Role of Capital Formation and Saving in Promoting Economic Growth in Nepal: An ARDL Bound Testing Approach

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Authors' contributions

This work was carried out in collaboration between both authors. Author AKD designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author AJL managed the analyses of the study. Both authors read and approved the final manuscript.

Article Information

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ABSTRACT

This study examines the relation and impact of gross capital formation and gross national saving on Nepal's Gross Domestic Product (GDP). It is based on the secondary data taken from various economics survey of Nepal and other published sources covering 33 data points from the fiscal year 1987/88 to 2019/20. Descriptive and empirical research designs examine the relation between GDP, gross capital formation, and gross national saving. The EViews 10 data processing software is used. Some econometrics tools like mean, dispersion, ARDL bound testing, error correction model, heteroskedasticity, serial correlation test, normality test, CUSUM test, and CUSUM square test are used. There is a long-run positive relationship between GDP and gross capital formation and gross national saving. The gross capital formation and gross national saving are individually and jointly significant to explain GDP in the long run, but there is a negative impact on regressors' GDP. Capital formation and saving positively impact GDP. Still, the effectiveness is not found satisfactory because a one percent increase in capital formation only increases GDP by 0.267 per cent. So, the saving amount must be utilized in the productive sector. The author of the research is not affected by the other researchers' findings, tools, and methods.

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1. INTRODUCTION

Gross Domestic Saving is the difference between GDP and, the final consumption expenditure. It is expressed as a percentage of GDP. Gross Domestic Saving is the sum of savings of the household sector, private corporate sector, and the public sector. Capital formation is defined as the process of increasing the stock of real capital in the country. Capital formation involves making more and more capital assets. In the wider sense, it includes investment in human capital along with material capital. Capital formation is a term used to describe the net capital accumulation during an accounting period for a particular country. The term refers to additions of capital goods, such as equipment, tools, transportation assets, and electricity. Countries need capital goods to replace the older ones that are used to produce goods and services.

Capital formation is the main component of the economic growth and development of any society. Capital formation is the process of acquiring additional capital assets that are used in the line of production. The foundation of capital formation is saving, whereas saving depends on income and interest rate. The extent to which the level of savings can affect capital accumulation and growth largely depends on economy's ability to channel the savings into productive use. Higher savings then implies higher capital accumulation and hence, economic growth. Many attempts are being made regularly to study the relationship between capital accumulation and economic growth in less developed countries [1].

The economic development of a country significantly depends upon the availability of capital stock with it. The higher rate of capital formation enables the economy to produce a larger volume of goods and services, increasing the nation's output. Capital formation leads to industrialization, economic welfare, and a reduction in production cost [2].

Nepal has exerted strenuous efforts to promote economic development. Planning has concentrated on attaining self-sufficiency, a high growth rate, full employment, and the reduction of inequalities [3]. However, the government's plan and program are not working well, and the performance of most of the development efforts has been discouraging. Nepal's saving habit is currently at its worst in the last two decades, as they have started consuming almost everything produced in the country. The gross domestic saving as a percent of GDP is likely to stand at 5.26 percent [4]. The key is that gross national saving contributes to economic growth by freeing up resources that can be employed to raise the productive capacity of the economy by increasing the amount of capital equipment, machinery, and building among others [5]. Solow's [6] growth model emphasis on higher saving rates for economic growth. Aghion, Comin et al. [7] argued that saving does not always matter for developing countries' growth. They further asserted that the production technology and the local sectors familiar with the domestic condition to mobilize the available savings into productive sectors.

This study explores the role and impact of gross domestic saving and gross capital formation to increase Nepal's GDP. It is assumed that the increase in GDP promotes economic growth in the nation.

2. REVIEW OF LITERATURE

The literature on the relation between GDP and Gross National Saving (GNS) and Gross Capital Formation (GCF) are varied and complex in some cases. Several researchers have tried to capture the relation between GDP and GNS and GCF by using various Proxies. Some relevant kinds of literature are presented in this section.

