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Investment, Saving, Money Supply and Economic Growth in Nepalese Economy: A Nexus through ARDL Bound Testing Approach

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Abstract: This paper seeks to examine a nexus of investment, broad money supply and saving with economic growth of Nepal through the application of ARDL bound testing approach covering the period from 1974/75 to 2018/19 with the help of annual time series on the concerned variables. The variables except broad money supply are converted into the real terms with the help of GDP deflator with base year 2000/01 and all the variables are converted into the natural logarithm. First, broad money supply is included into the ARDL model and long run impact of regressors on dependent variable is examined. The long run impact of investment on economic growth is found to be weak. As a result, in remodeling of ARDL, the broad money supply variable is dropped and results are calculated with the view of examining the nexus of investment and saving on economic growth. From long run ARDL test, the investment elasticity and saving elasticity are found to be statistically significant and positive as0.066 and 0.023 respectively. The ARDL bound test shows cointegrating relations among the variables. As indicated by error correction model, short run shocks significantly affect long run relations among the variables. The departure from the long-term growth path due to short run shocks is adjusted by 9.5 % over the next yearasindicated by error correction model. This paper throws some light in policy perspective. The policies associated with saving, investment and economic growth should not contradict each other. Government should formulate saving attracting policies either through tax increase to discourage unnecessary consumption or passing new acts at local levels to encourage saving. Investment friendly policies are required to formulate to increase attraction of returned migrant youths in agriculture, fruits, livestock and other business activities with the view of promoting export and substitution of import to accelerate economic growth in Nepal.

INTRODUCTION

The nexus of Investment and capital formation with economic growth is very influential matter in macroeconomic theories and empirical studies that has fascinated keen interest of researchers and policy makers. The Neoclassicists like Ramsey (1928), Solow (1956), Swan (1956), Cass (1965) and Koopmans (1965) highlighted the saving and investment play central role to accelerate economic growth. The growth models by Harrod(1939), Domar (1946), Frankal (1962) and Romer (1986) emphasized capital formation as the source of growth and saving as the source of capital formation. Higher saving implies higher capital formation and higher capital formation would foster economic growth.According to Verma (2007), saving and investment play vital role in promoting economic growth. Gutierrez &Solimano (2007) andHundie (2014) also observed saving and investment as the factors that have a significant positive impact on economic growth in long run.

There are different views of economists and researchers who advocated either in favor of saving or investment or both to accelerate economic growth. For example, Lewis (1955) stated that increasing saving would accelerate growth, while Harrod (1939) and Domar (1946) highlighted investment as the key factor in promoting economic growth. Solow (1956) argued that increase in saving rate boosts steady-state output by more than its direct impact on investment. According to Solow, since saving is the direct function of income, the rise in income causes saving to increase, which leads to rise in investment.Whereas, Barrow (1991) highlighted the role of investment for economic development of LDCs.The study of Ahmad &Anoruo (2001) is also found to be in the line of Lewis and Solow.

According to Wondwesen (2011), the Keynesians and post-Keynesiansemphasized on the role of investment in determining medium term growth rates through aggregate demand. On the other hand, some studies like Bacha (1990), Stern (1991), DeGregorio (1992) and Saltz (1999) emphasized on the role of saving in promoting economic growth. All of the authors concluded that increase in saving results rapid expansion of capital stock leading to rise in investment and hence higher growth is attained. Samuelson (1948) and Hicks (1967) explained the role of investment to achieve growth through interaction between accelerator and multiplier.

In addition to saving and investment, money supply also has the effect on economic growth. Money supply is determined by central bank through its monetary policy. Monetary policy is an important tool for economic stabilization and enhancing economic growth. There are different versions

regarding money supply and growth. Classicists and monetarists believed that money supply will have neutral effect in output in the long run.Friedman (1956) emphasized long run monetary neutrality and short run monetary non-neutrality. However, Keynes (1940) advocated that money supply will be merely inflationary corresponding to full employment level. The increase in money supply below full employment level will have positive impact on output.Anumber of researches have been conducted regarding the nexus between money supply and growth. Some studies reveal positive linkage between money and output, whereas other studies exhibit neutral role of money in output. The empirical findings are covered in the section 'Literature Review'.

