upon the economic growth rate of Nepal is negative. It means as internal debt increases, economic growth rate decreases. However, the p-value is insignificant; therefore, there are not sufficient reasons to accept this conclusion. But, the long run effect of external debt upon the economic growth rate is positive and significant. It means, confirmly the increase in external debt leads to increase in the economic growth rate of Nepal in long run. There is also the short run and long run relationship between the economic growth rate (i.e. RGDPgr) and internal debt, external debt and other independent variable used under this study because the value of F-statistic is more than the lower and upper critical values.

In this condition the government should be more accountable and transparent even in the internal debt collection and its uses. The fund collected internally should not be used for any kind of regular expenditure. It must be utilized for developmental activities effectively and transparently. Internal debt collection should be for long term rather than short term and its terms and conditions should be in favour of government. Though it is found that there is negative effect of internal debt and positive effect of external debt upon economic growth of

Nepal. But priority should be given to obtain internal debt. It is because, external debt servicing against the external debt results the flight of domestic resources in foreign market.

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