Rao [8] observed saving, capital formation, and national income in the Indian economy. He found that the Indian economy has reached a high rate of domestic saving and capital formation, and yet poverty and employment have seen to be on the increase. The level of income has reached near the middle level of industrialized countries even though the rate and capital formation seem to be approaching their level.

Pahlavani [9] investigates how capital accumulation and savings promote Iran's economic growth over four decades (1960 - 2003). Stiglitz and Weiss [10] argue that unequal or insufficient information led to adverse risk rselection, particularly under macroeconomic instability conditions. Abiodun and Basiru [11] examined the cause-and-effect relationship between domestic savings and economic growth in Nigeria. They found that causality runs from

savings to economic growth using granger causality and Engle-Granger causality co-integration test. Using a Vector Autoregression (VAR) approach, Igbatayo and Agbada [12] found that stimulate output and output and critically cause movement in savings.

Gibescu [13] examined the relationship between gross fixed capital formation and economic growth in Romania, Bulgaria, Czech Republic, Poland, and Hungary for 2003-2009. The obtained results show a direct and strong connection between economic growth and gross fixed capital formation, the relation expressed by correlation coefficient with a level very close to the value of 1 for Romania, Bulgaria, Czech Republic, and Poland. The conclusion is that the gross fixed capital formation level may positively influence economic growth in Romania, Bulgaria, Czech Republic, and Poland.

Misztal [14] analyzed the cause-and-effect relationship between economic growth and savings in advanced economies and in emerging and developing countries. The results confirmed the existence of a one-way causal relationship between gross domestic savings and gross domestic product in developed countries and developing and transition countries. At the same time, it was revealed the absence of a causal relationship between gross domestic product and gross domestic savings both in developed economies and developing and transition countries.

Krushna and Seelam [15] examined the effects of Gross Domestic Savings (GDS) and Gross Domestic Capital Formation (GDCF) on Gross Domestic Product at Market Prices (GDP at MP) at aggregate as well as disaggregated level during the two decades of the post-reform period, i.e., 1990-91 to 2009-10. The main result obtained is that regarding public sector savings contribution to the increase of GDP. But during the total period, the public sector contribution to GDP is more than that of the private corporate sector. The total period contribution of capital formation to GDP from the public sector is higher than the private sector.

Budha [16] examined the relationship between the gross domestic savings, investment, and growth for Nepal using annual time series data for 1974/75 to 2009/10. The study employs the Autoregressive Distributed Lag (ARDL) approach to test for cointegration and Errorcorrection based on Granger causality analysis for exploring the causality between the variables.

Empirical results show cointegration between gross domestic savings, investment, and gross domestic product when each of these is taken as the dependent variable. Granger causality analysis shows short-run bidirectional causality between investment and gross domestic product and between gross domestic savings and investment. Nevertheless, no short-run causality is found between gross domestic savings and gross domestic product.

Osundina and Osundina [1] examined the problem of low savings and capital accumulation related to economic growth in Nigeria. Addressing some of the methodological issues, underlying these macroeconomic aggregates, and identifying policy implications of the linkage between savings, capital accumulation, and growth in Nigeria. The study covers a period of thirty-three years starting from 1980 to 2012. The study employed a savings model, investment model, and Growth model. The savings model shows that investment and gross domestic product have a positive and significant effect on savings in Nigeria.

In contrast, inflation has a negative and insignificant effect on savings in Nigeria. The lending rate has a positive but negligible impact on savings. Savings has a positive and significant effect on investment in Nigeria; investment has a positive but insignificant effect on economic growth while savings have a positive and significant effect on Nigeria's economic growth. Ongo and Vukenkeng [17] examined the effect of capital formation on economic growth. The result shows that private investment has a significant positive association in increasingwith economic growth and capital formation, which has a significant role in increasing GDP and employment.