There are different factors to determine economic growth like capital formation, foreign direct investment, level of export, rate of inflation, development of infrastructure, level of public expenditure, political condition, population growth, development of technology etc. However, from the analysis mentioned above it can be concluded that economic growth is determined by investment, saving and money supply. Hence, growth is taken as the function of these three variables as presented the functional form:

$$Q_{gt} = f(I_t, S_t, M_2)$$

where, Q_{gt}, I_t, S_t and M_2 stand for output growth, investment, saving and broad money supply respectively.

Present study aims at examining the nexus of investment, saving and broad money supply with economic growth in the economy of Nepal through newly developed econometric model, autoregressive distributed lags (ARDL) bound testing approach. The rest of the section includes: literature review, research methodology along with discussion and analysis, while last section includes conclusion and policy implications.

LITERATURE REVIEW

In this section,Present paper incorporates the review of literature in two categories such as theoretical review and empirical review. Under theoretical review, present paper includes the summary and conclusion of Keynesian and Neo-classical approach. Some modern views associated with this study are also covered.

Keynes (1936) in his paper "General Theory of Employment, Interest and Money" developed the multiplier principle. The Keynesian multiplier principle states that investment will translate into income, where a smaller increment in investment results in a multiple increase in final income. Keynes postulated that for the economy to be in equilibrium saving must

be equal to investment. The equilibrium between saving and investment brings stable equilibrium in the economy. This implies that saving are the source of capital formation and capital formation is the basis of income generation in the economy. Harrod-Domar growth theory (Harrod,1939 and Domar,1946) is based on the experience of capitalist economy, which attempts to analyze the role of investment for steady state growth. This model states that investment has dual role. First, it generates capacity and second it generates income. Besides, Harrod-Domar model states that a targeted rate growth of output is determined by rate of saving, capital output ratio andcapital depreciation. On the other hand, Solow (1956) presented that level of output is determined by capital stock, labor employment and level of technology. He further asserted that how saving, population growth and technological progress affect growth of output in the economy.

Mankiw (2000) rightly remarked that high level of output can be achieved by high level of capital stock and savings are the source of capital stock. Higher the rate of saving, higher will be the capital stock and hence there will be higher level of output. Todaro & Smith (2002) also agreed the arguments of Mankiw that savings contribute to higher capital formation and thereby higher level of output.

Mixed forms of findings and conclusion are available in the economic theory regarding the contribution of money into output. The classicists view was that money has neutral effect on real variables like employment and output. According to classicists, the function of money is to determine price level. On the other hand, liquidity preference theory of interest of Keynes (1936) stressed that growth of output is determined by liquidity in the economy implying that money has no neutral effect on real variables. Friedman (1968), a leader of the monetarism, argued that variations in money supply have major influences on output in the short run and money will have no influence on output in the long run.

A number of empirical researches have been carried out on the nexus of investment, saving and money supply with economic growth. Present study includes the review of some of the latest and key researches in the empirical areas. For example, Verma (2007) explored the linkage of investment, saving and economic growth for Indian economy using ARDL Bound Testing approach, and found a cointegration between gross domestic saving, gross domestic investment and economic growth. In short run, saving and investment did not have impact. However, in the long run investment caused economic growth. Another study of Budha (2012) in Nepalese context found cointegration among the variables saving, investment and economic growth by employing ARDL approach.

Employing Granger causality test, the author found bidirectional causality between saving and economic growth as well as investment and economic growth.

A nexus between economic growth and monetary policy is found in the study of Taiwo (2012) and Chinuba, Akhor & Akwaden (2015) for Nigeria, Salih (2013) for Saudi Arabia and Mohamed Aslam (2016) for Sri Lanka, in which all studies showed positive relationship between money supply and GDP. Some studies in Nepalese context like Gyanwaly (2012), Acharya (2018) and Gyanwaly (2019) through their econometric modeling also supported the evidence of positive impact of money supply on economic growth.

RESEARCH METHODOLOGY

Data and Variables

The present study is based on empirical analysis that employs the secondary data of GDP, gross capital formation, domestic saving and broad money supply over the period 1974/75-2018/19. The variables are converted into the real terms (except broad money supply) with the help of GDP deflator with base year 2000/01 and transformed into natural logarithm. GDP in real terms transformed into logarithm is denoted by lnY_t is proxy for economic growth. Gross capital formation in real terms transformed into logarithm is denoted by lnI_t is proxy for investment. Domestic saving in real terms transformed into logarithm is denoted by lnS_t and broad money supply transformed into logarithm is denoted by lnM_{2t}. The related data are taken from Economic Survey (various issues), Ministry of Finance.

Methodology

Present study employs econometric methodology to signify the nexus of the variables lnI_t, lnS_t and lnM_{2t} with lnY_t. Phillips-Perron unit root test is applied to identify the stationarity of the variables. ARDL bound testing approach is the main econometric methodology used in the present study to examine the cointegrating relationship between aforementioned variables and establish the nexus between them. The ARDL bound testing approach can be used when the variables are purely $I(1)$ or $I(0)$ or mixed order of $I(1)$ and $I(0)$. The unit root is not necessary in ARDL models. However, it is performed only for identifying whether variables are $I(2)$. The variables with order $I(2)$ are not appropriate for ARDL models. If any variable is $I(2)$, it cannot be employed for ARDLs.

Phillips-Perron (PP) Unit Root Test

Phillips & Perron (1988) propose an alternative (nonparametric) method of controlling for serial correlation when testing for a unit root. The PP method estimates the non-augmented Dickey Fuller test equation $\Delta y_t = \alpha y_{t-1} + x_t'\delta + \varepsilon_t$ and modifies the *t*-ratio of the α coefficient so that serial correlation does not affect the asymptotic distribution of the test statistic. Where y_t is the variable under study, x_t is the optional exogenous regressors which may consist of constant, or a constant and trend $\tilde{t}_\alpha$ and ε_t is the white noise error term. The PP test is based on the statistic: (Eviews 10, User's Guide)

$$\tilde{t}_\alpha = t_\alpha \left(\frac{\gamma_0}{f_0}\right)^{\frac{1}{2}} - \frac{T(f_0 - \gamma_0)(se(\hat{\alpha}))}{2 f_0^{\frac{1}{2}} s} \tag{1}$$

where $\hat{\alpha}$ is the estimate, t_α the t-ratio of α, $se(\hat{\alpha})$ is the coefficient standard error of the test regression, γ_0 is a consistent estimate of the error variance and the remaining f_0 an estimator of the residual spectrum at frequency zero. Finally, T represents number of observations.

There are two choices we will have make when performing the PP test. First, we mustchoose whether to include a constant, a constant and a linear time trend, or neither, in the test regression. Second, we will have to choose a method for estimating f_0. The null hypothesis for PP unit root test is 'variable has unit root'. If null hypothesis is not rejected, the variable will have unit root and it is said to be non-stationary variable. On the other hand, if null hypothesis is rejected, the variable will be stationary.