Onyinye, Idenyi et al. [18] observed the effect of capital formation on Nigeria's economic growth. The result of the data analysis indicates a stable long-run relationship. It further found that gross capital formation has a significant positive impact on GDP in the short-run and long run. Meyer and Sanusi [19] observed the role of gross fixed capital formation to accelerate economic growth and employment in South Africa. This study re-examines the controversial issue of causality between domestic investment, employment, and economic growth using South African data. The traditional assumption of causality running from investment to economic growth has remained inconclusive while empirical findings on the

investment and employment growth nexus are also largely unsettled. The study uses quarterly data from 1995Q1 to 2016Q4 within the framework of the Johansen cointegration and Vector Error Correction Models (VECM). The empirical findings suggest that a long-run relationship exists between domestic investment, employment, and economic growth, with causality running from economic growth to investment and not vice versa. The results also demonstrate that investment has a positive long-run impact on employment. The empirical evidence suggests bi-directional causality between employment and economic growth, while evidence of unidirectional causality, from investment to employment, is also found.

Joshi, Pradhan et al. [20] analyzed the relationship between saving, investment, and economic growth in Nepal from 1975 to 2016. The ARDL approach was utilized to analyze the long-run and short-run dynamics of saving. Investment and growth in Nepal. It was found that the investment has a significant and positive impact on economic growth. However, gross domestic saving hurts GDP growth in the long run.

3. MATERIALS AND METHODS

3.1 Research Design

This study is based on a descriptive and exploratory research design. It is based on the annual data series from the fiscal year 1987/88 to 2019/20, which includes 33 points. Some statistical tools like a line graph, Unit Root Testing, and Autoregressive Distributed Lag (ARDL) model describe and explore the relationship between gross domestic product and gross capital formation and gross domestic saving.

3.2 Data Source

This study uses the gross domestic product's annual secondary data, gross domestic capital formation, and gross domestic saving from 1987/88 to 2019/20, which comprises 33 years of data points. The secondary data are collected from various economic surveys of Nepal, various Nepal Rastra Bank (NRB), and publications of Central Bureau Statistics (CBS).

3.3 Model Specification

Consider a simple static model of Cobb-Douglas production function that postulates a relationship between output (Y) and capital (K) and labour(L).

$$Y_t = AK^\alpha L^\beta \tag{1}$$

In equation first Y_t indicates real output, L and K are labour and capital, respectively, α shows the contribution of capital in production, and β shows the contribution of labour in the production. It is assumed that α and β have a positive contribution to production. A is the efficiency parameter. The GDP depends on gross capital formation and gross domestic savings. In this sense,

$$GDP = f(GNS, GCF) \tag{2}$$

Where GDP stands gross domestic product, GNS stands gross national saving and GCF stands for gross capital formation.

$$LNGDP = \beta_0 + \beta_1 LNGNS_t + \beta_2 LNGCF_t + \varepsilon_t \tag{3}$$

Where, β_1 and β_2 indicate the gross national saving and gross capital formation elasticities of GDP, which are typically expected to take a positive value and are significant. Equation three implies that the expansion of gross saving and capital formation leads to a rise in GDP and vice versa. ε_t is the error term or disturbance term.

3.4 The ARDL Model Specification

The ARDL cointegration technique or bound testing approach is preferable when dealing with variables that are integrated of a different order, I(0), I(1), or a combination of both [21]. To examine the relationship between GDP and gross domestic saving and gross capital formation the autoregressive distributed lag (ARDL) model is used which was introduced by Pesaran and Shin [22], and Pesaran, Shin and Smith [23]. When we combined the features of autoregressive and distributed lag models in a more general dynamic regression model, known as the ARDL model. Suppose there three variables in the analysis, the model is specified as:

$$\Delta X_t = a_{01} + b_{11}X_{t-i} + b_{21}Y_{t-i} + b_{31}Z_{t-i} + \sum_{i=1}^{p} a_{ij} \Delta X_{t-l} + \sum_{i=1}^{q_1} a_{2j}\Delta Y_{t-1} + \sum_{i=1}^{q_2} a_{3j}Z_{t-1} + \varepsilon_{1t} \tag{4}$$

$$\Delta Y_t = a_{02} + b_{12}X_{t-i} + b_{22}Y_{t-i} + b_{32}Z_{t-i} + \sum_{i=1}^{p} a_{ij} \Delta Y_{t-l} + \sum_{i=1}^{q_1} a_{2j}\Delta X_{t-1} + \sum_{i=1}^{q_2} a_{3j}Z_{t-1} + \varepsilon_{2t} \tag{5}$$

$$\Delta Z_t = a_{03} + b_{13}X_{t-i} + b_{23}Y_{t-i} + b_{33}Z_{t-i} + \sum_{i=1}^{p} a_{ij} \Delta Z_{t-l} + \sum_{i=1}^{q_1} a_{2j}\Delta X_{t-1} + \sum_{i=1}^{q_2} a_{3j}Y_{t-1} + \varepsilon_{3t} \tag{6}$$

Where p and q refer to the lags used for the dependent and independent variables, respectively.

In this ARDL model, the lagged Xs constitute the autoregressive part, and Y's and Z's constitute the distributive part of the ARDL (p, q) model. P and q indicate the autoregressive and distributive lag terms. Expressing all variables of this study in natural logarithms, the following ARDL model can be specified as given below:

$$\Delta LNGDP^r = \beta_0 + \sum_{1=i}^{n} \beta_{1i} \Delta LNGDP^r_{t-i}$$
$$+ \sum_{1=i}^{n} \beta_{2i} \Delta LNGCF_{t-i} + \sum_{1=i}^{n} \beta_{3i} \Delta LNGNS_{t-i}$$
$$+ \sum_{1=i}^{n} \alpha_1 \Delta LNGDP_{t-l} + \sum_{1=i}^{n} \alpha_2 \Delta LNGCF_{t-l}$$
$$+ \sum_{1=i}^{n} \alpha_3 \Delta LNGNS_{t-l} + \mu_t \qquad (7)$$

In this equation, β_0 is the drift component, β_1 to β_3 represent the short-run dynamics of the model; the coefficients α_1 α_2 and α_3 indicate the long-run relationship and μ_t indicates the error term. After bound testing, we have to decide the long run or short run test or both are necessary. If variables are cointegrated, we have to specify both the short-run ARDL and long-run VECM model. If variables are not cointegrated, we have to specify only the short-run ARDL model. If there is no cointegration, the ARDL (p, $q_{1,}$ q_2) model is specified as given below:

$$\Delta X_t = a_{01} + \sum_{i=1}^{p} a_{1i} \Delta X_{t-i} + \sum_{i=1}^{q_1} a_{2i} \Delta Y_{t-i} + \sum_{i=1}^{q_2} a_{3i} Z_{t-i} + \varepsilon_t \qquad (8)$$

If there is cointegration, the error correction model (ECM) is specified as:

$$\Delta X_t = a_{01} + \sum_{i=1}^{p} a_{1i} \Delta X_{t-i} + \sum_{i=1}^{q_1} a_{2i} \Delta Y_{t-i} + \sum_{i=1}^{q_2} a_{3i} Z_{t-i} + \lambda ECT_{t-1} + \varepsilon_t \qquad (9)$$

Where,
ECT= error correction term. It represents the long-run adjustment process. a_{1i}, a_{2i}, and a_{3i} are the short-run dynamics coefficients, and λ represents the speed of adjustment parameter.

4. RESULTS AND DISCUSSION

4.1 Condition of Variables

The GDP and its affecting factors gross capital formation, and gross national saving considered in this study. The mean value of GDP, gross national saving, and gross capital formation was found 904036.3, 396439.0, and 404009.3 ten million, respectively. The value of GDP ranges from73170 to 3208519 ten million in the study period. Similarly, the minimum and maximum values were 9335 to1733867 and 13414 to 1956373 ten million for gross national saving and gross capital formation. The condition of GDP, gross capital formation, and gross national saving is presented in Fig. 1.