ARDL Bound Test

A two-step procedure is used while estimating cointegration between the variables using ARDLs. ARDLs are standard least squares regressions that include lags of both the dependent variable and explanatory variables as regressors (Greene, 2008). These models are popular econometric tools of examining the cointegrating relationship between the variables under study. From the literature, economic growth can be taken as the function of investment, saving and money supply. The functional form is represented by equation (2).

$$\ln Y_t = f(\ln I_t, \ln S_t, \ln M_{2t}) \tag{2}$$

Equation (2) can be converted into ARDL terms using Pesaran, Shin, & Smith (2001) procedures. The long run *ARDL* (*p*, *q*, *r*, *k*) model with dependent variable lnY_t and regressors lnY_{t-p}, lnI_{t-q}, lnS_{t-r} and lnM_{2t-k} can be represented by equation (3).

$$\begin{aligned}\ln Y_t = \gamma_0 + \alpha_1 \ln Y_{t-1} + \cdots + \alpha_p \ln Y_{t-p} + \beta_0 \ln I_t + \beta_1 \ln I_{t-1} + \cdots \\ + \beta_q \ln I_{t-q} + \theta_0 \ln S_t + \theta_1 \ln S_{t-1} + \cdots \\ + \theta_q \ln S_{t-q} + \delta_0 \ln M_{2t} + \delta_1 \ln M_{2t-1} + \cdots \\ + \delta_k \ln M_{2t-k} + \varepsilon_t\end{aligned} \tag{3}$$

To apply ARDL bound test using Eviews 10, first we choose the appropriate model with suitable lags to be included for each regressors using either AIC or SC criterion. Eviews automatically provides appropriate model for ARDL test. With the help of ARDL model expressed in equation (3), we can estimate the elasticity coefficients, which imply long run effect of regressors on dependent variable.

Once long run ARDL tests are performed, the next step is to employ ARDL bound test to examine the cointegrating relationship between the variables. In this test, the F-statistic is compared with upper bound and lower bound critical values. If F-statistic is greater than upper bound critical value, the null hypothesis 'no cointegration' is rejected, which means there is cointegration between the variables. On the other hand, if F-statistic is less than lower bound critical value, the null hypothesis cannot be rejected. Again, if F-statistic lies between upper bound critical value and lower bound critical value, the decision will be inconclusive.

If cointegrating relationship between the variables is established, the next step is to carry out the unrestricted error correction model (UECM). Error correction term as the feedback effect shows the extent to which disequilibrium in short run converges to the long run equilibrium. The coefficient of regressors show short run Granger causality and coefficient of error correction term shows the long run Granger causality and it must be negative. To test for co-integration among the variables lnY_t, lnI_t, lnS_t and lnM_{2t} with an ARDL (*p*, *q*, *r*, *k*) representation respectively, the unrestricted ECM is presented through equation (4).

$$\begin{aligned}\Delta \ln Y_t = \gamma_1 + \rho_1 Z_{1t-1} + \Sigma_{i=1}^{n} \alpha_i (\Delta \ln Y_{t-i}) + \Sigma_{i=1}^{n} \beta_i (\Delta \ln I_{t-i}) + \Sigma_{i=1}^{n} \theta_i (\Delta \ln S_{t-i}) + \\ \Sigma_{i=1}^{n} \delta_i (\Delta \ln M_{2t-i}) + \varepsilon_{1t}\end{aligned} \tag{4}$$

Where, Z_{1t-1} is the first lag of error correction term γ_1 is the intercept, α_i, β_i θ_i and δ_i are the coefficients of lagged variables and finally, ρ_1 is the coefficients of error correction term.

Before carrying out ARDL bound test, it is necessary to perform unit root test. The ADF unit root test is performed to identify whether any variable is $I(2)$ If no variable is $I(2)$, we can carry out ARDL bound test freely. Similarly, once ARDL bound test is carried out the next step is to check residual diagnostics and stability diagnostics for robustness the selected ARDL model. Residuals diagnostics include serial correlation test and heteroscedasticity test. Finally, the stability test includes Ramsey RESET test.

RESULTS AND DISCUSSION

The results from econometric tests like Phillips-Perron unit root, ARDL bound test and other necessary tests in accordance with the objective of this paper are presented and discussed below.

Results from Phillips-Perron Unit Root Test

The results from Phillips-Perron unit root test are presented through Table 1.

Table 1
Phillips-Perron Unit Root Test

Variables	*PP test statistic*	*Test critical value at 5 % level*	*Probability*
lnY_t	1.4015	-2.9297	0.9987
ΔlnY_t	-7.3308	-2.9314	0.0000
lnI_t	1.6347	-2.9297	0.9994
ΔlnI_t	-8.4974	-2.9314	0.0000
lnS_t	-1.1301	-2.9297	0.6955
ΔlnS_t	-17.3760	-2.9314	0.0000
lnM_{2t}	-0.9571	-2.9297	0.7602
$\Delta ln\mathrm{M}_{2t}$	-4.7461	-2.9314	0.0004

(a) *variable has unit root (b) Exogenous: constant (c) Bandwidth: Newey-West automatic-using Bartlett Kernel*

From Table 2, it is observed that the variables lnY_t, lnI_t, lnI_t and lnM_{2t} are not significant at level forms as reported by the Phillips-Perron statistic and the corresponding probability values at 5% level of significance. The null hypothesis for all variables is not rejected. Hence, these variables are non-stationary at level forms. However, the null hypothesis for all variables lnY_t, lnI_t, lnI_t and $ln\mathrm{M}_{2t}$ is rejected at their first differences implying that they are stationary at first difference. Hence, all variables are $I(1)$.

Selection of Appropriate ARDL Model

Using Akaike Information Criterion (AIC), the appropriate ARDL models with dependent variable lnY_t and regressors lnI_t, lnM_{2t}, lnS_t and with own lnY_t is represented by Figure 1. The figure implies that *ARDL* (1,0,0,3) is the appropriate model based on minimum AIC. Out of top twenty models, the AIC is minimum (highest negative) with this *ARDL* (1, 0, 0, 3). Hence, the present study uses this model as the appropriate ARDL bound test to examine the nexus of investment, saving and broad money supply with economic growth.

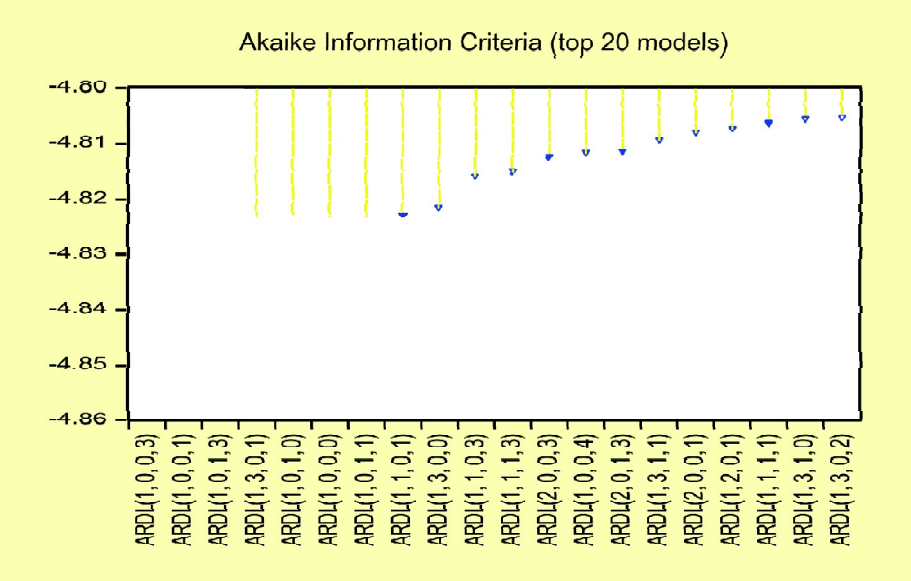

Figure 1: Selection of Appropriate ARDL Model Based on Akaike Information Criterion

Autoregressive Distributed Lag (ARDL)

The results from *ARDL* (1, 0, 0, 3) have been presented through Table 2, in which lnY_t is taken as dependent variable, and lnY_t, lnI_t, lnS_t and lnM_{2t} with suitable lag are explanatory variables. All variables (dependent and explanatory) under study are *I*(1).