4.2 Descriptive Statistics

The descriptive statistics show the statistical characteristics of the variables used in the study. The Table 1 shows the descriptive statistics of GDP, gross national saving, and gross capital formation after converting natural logarithms over the sampled period.
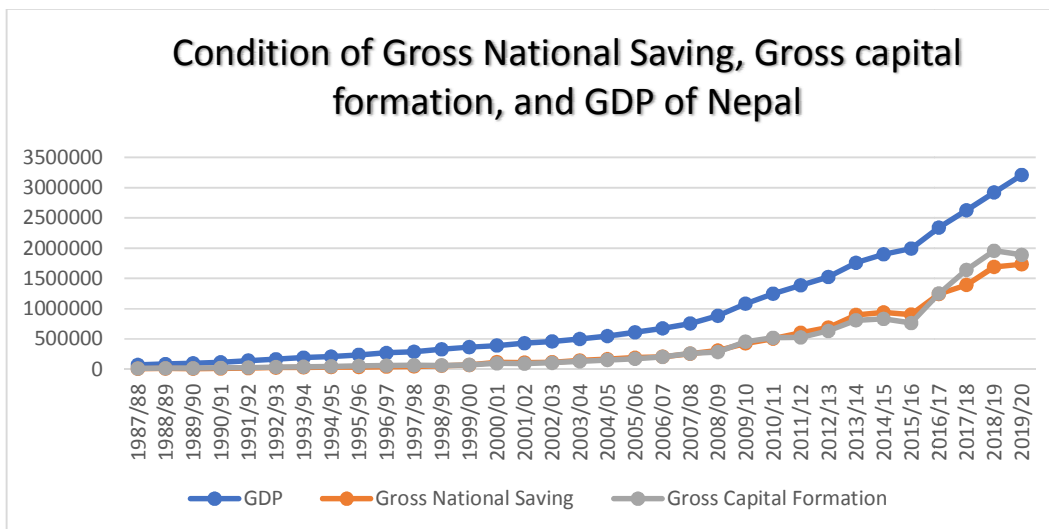

Fig. 1. Condition of gross national saving, gross capital formation, and GDP
Data source: Economic Surveys of Nepal 2004/05. 2007/8 and 2019/20 (GoN, [24,25,26])

Table 1. Descriptive statistics

Descriptions	LnGDP	LnGNS	LnGCF
Mean	13.18838	11.87499	11.96696
Median	13.12376	11.89320	11.78805
Maximum	14.98132	14.36586	14.48660
Minimum	11.20054	9.141526	9.504054
Std. Dev.	1.100130	1.614003	1.474818
Skewness	-0.050456	-0.070773	0.130609
Kurtosis	1.936491	1.830265	1.907188
Jarque-Bera	1.569197	1.908933	1.735901
Probability	0.456303	0.385017	0.419811
Sum	435.2166	391.8748	394.9098
Sum Sq. Dev.	38.72918	83.36016	69.60280
Observations	33	33	33

Source: Author's calculation by using EViews 10

The descriptive statistics show an average log GDP is 13.18, gross national saving 11.87, and gross capital formation 11.96. the standard deviation of GDP is smaller than others, So the average GDP is more representative than the average of gross capital formation and gross national saving. The distribution of GDP and gross national saving is negatively skewed, whereas gross capital formation is positively skewed. The value of all variables' kurtosis is less than three, so all distribution of all variables has platykurtic distribution.

4.3 Autoregressive Distributive Lag (ARDL) Model

4.3.1 Unit root testing

The unit root testing is carried out to determine the order of integration of the series. The Augmented Dickey-Fuller (ADF) test is the common method for unit root testing. All the variables are non-stationary in their level form

and stationery in their first difference at a 5 percent level of significance. All variables are stationary in their first difference I(1), So we can run the ARDL model [23]. The outcomes of the ADF test are listed in Table 2.