From Table 2 it is observed that the coefficient of lnI_t is $\beta_0 = 0.0491$, which is positive and significant at 10 % level. This investment elasticity of GDP 0.0491 implies that a 10% rise in investment causes GDP to increase by 0.49%. The broad money supply elasticity $\delta_0 = 0.0965$ is also positive and significant at 1% level, which reveals that a 10% rise in broad money supply causes GDP to increase by 0.96%. The saving elasticity $\theta_0 = 0.0249$,

Table 2
Results from ARDL (1,0,0,3) Model with lnY_t as Dependent Variable

Explanatory Variables	*Coefficients*	*Standard Errors*	*t-Statistic*	*Probability*
lnY_{t-1}	$\alpha_1 = 0.5902$	0.1293	4.5623	0.0001
lnI_t	$\beta_0 = 0.0491$	0.0277	1.7729	0.0852
lnM_{2t}	$\delta_0 = 0.0965$	0.0367	2.6279	0.0128
lnS_t	$\theta_0 = 0.0249$	0.0094	2.6320	0.0127
lnS_{t-1}	$\theta_1 = - 0.0168$	0.0091	-1.8383	0.0748
lnS_{t-2}	$\theta_2 = 0.0045$	0.0085	0.5381	0.5940
lnS_{t-3}	$\theta_3 = -0.0159$	0.0084	-1.8861	0.0678
γ_0	$\gamma_0 = 2.7753$	0.9149	3.0332	0.0046

which is positive and significant at 1% level implying that a 10% rise in saving causes GDP to increase by 0.24%. Finally, the coefficients of saving at lag 1,2 and 3 are either negative or insignificant. It clearly implies that saving at lag 1, 2 and 3 has no effect on the growth of GDP. Thus, the ARDL test result implies that gross invest has little impact but saving and broad money supply have strong impact on the growth of GDP during the study period.

However, the impact of investment on economic growth should be strong as argued by Keynesian multiplier analysis and Harrod-Domar growth model. Again, when ARDL model is applied with economic growth as dependent variable and investment as regressor separately, a strong impact of investment on economic growth is found in Nepalese economy. The influence of investment on economic growth is found to be weak when nominal variable, money supply is included along with real variables GDP, investment and saving. The money supply variable lnM_{2t} is dropped from our ARDL model given by equation (3). Now, equation (3) can be modified into equation (5) as:

$$lnY_t = \gamma_0 + \alpha_1 lnY_{t-1} + \ldots + \alpha_p lnY_{t-p} + \beta_0 lnI_t + \beta_1 lnI_{t-1} + \ldots + \beta_q lnI_{t-q} + \theta_0 lnS_t + \theta_1 lnS_{t-1} + \ldots + \theta_q lnS_{t-q} + \varepsilon_t \quad (5)$$

Equation (5) represents long run ARDL model, in which the coefficients of regressors signify long run elasticity. In the same manner, equation (4) is also converted into equation (6) as lnM_{2t} is dropped.

$$\Delta \ln Y_t = \gamma_1 + \rho_1 Z_{1t-1} + \sum_{i=1}^{n} \alpha_i \left((\Delta \ln Y_{t-i}) + \sum_{i=1}^{n} \beta_i (\Delta \ln I_{t-i} \right) + \Sigma_{i=1}^{n} \theta_i (\Delta \ln S_{t-i}) \quad (6)$$

In accordance with equation (5) the suitable ARDL model based on AIC is: ARDL (1,0,1). Table 3 presents results from ARDL (1,0,1) in accordance with equation (5).

Table 3
Results from ARDL (1, 0, 1) Model with lnY_t as Dependent Variable

Explanatory Variables	*Coefficients*	*Standard Errors*	*t-Statistic*	*Probability*
lnY_{t-1}	θ_1= 0.9042	0.0388	23.2489	0.0000
lnI_t	β_0= 0.0668	0.0288	2.3180	0.0258
lnS_t	θ_0= 0.0233	0.0099	2.3439	0.0243
lnS_{t-1}	θ_1=-0.0228	0.0091	-2.4831	0.0174
γ_0	γ_0=0.4287	0.184008	2.330243	0.0251

From Table 3, it is observed that the coefficient of lnI_t is β_0 = 0.0668, which is positive and significant at 5% level. This investment elasticity of GDP 0.0668 implies that a 10% rise in investment causes GDP to increase by 0.66 %. The saving elasticity θ_0 = 0.0233, which is positive and significant at 5 % level implying that a 10 % rise in saving at current time causes current time GDP to increase by 0.23 %. Finally, the coefficients of saving at lag 1 is negative, it is inconclusive. Thus, the ARDL test implies that investment and saving have positive impact on economic growth in Nepal in the long run.

Once long run ARDL models are employed, the next step is to apply ARDL bound test and error correction models to examine the cointegration between the variables. Table 4 shows the results from ARDL bound test and Table 5 the results from unrestricted error correction model as expressed by equation (6).

Table 4
Results from ARDL Long Run form and Bound Test

Description	*Value*	*Level of Significance*	*I(0)*	*I(1)*
			Asymptotic: N = 1000	
F-statistic	50.24	10%	2.63	3.35
k = 2		5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5.0

H_0: No level relationship Included Observation: *T* = 44

Table 4 suggests that the F-statistic with degree of freedom (3,44)is 50.24, which is greater than all critical values at *I*(1). The null hypothesis is strongly rejected at 5%, 2.5% and 1% level of significance. Hence, there exists level relationship between the variables. The ARDL bound test supports the cointegration between the variables lnY_t, lnI_t and lnS_t under study.

Table 5
Results from ARDL (1,0,1) Model with lnY_t as Dependent Variable

Explanatory Variables	*Coefficients*	*Standard Errors*	*t-Statistic*	*Probability*
ΔlnS_t	$\theta_1 = 0.0238$	0.0067	3.4867	0.0012
Z_{t-1}	$\rho_1 = -0.0957$	0.0065	-14.711	0.0000

Table 5 demonstrates the results of the short-run parametersalong with that of the error correction term. The coefficient of ΔlnS_t is $\theta_1 = 0.0238$, which is positive and significant at 1% level implying that current year growth of saving has positive significant effect on current economic growth. The result indicates that a 10% increase in growth of saving at current year causes economic growth at the same time to increase by 0.23%. The result reveals that there is short run Granger causality between growth of saving and economic growth and causality runs from saving to economic growth in the economy of Nepal.

The error correction coefficient is $\rho_1 = -0.0957$, which is negative and highly significant at 1 % level. The result implies that short run shocks significantly affect long run equilibrium among the variables economic growth, investment, and saving. The departure from the long-term growth path due to short run shocks is adjusted by 9.5 % over the next year.

Residuals Diagnostics and Stability Diagnostics

The robustness of the estimated ARDL(1,0,1) model has been testifiedthrough applying serial correlation test and heteroscedasticity test.Breusch-Godfrey approach and Breusch-Pagan-Godfrey (B-P-G) approach are used to check the serial correlation and heteroscedasticity respectively in the residuals of the estimated ARDL.Moreover, the stability of the estimated model is testified through Ramsey's RESET test. Table 6 presents residuals diagnostic and stability test for estimated ARDL (1,0,1) model.