4.3.2 Lag selection

Lag length helps to identify the affecting period of one variable to another variable or itself. To run the ARDL model, the arbitrary and same number of lags for all variables are used in the equation. The outcomes may be different depending on the choice of lag length. The Akaike Information Criteria (AIC) and Schwarz's Information Criteria (SIC) are used to select the optimal lag length. The outcomes of AIC and SIC values in different lags are presented in Table 3.

According to the outcomes of AIC and SIC criteria, the optimum lag is 1 because the AIC and SIC values are minimum. Recall that the lower the AIC or SIC value better the model.

Table 2. Outcomes of ADF test

Variables	Descriptions	Level		First Difference	
		Intercept	Intercept and trend	Intercept	Intercept and trend
LnGDP	P-value	0.719	0.262	0.007	0.026
	t- stat.	-2.960	-3.563	-2.960	-3.563
	ADF test	-1.059	-2.652	-3.786	-3.870
LnGNS	P-value	0.808	0.098	0.000	0.000
	t- stat.	-2.957	-3.558	-2.960	-6.136
	ADF test	-0.789	-3.219	-6.206	-6.136
LnGCF	P-value	0.808	0.098	0.000	0.000
	t- stat.	-2.957	-3.558	-2.960	-3.563
	ADF test	-0.789	-3.219	-6.206	-6.136

Source: Author's Calculation by using EViews 10
LnGDP= Gross domestic product after taking the log
LnGNS= Gross national saving after taking the log
LnGCF= Gross capital formation after taking the log

Table 3. Outcomes of selecting lag order

Criteria	Selection of lag order		
	Lag 1	Lag 2	Lag 3
AIC	-3.482	-3.404	-3.320
SIC	-3.158	-2.937	-2.610

Source: Author's Calculation by using EViews 10

Table 4 shows the selected ARDL optimal model used with the maximum lag selection the maximum lags of dependent and dynamic regressors was ARDL (1,1,1). The selected model is presented in the following table.

According to Table 4, the R square is 0.9994 or 99.94% which is more than 60%. So, independent variables are nicely fitted. The probability of F statistics is less than 5%. So, the independent variables have a combined effect on the dependent variables. It means gross national saving, gross capital formation, and lag GDP have combined effect to promote economic growth or increase Nepal's GDP. The coefficients LnGDP(-1) and LnGCF are indecently significant to explain the dependent variable. We can run the bound test to check the long-run or short-run association ship between the variables from this model.

4.3.3 ARDL bound testing

In the ARDL Model, the long run or short run association ship is determined by the bound testing approach. When F-stat's value is more than the upper bound I(1), then there is a long-run relationship between variables. When the F-stat is less than the lower bound I(0) value, there is no long-run relationship between variables. They have only a short-run relationship. The outcomes of bound testing are presented in Table 5.

The F- statistics exceeds the upper bound value. We can reject the null hypothesis of no cointegration between dependent variables and regressors. It means there is a long-run relationship between variables. There is a long-run relationship between GDP and gross national saving and gross capital formation in Nepal. They moved together. From the bound test, it is found that variables are cointegrated. So, we have to follow both short-run ARDL and long-run Error Correction Model (ECM).

According to Table 6, the estimated coefficients show how different independent variables like gross capital formation and gross national saving