Table 6
Residuals Diagnostic and Stability Test for Estimated ARDL (1,0,1) Models

Test Statistic	*B-G Serial Correlation*	*P-P-G Heteroscedasticity*	*Ramsey's RESET*		
F-statistic	0.6536	0.8880	2.3004		
Degree of Freedom	(1,38)	(4,39)	(1,38)		
Probability	0.4239	0.4802	0.1376		
$T \times R^2$	0.7440	3.6729	t-Test		
Probability χ^2	0.3884	0.4521	t-stat	DF	Prob.
			1.5167	38	0.1376

From Table6, it is observed that F-statistic, value of ($T \times R^2$) and probability value of ?^2under Breusch-Godfrey Serial Correlation LM test imply that the null hypothesis of no serial correlation is not rejected. Hence, the residuals of estimated ARDL are not serially correlated. Likewise, the residuals are also free from heteroscedasticity problem as accounted by F-statistic, value of ($T \times R^2$) and corresponding probability value of χ^2 under B-P-G. Finally, as reported by t-statistic and F-statistic under Ramsey's RESET test, the estimated ARDL is correctly specified bearing the property of linearity and hence it is stable equation.

Conclusion and Policy Implication

The ARDL (1,0,0,3) models with regressors investment, broad money supply, saving and own lag of GDP implies that saving and broad money supply have the strong effect on GDP, whereas the investment has the weak effect on the dependent variable GDP. In accordance with the Keynesian theory and Harrod-Domar growth theory, investment has the pivotal role for the promotion of economic growth. considering this fact, the ARDL models were reexamined dropping the nominal variables, broad money supply from the set of real variables GDP, investment and saving and new ARDL (1,0,1) model is selected to examine the cointegration among the variables. New ARDL (1,0,1) represents a cointegration among these variables as indicated by bound test. The long run ARDL implies the strong impact of both investment and saving on the economic growth. The investment elasticity and saving elasticity are calculated as 0.066 and 0.023 respectively. These results prove a long run impact of investment and saving on economic growth. Additionally, the error correction mechanism of ARDL reveals that short run shocks significantly affect long run equilibrium relations among the variables under study. The departure from the long-term growth path due to short run shocks is adjusted by 9.5 % over the next year. Finally, the diagnostic tests applied under ARDL (1,0,1) prove the robustness of the selected ARDL model.

The findings of the present study throw some light in policy perspective. Since the variables under study are cointegrated, the policies associated with saving, investment and growth should not be contradicted each other. Government of Nepal including state government and local level government are required to formulate saving-promoting policy to increase saving. The individuals and households are encouraged saving through reduction in consumption. The consumption of ornaments, unnecessary luxuries, spending on unnecessary expenses on wedding and festivals and consumption dependent loans are required to discourage through high taxes on ornaments and luxuries. Local government should immediately

pass new acts to regulate the unnecessary expenses associated with wedding, festivals and loan dependent consumption. It is because Nepalese society's consumption behaviors are affected by Duesenberry's demonstration effect. Nepalese remittance occupies more than 25 % of GDP (before COVID-19 lockdown), out of which more than 79 % is spent on consumption as reported by Nepal Living Standard Survey (2011). Hence, immediate regulation of remittance is required to promote saving because saving is the most important and reliable source of capital formation to increase economic growth in Nepal.

Additionally, investment friendly policies are required in Nepal to promote investment and there by economic growth. The interest rate on capital investment is required to decrease in Nepal. Besides, tax concessions are also inevitable to agro-based small and medium scale industries to attract more investment in these areas. Nepal can take COVID-19 as an opportunity to promote economic growth through the investment on agriculture, fruits and livestock. Thousands of youth have returned home after living abroad with some skills in agriculture, fruits and livestock and other business activities. It is necessary to attract these youths in development of Nepalese agriculture, tourism and other business activities by providing necessary loans at cheap interest rate. This effort on the part of government brings multiple benefits. First, it promotes employment and output. Second, incomes are generated through internal market and foreign market, which helps to reduce our unfavorable balance of payments through export promotion and import substitution.

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