Table 4. ARDL optimal model

Dependent Variable: LnGDP
Method: ARDL
Sample (adjusted): 2 33
Included observations: 32 after adjustments
Dependent lags: 1 (Fixed)
Dynamic regressors (1 lag, fixed): LnGNS LnGCF
Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LnGDP(-1)	0.766742	0.086250	8.889764	0.0000
LnGNS	0.034724	0.062565	0.555016	0.5836
LnGNS(-1)	-0.014191	0.057318	-0.247578	0.8064
LnGCF	0.168400	0.055507	3.033865	0.0054
LnGCF(-1)	-0.023809	0.062961	-0.378153	0.7084
C	1.188340	0.417530	2.846121	0.0085
R-squared	0.999456	Mean dependent var		13.25050
Adjusted R-squared	0.999351	S.D. dependent var		1.057297
S.E. of regression	0.026928	Akaike info criterion		-4.223969
Sum squared residual	0.018852	Schwarz criterion		-3.949143
Log-likelihood	73.58350	Hannan-Quinn criteria.		-4.132872
F-statistic	9553.310	Durbin-Watson stat		2.187464
Prob(F-statistic)	0.000000			

Source: Author's Calculation by using EViews 10

Table 5. ARDL bound testing for a short-run or long-run relationship

H0: No cointegration	Value	5% critical bounds		1% critical bounds	
		I(0)	I(1)	I(0)	I(1)
Computed value of F- statistics	41.06	3.10	3.87	4.13	5.00

Source: Author's calculation by using EViews 10

Table 6. Long run ARDL model

Dependent Variable: LnGDP
Method: Least Squares
Sample: 1 33
Included observations: 33

Variable	Coefficient	Std. error	t-statistic	Prob.
C	4.800845	0.130210	36.86999	0.0000
LnGCF	0.267297	0.080242	3.331158	0.0023
LnGNS	0.436952	0.073322	5.959360	0.0000
R-squared	0.996359	Akaike info criterion		-2.435667
Adjusted R-squared	0.996116	Schwarz criterion		-2.299621
F-statistic	4104.544	Hannan-Quinn criteria.		-2.389891
Prob(F-statistic)	0.000000	Durbin-Watson stat		1.305698

Source: Authors Calculation by using EViews 10

respond to Nepal's GDP. The gross capital formation and gross national saving both are significant to explain GDP at 0.267 percent. It indicates that a one percent increase in the gross capital formation increases in GDP by 0.267 percent. Similarly, a one percent increase in gross national savings increases the growth of GDP by 0.437 percent. The value of R square is 0.9964 or 99.64% which is greater than 60%. Therefore, independent variables are nicely fitted. The probability of F- statistics is 00, which is less than 0.05. So, independent variables have the joint effect of promoting economic growth or

increase the GDP of Nepal. The long-run equation is estimated as:

$$D(GDP)= 4.801 + 0.267LnGCF + 0.437LnGNS \qquad (10)$$

According to Table 7, the error correction term is negative and significant. The coefficient of ECT shows the speed of adjustment. The short-run coefficient is getting adjusted towards long-run equilibrium at a speed of 51.64%. The short-run dynamic impact of coefficients is different from the long run counterparts. The one lagged values

Table 7. Estimation of short-run dynamic ecm model

Dependent Variable: D(LnGDP)
Method: Least Squares
Sample (adjusted): 3 33
Included observations: 31 after adjustments

Variable	Coefficient	Std. error	t-statistic	Prob.
C	0.049976	0.030645	1.630808	0.1150
D(LnGDP(-1))	0.625207	0.305904	2.043801	0.0512
D(LnGCF(-1))	-0.010443	0.087026	-0.119999	0.9054
D(LnGNS(-1))	-0.034245	0.073712	-0.464576	0.6461
ECT(-1)	-0.516422	0.411094	-1.256214	0.0202
R-squared	0.182148	Akaike info criterion		-3.582265
Adjusted R-squared	0.056324	Schwarz criterion		-3.350977
F-statistic	1.447645	Hannan-Quinn criteria		-3.506871
Prob(F-statistic)	0.246681	Durbin-Watson stat		2.032079

Serial correlation (p-value is 0.4011), Heteroskedasticity (p- Value 0.7303)
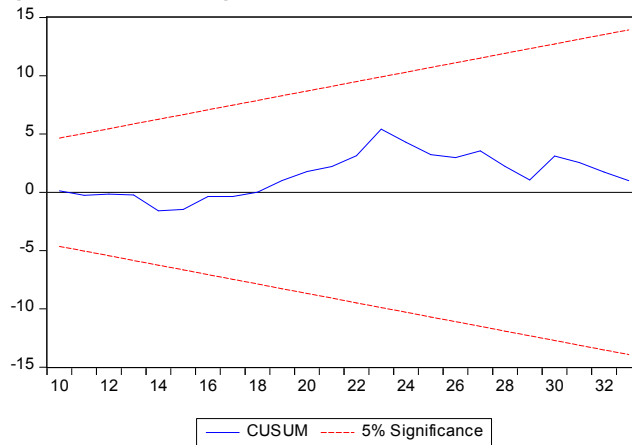*Source: Author's calculation by using EViews 10*

(CUSUM test)

Fig. 2. CUSUM test
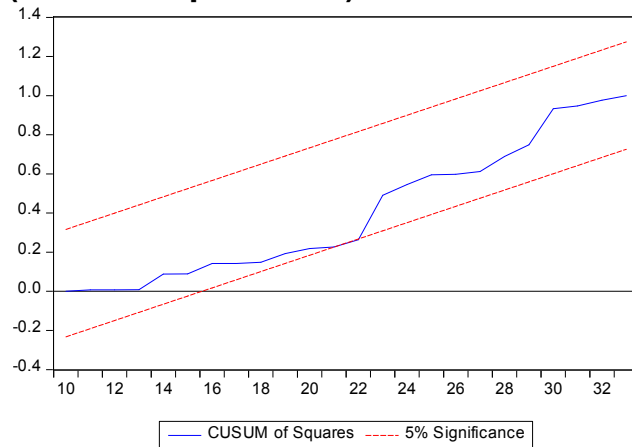
(CUSUM square test)

Fig. 3. CUSUM SQUARE test

of gross capital formation and gross national saving hurt GDP of Nepal. But one lagged value of GDP has a positive impact on GDP in the short run. There is an autoregressive effect on GDP in the short-run but no distributive effect on GDP in the short run.

The diagnostic test of the error correction model has multi-dimensional results. The value of R square is 0.1822 or 18.22% which is below 60%. It indicates the absence of goodness of fit of the independent variables to explain the dependent variable in the short run. There is no problem with serial correlation because the probability of observed chi-square is 0.4011, which is more than 0.05. there is no problem with heteroskedasticity because the p-value is 0.7303

at a 5% level of significance. This model's stability test is made by using the CUSUM and CUSUM Square test of recursive residuals. The CUSUM and CUSUM square test indicates the stability of the model because the blue line is in between two red boundary lines.

5. CONCLUSION, POLICY IMPLICATION AND LIMITATIONS

The gross domestic product is determined by gross domestic product and gross national savings. There was a long-run association between GDP and its affecting factors, i.e. gross capital formation and gross national saving. The gross capital formation and gross national saving have a combined effect onof, increasing the GDP

of Nepal. In the long-run GDP, gross capital formation, and gross national saving moved together. Gross capital formation and gross national saving have a positive impact on Nepal's GDP. But in the short-run capital formation and saving hurt GDP.

National saving and capital formation have a positive impact on the GDP of Nepal. The ability to save people must be increased. It is necessary to invest the saved amount in the productive sector. An increase in saving leads to an increase in capital formation and ultimately improve the GDP. The impact of capital formation to stimulate GDP is not satisfactory. There is a positive impact but only 26.72% of the total change in capital formation. The result clearly shows the weakness of the economy in mobilizing saving into the productive sector.

This study is based on the secondary data of 33 years, considering only three variables like GDP, gross capital formation, and gross national saving. The relation and impact of dependent and independent variables are measured. So many variables and techniques are untouched. The association ship and causality are examined by the ARDL approach with the help of EViews 10. Therefore, further research is needed to use other variables, tools, and data processing software.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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